IFA-Proficiency Testing Scheme for Water Analysis

Round M163
Metals

Sample Dispatch: 5 September 2022

In accordance with the procedure: AVKPS.02

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Round: M163	Date / Signature:	05.10.2022

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109 pages

This report summarises the results of round M163 (trace metals) within the IFA-Proficiency Testing Scheme for Water Analysis. The samples M163A and M163B were distributed to 30 participants on Monday, 5 September 2022. Each participant received two samples of 250 mL filled into LDPE bottles.

Closing date for reporting results to the IFA-Tulln was Friday, 30 September 2022. All participants submitted results. To make the participants anonymous, each laboratory obtained a letter code by random.

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. The following ultrapure salts were used: $CaCO_3$, $Mg(NO_3)_2$, NaCl, KCl, besides ultrapure H_2SO_4 and HCl. By this, the matrix of the samples consisted of about 45.8 mg/L Ca, 19.4 mg/L Mg, 9.0 mg/L Na, 1.19 mg/L K, 19.3 mg/L SO_4^{2-} and 15.6 mg/L Cl^-. Ultrapure HNO_3 (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.

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 M163A and M163B were analysed for all investigated parameters prior to shipment to the participants. The results are listed in the results tables and the parameter oriented part of the report ("IFA result").

Stability tests will be carried out together with the accuracy tests of the following round (M164).

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 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 %).

The recoveries of the target concentrations, calculated from outlier-corrected data mean values ranged between 87.7 % (Hg in sample M163A) and 106.8 % (Se in sample M163B).

The between laboratory CVs covered the ranged between 1.8 % (Cr in sample M163B) and 16.4 % (Al in sample M163B).

All confidence intervals of the outlier-corrected laboratory mean values except that for Hg in sample M163A (87.7 % ± 8.2 %) encompass the corresponding target values with their uncertainties. For all other parameters, no difference could be detected between target concentrations and outlier corrected laboratory mean values statistically.

z-scores

The most common approach to calculate a z-score is given by

$$z = \frac{x_i - X}{\sigma_{pt}}$$

z	z-score
x_i	result of laboratory
X	target value or mean value („consensus value“)
σ_{pt}	standard deviation for proficiency assessment

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 have been organised by the IFA-Tulln from 2011 to 2021. They represent average performance data of all former participating laboratories.

This approach was chosen, because standard deviations of the outlier-corrected measurements substantially vary between individual proficiency test rounds. Averaging standard deviations from proficiency testing rounds of several years can provide standard deviations for proficiency assessment on a broad data basis. It is therefore more suitable than a standard deviation taken directly from the interlaboratory comparison (EN ISO/IEC 17043:2010, B.3.1.3). Another advantage of previously determined standard deviations is that the participants can foresee which z-scores can be expected by their routine analysis methods before participation.

<u>Calculation example:</u>

A laboratory found 73.7 µg/L for the parameter Aluminium (recovery of 102 %). The target value for Aluminium was 72.3 µg/L (100 %). The relative standard deviation for proficiency assessment is given in the table below (as well as in the annual program www.ifatest.eu) by 7.8 %, which is 5.6 µg/L Al, when based on the target value.

$$z = \frac{x_i - X}{\sigma_{pt}} = \frac{73.7\ \mu g/L - 72.3\ \mu g/L}{5.6\ \mu g/L} \approx 0.25 \quad \textbf{or} \quad \frac{102\% - 100\%}{7.8\%} \approx 0.25$$

z	z-score	
x_i	73.7 µg/L	equivalent to 102 % (result of the laboratory)
X	72.3 µg/L	equivalent to 100 % (target value)
σ_{pt}	5.6 µg/L	equivalent to 7.8 % (standard deviation for proficiency assessment see table below)

In the case of recalculation, deviations in the last digits may occur due to the fact that rounded values are given in the report for clarity.

The following table lists the standard deviations for proficiency assessment and their limits of applicability. Z-scores were only calculated, if the target values were higher than these limits.

Thus, no z-scores were calculated for Al in sample M163B.

Parameter	standard deviation for proficiency assessment	Lower limit
Aluminium	7.8 %	8 µg/L
Arsenic	7.4 %	0.5 µg/L
Cadmium	5.6 %	0.1 µg/L
Chromium	6.3 %	0.5 µg/L
Copper	7.8 %	1.0 µg/L
Iron	6.6 %	10 µg/L
Lead	6.8 %	0.3 µg/L
Manganese	5.4 %	2.0 µg/L
Mercury	11 %	0.2 µg/L
Nickel	7.5 %	0.9 µg/L
Selenium	10 %	0.3 µg/L
Uranium	5.6 %	0.35 µg/L
Zinc	7.4 %	3 µg/L

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

|z-Score|	Classification
≤2	satisfactory
2<|z|<3	questionable
≥3	unsatisfactory

The z-scores are listed in the parameter-oriented evaluation in the tables next to the recoveries. Additionally, each laboratory receives a sheet on which the obtained z-scores are summarized and graphically presented. The standard deviations for proficiency assessment are given in concentration units there.

An overview table of all z-scores can be found after the result tables in the parameter-oriented part.

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, or the measured value was given as “0” when the substance was added.
- “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, 5 October 2022

EXPLANATION

Sample M106A

Parameter Copper

Target value ± U (k=2)	4,79 µg/l	±	0,13 µg/l	*Obtained from sample preperation, U=uncertainty*
IFA result ± U (k=2)	4,79 µg/l	±	0,38 µg/l	*Determined at IFA prior to shipment of samples*
Stability test ± U (k=2)	4,69 µg/l	±	0,38 µg/l	*Determined at IFA 3 weeks after sample dispatch*

Lab Code	Result	±	Unit	Recovery	z-Score
A	5,16	0,4128	µg/l	108%	0,90
B	4,22	0,42	µg/l	88%	-1,38
C	4,45	0,13	µg/l	93%	-0,83
D			µg/l		
E			µg/l		
F	4,10	0,08	µg/l	86%	-1,68
G			µg/l		
H			µg/l		
I	4,75	0,74	µg/l	99%	-0,10
J	<5		µg/l	•	
K	4,76		µg/l	99%	-0,07
L	<10		µg/l	•	
M	4,8	0,5	µg/l	100%	0,02
N	3,7	0,4	µg/l	77%	-2,65
O	4,47	0,447	µg/l	93%	-0,78
P	6,0		µg/l	125%	2,94
Q	4,17	0,2	µg/l	87%	-1,51
R	4,6	0,8	µg/l	96%	-0,46
S	4,44	0,67	µg/l	93%	-0,85
T			µg/l		
U	4,675	0,935	µg/l	98%	-0,28
V	5,0	0,50	µg/l	104%	0,51
W	3,54	0,3	µg/l	74%	-3,03
X	7,108 *	0,749	µg/l	148%	5,63
Y	<10		µg/l	•	
Z			µg/l		
AA	<3,0		µg/l	FN	
AB	3,775	0,107	µg/l	79%	-2,46
AC	<10,0		µg/l	•	

Recovery of target value in percent

z-Score of the laboratory

An asterik 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 ± CI(99%)	4,65 ± 0,57	4,51 ± 0,42	µg/l
Recov. ± CI(99%)	97,1 ± 12,0	94,1 ± 8,8	%
SD between labs	0,84	0,59	µg/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

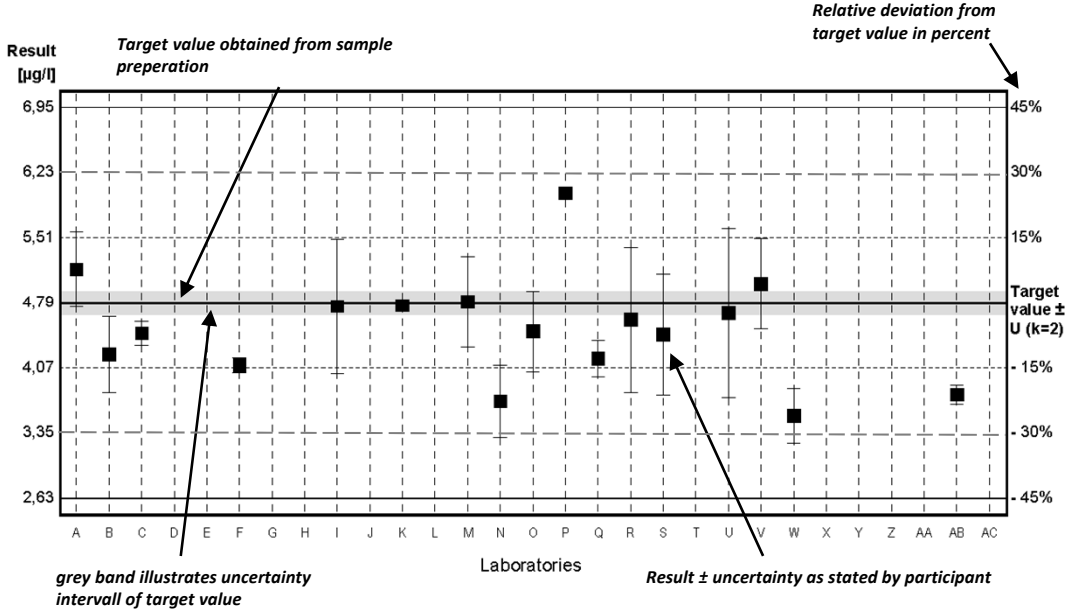


Diagram 1: Measurement results and their uncertainties

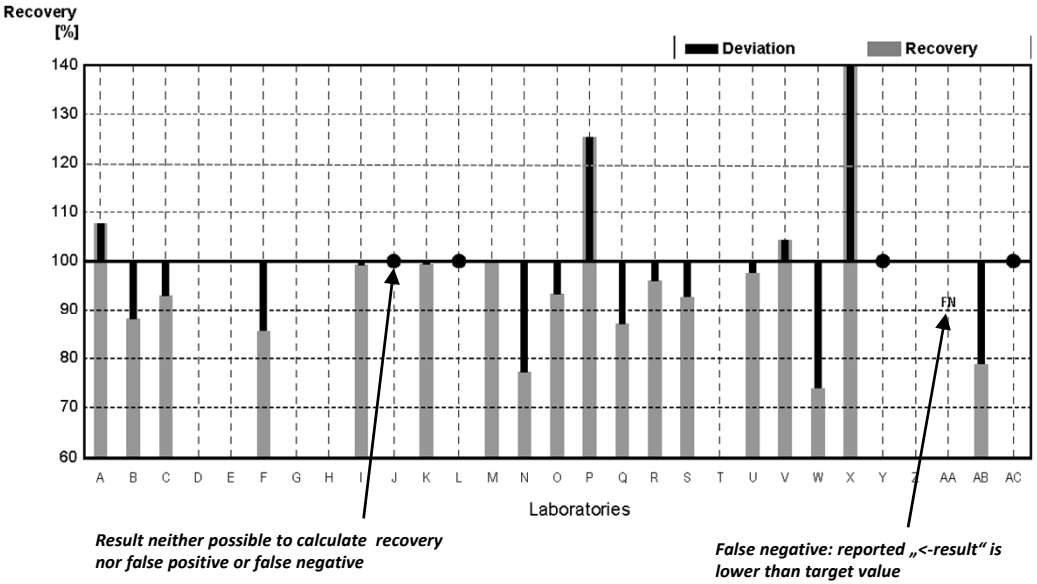


Diagram 2: Recoveries and deviations from target values

Illustration of Results
Tables and Parameter Oriented Part

Round M163
Metals

Sample Dispatch: 5 September 2022

Results Sample M163A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
Target value	20.3	1.056	3.14	2.017	4.54	29.1	1.10
IFA result	20.5	1.06	2.97	1.98	4.60	28.9	1.14
A	19.7	1.07	2.97	1.99	4.41	28.3	1.04
B						29.7	
C			3.26				
D	16.6	1.10	2.99	2.02	4.48	29.2	1.02
E	21.3					26.7	<10
F	22.5	1.10	3.00	2.15	4.85	30.0	1.15
G	20.5	<1.5	2.98	1.97	<5	27.1	<5
H	16.6	1.47	2.43	2.56	4.29	31.7	0.97
I				1.862	4.522		
J	19.2	1.06	2.82	2.01	4.36	28.4	1.05
K	21.4	0.991	3.168	1.949	4.456	29.4	1.040
L	22.6	1.09	2.83	1.94	5.03	31.6	1.03
M	30.0	1.17	3.15	2.03	4.41	32.5	1.17
N	20.22	1.091	2.832	2.022	4.363	28.36	0.918
O	21.5	1.09	2.99	2.01	4.51	28.8	<1
P	20.6	1.03	3.17	1.99	4.44	27.4	1.10
Q	22.0	1.10	3.60	2.03	4.50	29.0	1.10
R	19.5	1.10	2.64	1.90	4.01	25.2	0.81
S	20.5					33.0	5.5
T	22.3	1.06	2.98	1.94	4.50	27.7	1.03
U	21.1	1.24	3.20	2.13	4.66	29.6	1.04
V	20.948	0.979	3.247	2.094	4.717	29.477	1.176
W	17.7	<1	2.98	1.92	4.54	26.1	1.11
X	22.5	1.17	2.92	2.02	4.78	31.5	1.07
Y	20.2	0.77	2.89	1.90	4.52	28.4	1.26
Z						30.9	3.25
AA	22.2	<2.13	2.58	1.96	4.21	27.6	0.54
AB	21.817	<5	<2	1.773	4.487	23.133	1.303
AC	25.0	1.02	3.69	2.01	4.51	28.7	2.24
AD	<200		<5		<4	13.5	<250

All data in µg/L

Measurement Uncertainties Sample M163A

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
Target value	0.3	0.010	0.03	0.016	0.04	0.2	0.07
IFA result	1.1	0.11	0.08	0.12	0.15	2.3	0.11
A	2.2	0.060	0.31	0.093	0.62	3.1	0.057
B						2.9	
C			0.156				
D							
E	3.6					4.8	
F	3.38	0.22	0.60	0.32	0.73	4.50	0.17
G	0.6		0.06	0.1		2.1	
H	1.7	0.15	0.25	0.26	0.43	3.2	0.10
I				0.279	1.357		
J	1.92	0.159	0.282	0.201	0.436	2.84	0.105
K	2.1	0.1	0.32	0.2	0.45	2.9	0.1
L	4.5	0.50	0.57	0.39	1.01	6.3	0.50
M	1.1	0.061	0.095	0.051	0.12	0.61	0.035
N	4.65	0.295	0.283	0.445	0.393	3.69	0.165
O	3.2	0.22	0.36	0.26	0.71	3.2	
P	3.09	0.206	0.634	0.398	0.666	2.93	0.22
Q	2.20	0.132	0.288	0.162	0.540	7.54	0.088
R	2	0.5	0.5	0.5	0.5	3	0.3
S	4					4	5
T	2.2	0.11	0.30	0.19	0.44	3.9	0.09
U	2.2	0.19	0.48	0.32	0.70	4.4	0.16
V	4.190	0.196	0.649	0.419	0.943	5.895	0.235
W	0.902		0.0665	0.109	0.163	1.12	0.122
X	2	0.1	0.1	0.1	0.1	2	0.1
Y	15.0	1.44	1.35	0.410	7.3	25.7	6.9
Z						0.2	0.02
AA	0.3	1.69	0.42	0.09	0.34	0.2	0.14
AB	3.508			0.0702	0.3002	1.026	0.0462
AC	2.10	0.054	0.533	0.086	0.169	1.12	0.150
AD						1.34	

All data in µg/L

Results Sample M163A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
Target value	38.5	1.10	0.417	1.92	4.61	17.8
IFA result	39.7	1.10	0.450	2.21	4.30	19.3
A	36.0	1.06	0.392	1.88	4.39	16.1
B						
C						
D	38.8	1.06	0.287	1.86	4.39	16.4
E	36.4					
F	40.2	1.10	0.324	2.00	4.40	18.3
G	38.0	1.41	0.350	1.905	4.53	16.8
H	35.9	1.22	<0.5	2.93	4.37	19.5
I						
J	36.4	1.01	0.400	1.83	4.49	16.0
K	37.9	1.062	0.377	1.792	4.513	17.1
L	36.0	1.18	0.214	1.84		25.9
M	39.1	1.08	0.493	2.10	4.32	17.0
N	38.30	0.989	0.394	2.073	4.285	14.66
O	37.9	1.03	0.358	2.08	4.51	17.7
P	36.7	1.13	0.415	1.80	4.32	18.3
Q	39.0	1.10	0.384	2.10	4.68	17.0
R	34.0	1.58	0.69	2.18	4.85	16.8
S	40.25					28.5
T	37.4	1.08	0.342	1.97	4.47	16.9
U	40.7	1.06	0.421	2.10	4.89	18.0
V	40.083	1.419	0.324	1.758	4.693	18.780
W	36.8	1.10	0.375	1.72	4.39	18.8
X	40.0	1.12	0.350	1.99	4.14	16.0
Y	37.9	1.03	0.277	2.18	3.46	17.6
Z						
AA	36.3	0.95	<0.468	<2.47		15.4
AB	350.3	1.207	0.299			16.83
AC	38.5	1.16	0.385	1.84	4.78	49.1
AD	36.1	8.57				

All data in µg/L

Measurement Uncertainties Sample M163A

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
Target value	0.2	0.09	0.012	0.02	0.04	1.3
IFA result	2.7	0.10	0.085	0.26	0.48	2.4
A	2.0	0.081	0.061	0.23	0.47	1.0
B						
C						
D						
E	6.6					
F	6.03	0.17	0.081	0.50	0.66	3.66
G	1.2	0.2	0.009	0.05	0.19	1.4
H	3.6	0.13	0.05	0.30	0.44	2.0
I						
J	3.64	0.101	0.0400	0.275	0.449	1.6
K	3.8	0.11	0.04	0.18	0.45	1.7
L	7.2	0.50	0.032	0.37		5.2
M	0.64	0.029	0.042	0.044	0.081	0.25
N	5.36	0.099	0.099	0.332	0.471	2.64
O	3.8	0.31	0.050	0.31	0.45	2.4
P	2.39	0.226	0.104	0.245	0.648	2.75
Q	3.90	0.110	0.058	0.315	0.234	1.70
R	3	0.5	0.2	0.2	0.2	0.55
S	2					10
T	3.7	0.10	0.101	0.14	0.36	1.4
U	6.1	0.16	0.063	0.31	0.73	2.7
V	8.017	0.284	0.065	0.352	0.939	3.756
W	0.745	0.184	0.0132	0.109	0.0751	0.381
X	2	0.2	0.01	0.2	0.05	0.5
Y	6.8	3.51	0.188	1.32	1.51	6.9
Z						
AA	0.7	0.11	0.249	1.32		0.3
AB	5.033	0.182	0.0408			0.643
AC	1.04	0.032	0.0095	0.160	0.208	2.81
AD	3.79	0.866				

All data in µg/L

Results Sample M163B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
Target value	7.3	1.537	1.741	0.695	2.36	56.0	2.72
IFA result	7.6	1.50	1.65	0.70	2.40	55	2.80
A	<10.0	1.54	1.65	0.674	2.27	53.7	2.59
B						55.7	
C			1.97				
D	5.36	1.57	1.66	0.67	2.32	57.1	2.49
E	<10					53	<10
F	8.1	1.65	1.60	0.75	2.50	39.5	2.75
G	<10	1.68	1.67	0.685	<5	54.3	<5
H	5.19	2.19	1.34	0.87	2.27	54.1	2.43
I				0.636	2.550		
J	6.82	1.54	1.55	0.66	2.29	55.8	2.44
K	7.77	1.437	1.768	0.668	2.292	55.7	2.615
L	8.91	1.74	1.56	0.698	2.94	54.6	2.84
M	16.8	1.67	1.80	0.699	2.33	58.0	2.58
N	6.07	1.552	1.531	0.693	2.248	54.50	2.327
O	8.9	1.58	1.67	0.68	2.33	54.3	2.25
P	<10	1.46	1.78	0.74	2.30	55.2	2.81
Q	10.0	1.60	2.20	0.700	2.30	57.0	2.60
R	3.61	1.58	0.93	0.390	2.04	39.8	2.00
S	8.25					56.75	6.0
T	7.8	1.55	1.65	0.67	2.34	54.6	2.53
U	8.12	1.79	1.77	0.724	2.59	58.1	2.59
V	7.993	1.501	1.779	0.739	2.499	56.547	2.752
W	<10	1.37	1.65	0.673	2.48	52.7	2.66
X	8.2	1.75	1.62	0.69	2.43	60.5	2.65
Y	6.9	1.30	1.73	0.54	2.30	55	2.86
Z						48.8	41.2
AA	9.0	<0.62	1.54	0.62	2.30	53	1.64
AB	7.970	<5	<2	0.575	2.100	45.167	2.453
AC	7.21	1.50	1.75	0.688	2.29	53.7	2.52
AD	<200		<5		<4	39.1	<250

All data in µg/L

Measurement Uncertainties Sample M163B

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
Target value	0.3	0.013	0.017	0.007	0.02	0.3	0.07
IFA result	0.4	0.16	0.05	0.04	0.09	4	0.17
A		0.086	0.17	0.054	0.32	6.0	0.14
B						5.3	
C			0.0945				
D							
E						9	
F	1.22	0.33	0.32	0.11	0.38	5.93	0.41
G		0.18	0.07	0.022		1.77	
H	0.52	0.22	0.14	0.09	0.23	5.5	0.25
I				0.095	0.765		
J	0.682	0.231	0.155	0.066	0.229	5.58	0.244
K	0.78	0.14	0.18	0.07	0.23	5.6	0.26
L	1.78	0.50	0.50	0.140	0.59	10.9	0.57
M	0.51	0.066	0.050	0.025	0.061	1.2	0.044
N	1.40	0.419	0.153	0.152	0.202	7.09	0.419
O	1.7	0.28	0.20	0.09	0.41	5.6	0.34
P		0.292	0.356	0.188	0.345	5.91	0.562
Q	1.00	0.192	0.176	0.056	0.276	14.8	0.208
R	0.5	0.6	0.3	0.3	0.3	5	0.8
S	4					4	5
T	0.8	0.16	0.17	0.07	0.23	7.6	0.25
U	1.22	0.27	0.27	0.11	0.39	8.7	0.39
V	1.599	0.300	0.356	0.148	0.500	11.309	0.550
W		0.106	0.0713	0.0160	0.175	1.03	0.0320
X	1	0.1	0.1	0.02	0.1	2	0.1
Y	15.0	1.44	1.35	0.410	7.3	25.7	6.9
Z						0.2	0.02
AA	0.1	0.15	0.18	0.13	0.03	1.2	0.26
AB	1.047			0.0546	0.216	4.365	0.401
AC	1.237	0.090	0.062	0.0402	0.083	2.39	0.121
AD						3.871	

All data in µg/L

Results Sample M163B

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
Target value	9.58	2.17	1.766	0.754	1.634	21.9
IFA result	9.7	2.20	1.83	0.80	1.46	23.0
A	9.00	2.08	1.64	<1.0	1.55	19.9
B						
C						
D	9.54	2.09	1.33	0.70	1.59	19.7
E	<10					
F	10.1	2.20	1.45	0.80	1.50	22.4
G	9.44	2.07	1.66	<1	<2	20.6
H	8.80	2.11	1.52	1.08	1.54	24.0
I						
J	9.2	2.07	1.57	<1.0	1.56	20.2
K	9.48	2.135	1.648	0.708	1.600	20.6
L	12.1	2.45	1.39	<1		27.5
M	9.39	2.15	1.50	0.756	1.56	20.7
N	8.79	2.115	1.640	0.795	1.466	21.05
O	9.4	2.08	2.04	<2	1.61	21.3
P	9.15	2.18	1.84	<1.0	1.61	21.3
Q	10.0	2.10	1.80	0.800	1.66	21.0
R	8.34	2.49	2.08	0.87	1.72	20.3
S	10.0					34.5
T	9.37	2.12	1.61	0.78	1.58	20.9
U	10.2	2.27	1.86	0.98	1.72	22.55
V	10.109	2.549	1.539	<1.250	1.649	22.865
W	<10	2.12	1.68	<1	1.56	21.9
X	10.0	2.20	1.53	0.73	1.45	20.5
Y	9.4	2.07	1.39	1.29	2.30	21.6
Z						
AA	8.9	1.86	<1.79	<0.73		19.5
AB	86.00	2.297	4.045			21.367
AC	9.53	2.15	1.67	0.660	1.67	21.4
AD	8.18	9.51				

All data in µg/L

Measurement Uncertainties Sample M163B

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
Target value	0.11	0.09	0.018	0.017	0.015	1.3
IFA result	0.7	0.13	0.34	0.10	0.16	2.8
A	0.49	0.16	0.25		0.16	1.2
B						
C						
D						
E						
F	1.52	0.33	0.36	0.20	0.23	4.48
G	0.31	0.17	0.02			1.50
H	0.88	0.22	0.16	0.11	0.16	2.4
I						
J	0.92	0.207	0.157		0.156	2.02
K	0.95	0.21	0.17	0.071	0.16	2.1
L	2.4	0.50	0.21			5.5
M	0.22	0.10	0.12	0.032	0.036	0.29
N	1.23	0.211	0.410	0.127	0.161	3.79
O	1.2	0.44	0.29		0.16	2.8
P	0.595	0.436	0.368		0.242	3.20
Q	1.00	0.210	0.271	0.120	0.083	2.10
R	1	1	0.6	0.1	0.12	0.65
S	2					10
T	0.93	0.21	0.47	0.06	0.13	1.7
U	1.54	0.34	0.28	0.15	0.26	3.4
V	2.022	0.510	0.308		0.330	4.573
W		0.172	0.0127		0.0850	0.376
X	1	0.20	0.01	0.2	0.05	0.5
Y	6.8	3.51	0.188	1.32	1.51	6.9
Z						
AA	0.1	0.04	0.18	0.36		0.2
AB	1.039	0.405	0.322			0.306
AC	0.272	0.073	0.145	0.0803	0.045	1.51
AD	0.859	0.961				

All data in µg/L

z-Scores Sample M163A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A	-0.38	0.18	-0.80	-0.24	-0.45	-0.42	-0.70
B						0.31	
C			0.56				
D	-2.34	0.56	-0.70	0.03	-0.21	0.05	-0.93
E	0.63					-1.25	
F	1.39	0.56	-0.66	1.18	1.08	0.47	0.58
G	0.13		-0.75	-0.42		-1.04	
H	-2.34	5.30	-3.33	4.81	-0.87	1.35	-1.52
I				-1.37	-0.06		
J	-0.69	0.05	-1.50	-0.06	-0.63	-0.36	-0.58
K	0.69	-0.83	0.13	-0.60	-0.29	0.16	-0.70
L	1.45	0.44	-1.45	-0.68	1.71	1.30	-0.82
M	6.13	1.46	0.05	0.12	-0.45	1.77	0.82
N	-0.05	0.45	-1.44	0.04	-0.62	-0.39	-2.12
O	0.76	0.44	-0.70	-0.06	-0.10	-0.16	
P	0.19	-0.33	0.14	-0.24	-0.35	-0.89	0.00
Q	1.07	0.56	2.15	0.12	-0.14	-0.05	0.00
R	-0.51	0.56	-2.34	-1.04	-1.85	-2.03	-3.38
S	0.13					2.03	51.28
T	1.26	0.05	-0.75	-0.68	-0.14	-0.73	-0.82
U	0.51	2.35	0.28	1.00	0.42	0.26	-0.70
V	0.41	-0.99	0.50	0.68	0.62	0.20	0.89
W	-1.64		-0.75	-0.86	0.00	-1.56	0.12
X	1.39	1.46	-1.03	0.03	0.84	1.25	-0.35
Y	-0.06	-3.66	-1.17	-1.04	-0.07	-0.36	1.86
Z						0.94	25.06
AA	1.20		-2.62	-0.50	-1.15	-0.78	-6.53
AB	0.96			-2.16	-0.19	-3.11	2.37
AC	2.97	-0.46	2.58	-0.06	-0.10	-0.21	13.29
AD						-8.12	

z-Scores Sample M163A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A	-1.20	-0.48	-0.55	-0.21	-0.85	-1.29
B						
C						
D	0.14	-0.48	-2.83	-0.31	-0.85	-1.06
E	-1.01					
F	0.82	0.00	-2.03	0.42	-0.81	0.38
G	-0.24	3.76	-1.46	-0.08	-0.31	-0.76
H	-1.25	1.45		5.26	-0.93	1.29
I						
J	-1.01	-1.09	-0.37	-0.47	-0.46	-1.37
K	-0.29	-0.46	-0.87	-0.67	-0.38	-0.53
L	-1.20	0.97	-4.43	-0.42		6.15
M	0.29	-0.24	1.66	0.94	-1.12	-0.61
N	-0.10	-1.35	-0.50	0.80	-1.26	-2.38
O	-0.29	-0.85	-1.29	0.83	-0.39	-0.08
P	-0.87	0.36	-0.04	-0.62	-1.12	0.38
Q	0.24	0.00	-0.72	0.94	0.27	-0.61
R	-2.16	5.82	5.95	1.35	0.93	-0.76
S	0.84					8.12
T	-0.53	-0.24	-1.64	0.26	-0.54	-0.68
U	1.06	-0.48	0.09	0.94	1.08	0.15
V	0.76	3.87	-2.03	-0.84	0.32	0.74
W	-0.82	0.00	-0.92	-1.04	-0.85	0.76
X	0.72	0.24	-1.46	0.36	-1.82	-1.37
Y	-0.29	-0.85	-3.05	1.35	-4.45	-0.15
Z						
AA	-1.06	-1.82				-1.82
AB	149.98	1.30	-2.57			-0.74
AC	0.00	0.73	-0.70	-0.42	0.66	23.76
AD	-1.15	90.55				

z-Scores Sample M163B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A		0.03	-0.77	-0.54	-0.61	-0.62	-0.61
B						-0.08	
C			1.93				
D		0.29	-0.68	-0.64	-0.27	0.30	-1.08
E						-0.81	
F		0.99	-1.19	1.41	0.94	-4.46	0.14
G		1.26	-0.60	-0.26		-0.46	
H		5.74	-3.39	4.50	-0.61	-0.51	-1.37
I				-1.52	1.28		
J		0.03	-1.61	-0.90	-0.47	-0.05	-1.32
K		-0.88	0.23	-0.69	-0.46	-0.08	-0.49
L		1.78	-1.53	0.08	3.90	-0.38	0.57
M		1.17	0.50	0.10	-0.20	0.54	-0.66
N		0.13	-1.77	-0.05	-0.75	-0.41	-1.85
O		0.38	-0.60	-0.39	-0.20	-0.46	-2.22
P		-0.68	0.33	1.16	-0.40	-0.22	0.42
Q		0.55	3.88	0.13	-0.40	0.27	-0.57
R		0.38	-6.85	-7.84	-2.15	-4.38	-3.39
S						0.20	15.46
T		0.11	-0.77	-0.64	-0.13	-0.38	-0.90
U		2.22	0.24	0.75	1.55	0.57	-0.61
V		-0.32	0.32	1.13	0.93	0.15	0.15
W		-1.47	-0.77	-0.57	0.81	-0.89	-0.28
X		1.87	-1.02	-0.13	0.47	1.22	-0.33
Y		-2.08	-0.09	-3.98	-0.40	-0.27	0.66
Z						-1.95	181.37
AA			-1.70	-1.93	-0.40	-0.81	-5.09
AB				-3.08	-1.75	-2.93	-1.26
AC		-0.33	0.08	-0.18	-0.47	-0.62	-0.94
AD						-4.57	

z-Scores Sample M163B

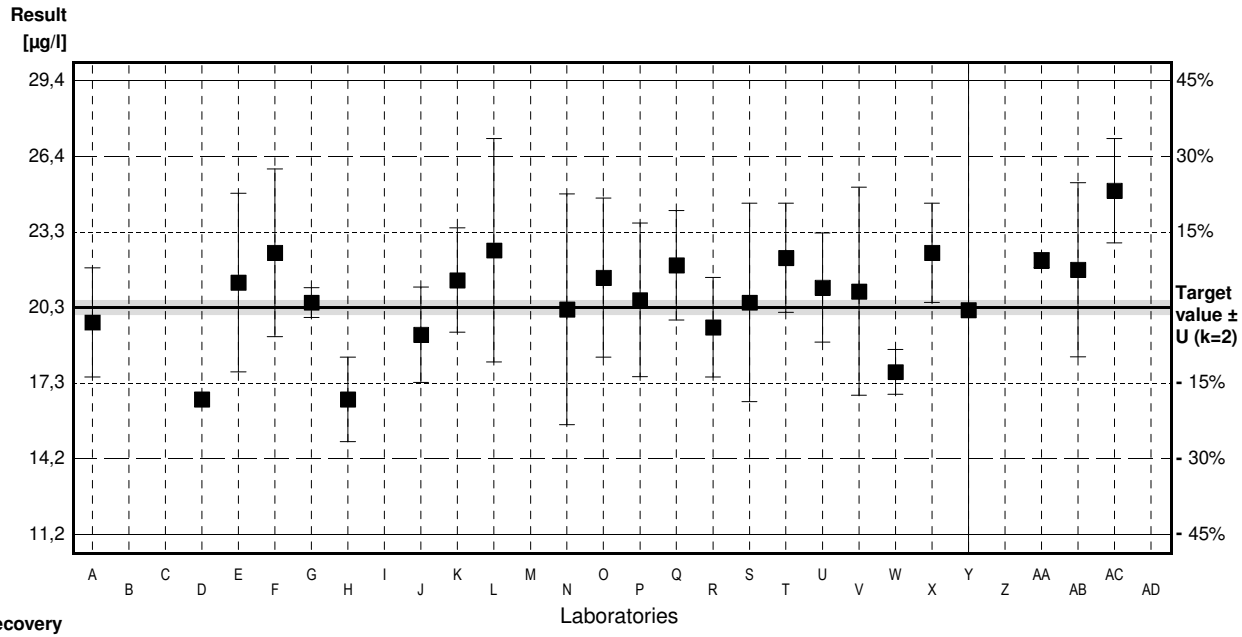
	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A	-1.12	-0.55	-0.65		-0.92	-1.23
B						
C						
D	-0.08	-0.49	-2.24	-0.72	-0.48	-1.36
E						
F	1.01	0.18	-1.63	0.61	-1.46	0.31
G	-0.27	-0.61	-0.55			-0.80
H	-1.51	-0.37	-1.27	4.32	-1.03	1.30
I						
J	-0.73	-0.61	-1.01		-0.81	-1.05
K	-0.19	-0.22	-0.61	-0.61	-0.37	-0.80
L	4.87	1.72	-1.94			3.46
M	-0.37	-0.12	-1.37	0.03	-0.81	-0.74
N	-1.53	-0.34	-0.65	0.54	-1.84	-0.52
O	-0.35	-0.55	1.41		-0.26	-0.37
P	-0.83	0.06	0.38		-0.26	-0.37
Q	0.81	-0.43	0.18	0.61	0.28	-0.56
R	-2.40	1.97	1.62	1.54	0.94	-0.99
S	0.81					7.77
T	-0.41	-0.31	-0.80	0.34	-0.59	-0.62
U	1.20	0.61	0.48	3.00	0.94	0.40
V	1.02	2.33	-1.17		0.16	0.60
W		-0.31	-0.44		-0.81	0.00
X	0.81	0.18	-1.21	-0.32	-2.01	-0.86
Y	-0.35	-0.61	-1.94	7.11	7.28	-0.19
Z						
AA	-1.31	-1.90				-1.48
AB	147.72	0.78	11.73			-0.33
AC	-0.10	-0.12	-0.49	-1.25	0.39	-0.31
AD	-2.71	45.10				

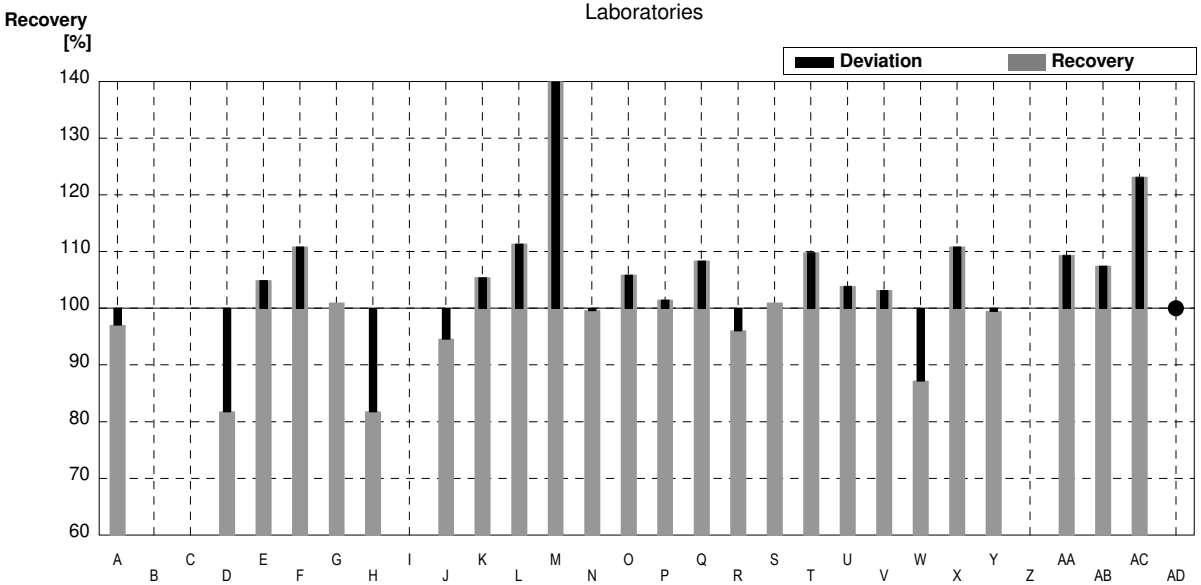
Sample M163A
Parameter Aluminium

Target value ± U (k=2)	20,3 µg/l	±	0,3 µg/l
IFA result ± U (k=2)	20,5 µg/l	±	1,1 µg/l
Stability test	µg/l		

Lab Code	Result	±	Unit	Recovery	z-Score
A	19,7	2,2	µg/l	97%	-0,38
B			µg/l		
C			µg/l		
D	16,6		µg/l	82%	-2,34
E	21,3	3,6	µg/l	105%	0,63
F	22,5	3,38	µg/l	111%	1,39
G	20,5	0,6	µg/l	101%	0,13
H	16,6	1,7	µg/l	82%	-2,34
I			µg/l		
J	19,2	1,92	µg/l	95%	-0,69
K	21,4	2,1	µg/l	105%	0,69
L	22,6	4,5	µg/l	111%	1,45
M	30,0 *	1,1	µg/l	148%	6,13
N	20,22	4,65	µg/l	100%	-0,05
O	21,5	3,2	µg/l	106%	0,76
P	20,6	3,09	µg/l	101%	0,19
Q	22,0	2,20	µg/l	108%	1,07
R	19,5	2	µg/l	96%	-0,51
S	20,5	4	µg/l	101%	0,13
T	22,3	2,2	µg/l	110%	1,26
U	21,1	2,2	µg/l	104%	0,51
V	20,948	4,190	µg/l	103%	0,41
W	17,7	0,902	µg/l	87%	-1,64
X	22,5	2	µg/l	111%	1,39
Y	20,2	15,0	µg/l	100%	-0,06
Z			µg/l		
AA	22,2	0,3	µg/l	109%	1,20
AB	21,817	3,508	µg/l	107%	0,96
AC	25,0	2,10	µg/l	123%	2,97
AD	<200		µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	21,1 ± 1,5	20,8 ± 1,1	µg/l
Recov. ± CI(99%)	104,1 ± 7,3	102,3 ± 5,5	%
SD between labs	2,6	1,9	µg/l
RSD between labs	12,5	9,3	%
n for calculation	25	24	



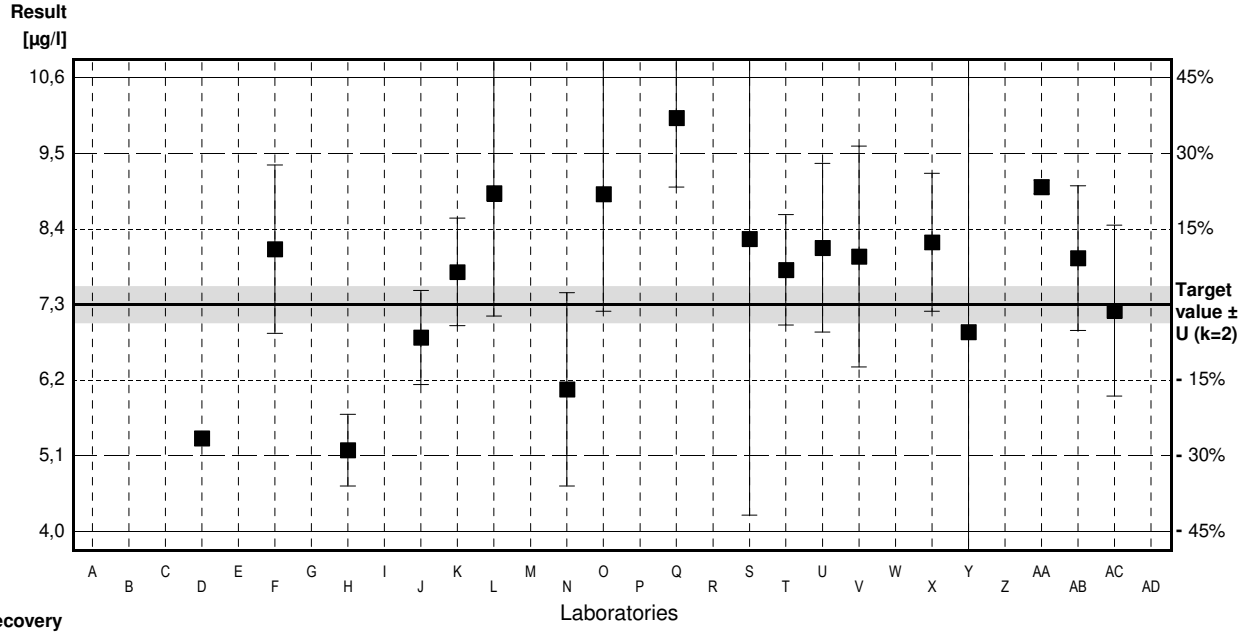


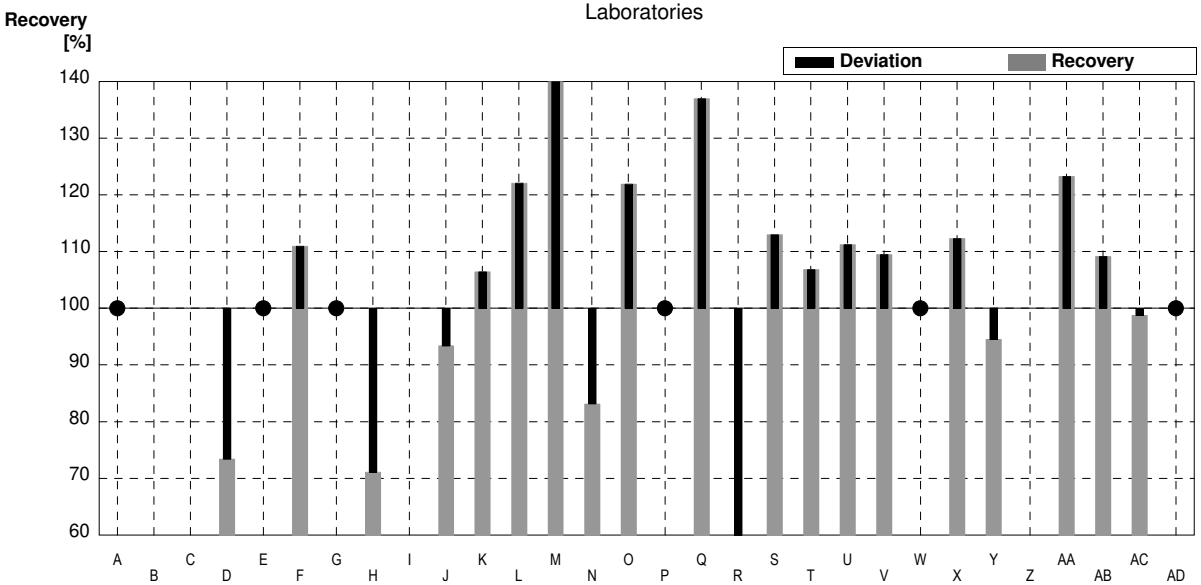
Sample M163B
Parameter Aluminium

Target value	± U (k=2)	7,3 µg/l	±	0,3 µg/l	
IFA result	± U (k=2)	7,6 µg/l	±	0,4 µg/l	
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	<10,0		µg/l	•	
B			µg/l		
C			µg/l		
D	5,36		µg/l	73%	
E	<10		µg/l	•	
F	8,1	1,22	µg/l	111%	
G	<10		µg/l	•	
H	5,19	0,52	µg/l	71%	
I			µg/l		
J	6,82	0,682	µg/l	93%	
K	7,77	0,78	µg/l	106%	
L	8,91	1,78	µg/l	122%	
M	16,8 *	0,51	µg/l	230%	
N	6,07	1,40	µg/l	83%	
O	8,9	1,7	µg/l	122%	
P	<10		µg/l	•	
Q	10,0	1,00	µg/l	137%	
R	3,61 *	0,5	µg/l	49%	
S	8,25	4	µg/l	113%	
T	7,8	0,8	µg/l	107%	
U	8,12	1,22	µg/l	111%	
V	7,993	1,599	µg/l	109%	
W	<10		µg/l	•	
X	8,2	1	µg/l	112%	
Y	6,9	15,0	µg/l	95%	
Z			µg/l		
AA	9,0	0,1	µg/l	123%	
AB	7,970	1,047	µg/l	109%	
AC	7,21	1,237	µg/l	99%	
AD	<200		µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	7,9 ± 1,6	7,7 ± 0,9	µg/l
Recov. ± CI(99%)	108,9 ± 22,5	105,5 ± 11,8	%
SD between labs	2,6	1,3	µg/l
RSD between labs	32,3	16,4	%
n for calculation	20	18	



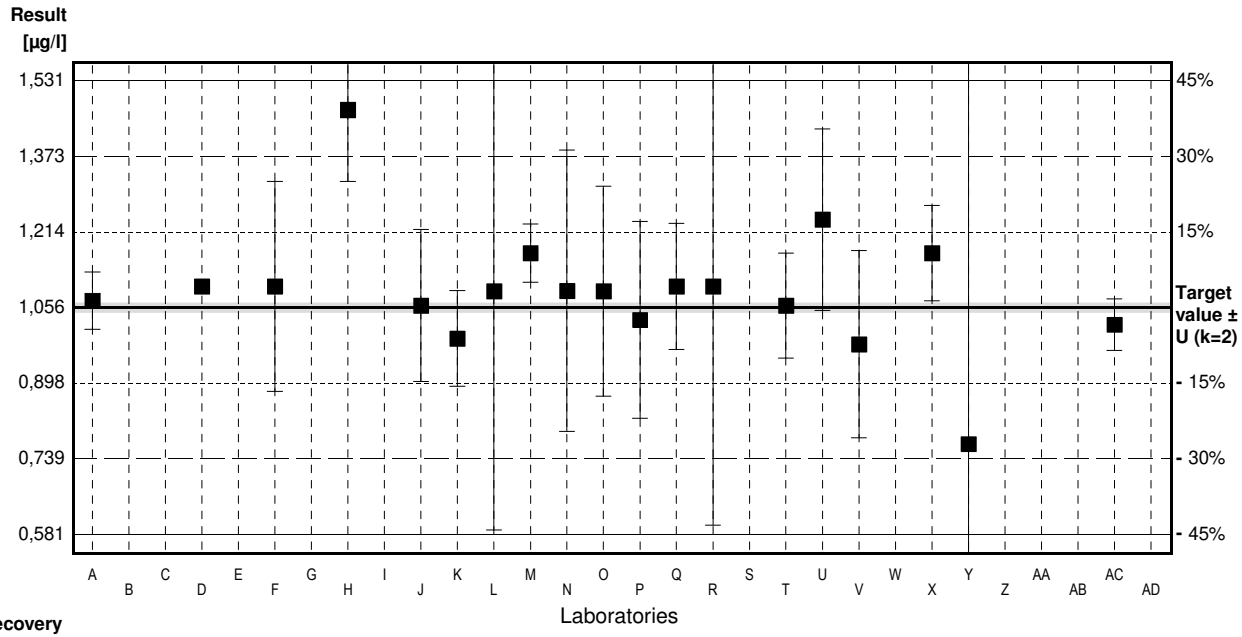


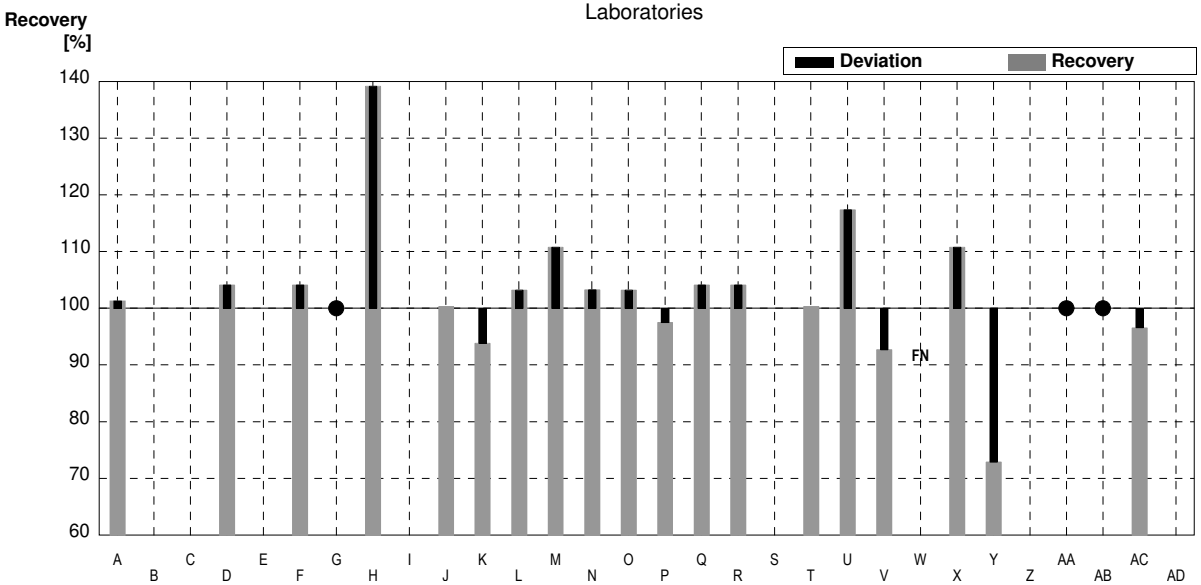
Sample M163A
Parameter Arsenic

Target value ± U (k=2)	1,056	µg/l	±	0,010	µg/l
IFA result ± U (k=2)	1,06	µg/l	±	0,11	µg/l
Stability test		µg/l			

Lab Code	Result		±	Unit	Recovery	z-Score
A	1,07		0,060	µg/l	101%	0,18
B				µg/l		
C				µg/l		
D	1,10			µg/l	104%	0,56
E				µg/l		
F	1,10		0,22	µg/l	104%	0,56
G	<1,5			µg/l	•	
H	1,47	*	0,15	µg/l	139%	5,30
I				µg/l		
J	1,06		0,159	µg/l	100%	0,05
K	0,991		0,1	µg/l	94%	-0,83
L	1,09		0,50	µg/l	103%	0,44
M	1,17		0,061	µg/l	111%	1,46
N	1,091		0,295	µg/l	103%	0,45
O	1,09		0,22	µg/l	103%	0,44
P	1,03		0,206	µg/l	98%	-0,33
Q	1,10		0,132	µg/l	104%	0,56
R	1,10		0,5	µg/l	104%	0,56
S				µg/l		
T	1,06		0,11	µg/l	100%	0,05
U	1,24	*	0,19	µg/l	117%	2,35
V	0,979		0,196	µg/l	93%	-0,99
W	<1			µg/l	FN	
X	1,17		0,1	µg/l	111%	1,46
Y	0,77	*	1,44	µg/l	73%	-3,66
Z				µg/l		
AA	<2,13		1,69	µg/l	•	
AB	<5			µg/l	•	
AC	1,02		0,054	µg/l	97%	-0,46
AD				µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,090 ± 0,087	1,076 ± 0,039	µg/l
Recov. ± CI(99%)	103,2 ± 8,3	101,9 ± 3,7	%
SD between labs	0,132	0,054	µg/l
RSD between labs	12,1	5,0	%
n for calculation	19	16	



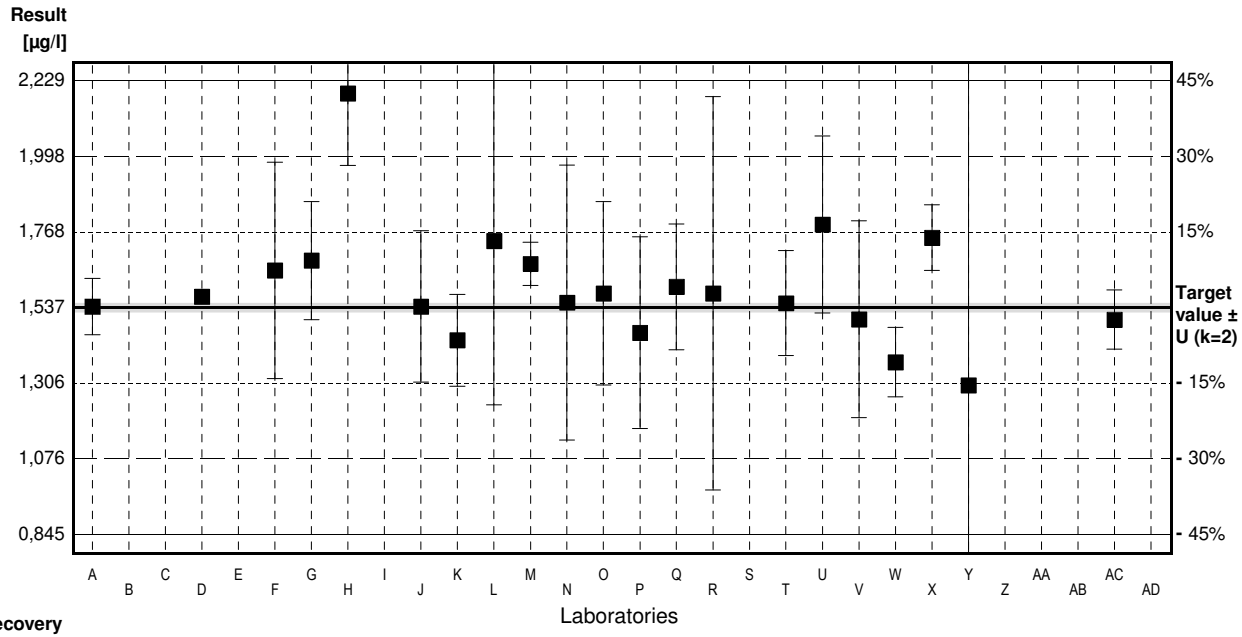


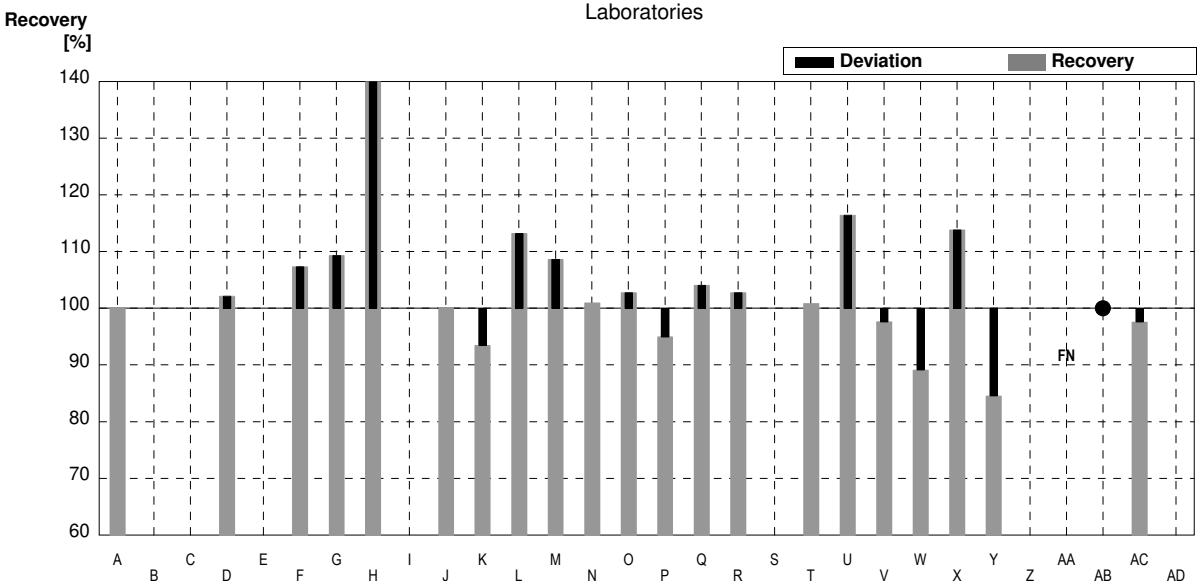
Sample M163B
Parameter Arsenic

Target value ± U (k=2)	1,537	µg/l	±	0,013	µg/l
IFA result ± U (k=2)	1,50	µg/l	±	0,16	µg/l
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,54	0,086	µg/l	100%	0,03
B			µg/l		
C			µg/l		
D	1,57		µg/l	102%	0,29
E			µg/l		
F	1,65	0,33	µg/l	107%	0,99
G	1,68	0,18	µg/l	109%	1,26
H	2,19 *	0,22	µg/l	142%	5,74
I			µg/l		
J	1,54	0,231	µg/l	100%	0,03
K	1,437	0,14	µg/l	93%	-0,88
L	1,74	0,50	µg/l	113%	1,78
M	1,67	0,066	µg/l	109%	1,17
N	1,552	0,419	µg/l	101%	0,13
O	1,58	0,28	µg/l	103%	0,38
P	1,46	0,292	µg/l	95%	-0,68
Q	1,60	0,192	µg/l	104%	0,55
R	1,58	0,6	µg/l	103%	0,38
S			µg/l		
T	1,55	0,16	µg/l	101%	0,11
U	1,79	0,27	µg/l	116%	2,22
V	1,501	0,300	µg/l	98%	-0,32
W	1,37	0,106	µg/l	89%	-1,47
X	1,75	0,1	µg/l	114%	1,87
Y	1,30	1,44	µg/l	85%	-2,08
Z			µg/l		
AA	<0,62	0,15	µg/l	FN	
AB	<5		µg/l	•	
AC	1,50	0,090	µg/l	98%	-0,33
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,598 ± 0,113	1,568 ± 0,080	µg/l
Recov. ± CI(99%)	103,9 ± 7,4	102,0 ± 5,2	%
SD between labs	0,182	0,124	µg/l
RSD between labs	11,4	7,9	%
n for calculation	21	20	



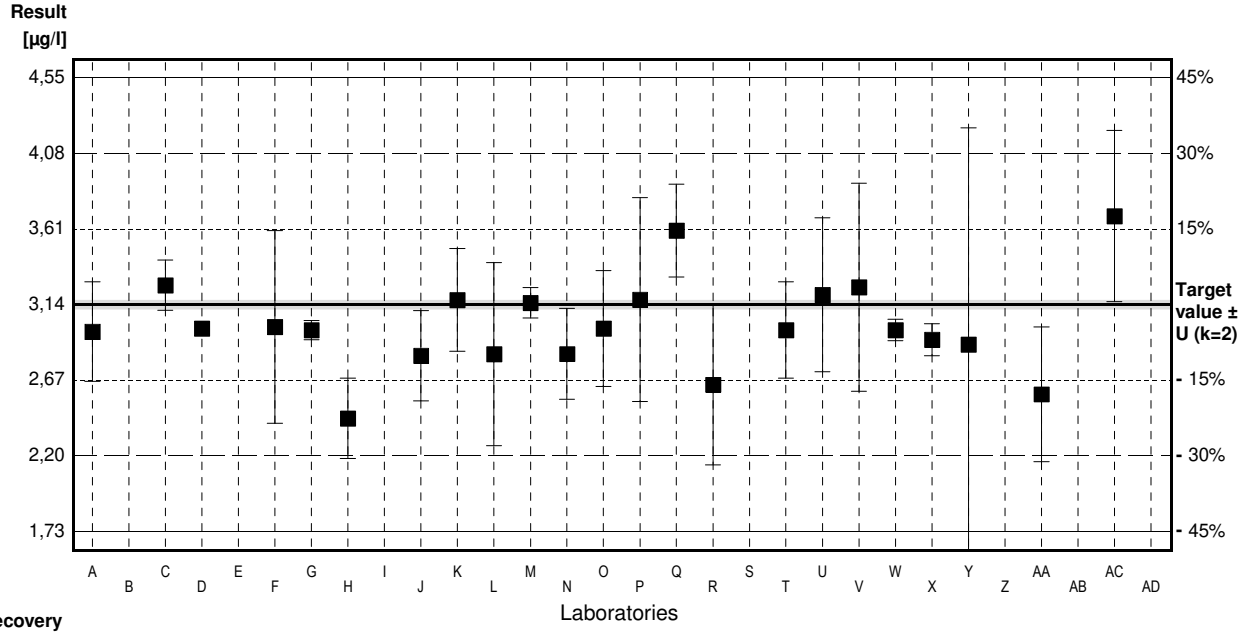


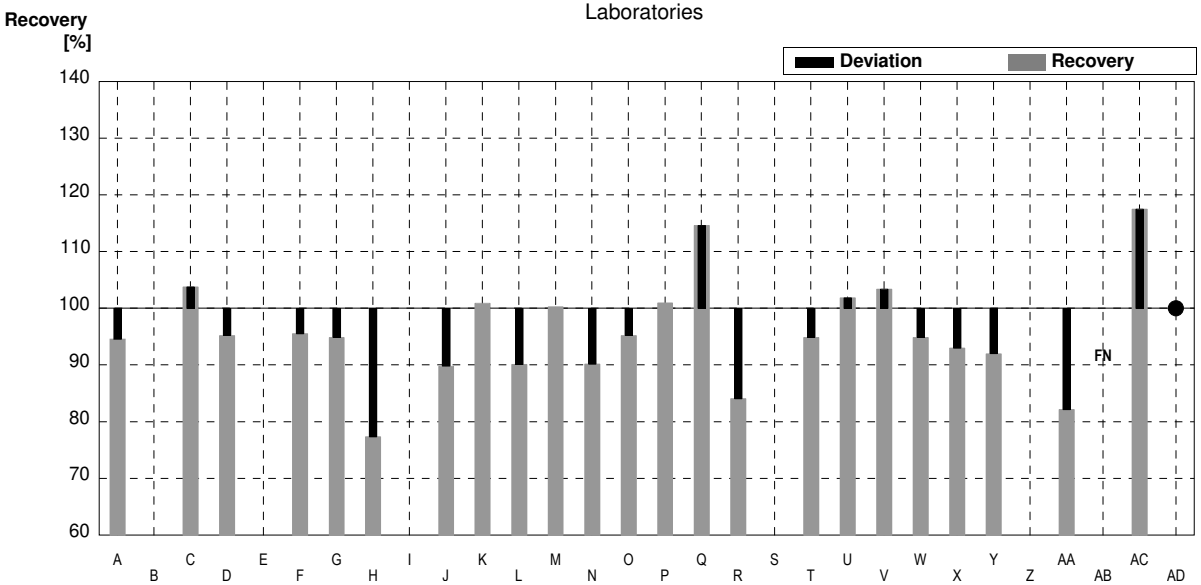
Sample M163A
Parameter Lead

Target value ± U (k=2)	3,14 µg/l	±	0,03 µg/l		
IFA result ± U (k=2)	2,97 µg/l	±	0,08 µg/l		
Stability test	µg/l				

Lab Code	Result	±	Unit	Recovery	z-Score
A	2,97	0,31	µg/l	95%	-0,80
B			µg/l		
C	3,26	0,156	µg/l	104%	0,56
D	2,99		µg/l	95%	-0,70
E			µg/l		
F	3,00	0,60	µg/l	96%	-0,66
G	2,98	0,06	µg/l	95%	-0,75
H	2,43	0,25	µg/l	77%	-3,33
I			µg/l		
J	2,82	0,282	µg/l	90%	-1,50
K	3,168	0,32	µg/l	101%	0,13
L	2,83	0,57	µg/l	90%	-1,45
M	3,15	0,095	µg/l	100%	0,05
N	2,832	0,283	µg/l	90%	-1,44
O	2,99	0,36	µg/l	95%	-0,70
P	3,17	0,634	µg/l	101%	0,14
Q	3,60	0,288	µg/l	115%	2,15
R	2,64	0,5	µg/l	84%	-2,34
S			µg/l		
T	2,98	0,30	µg/l	95%	-0,75
U	3,20	0,48	µg/l	102%	0,28
V	3,247	0,649	µg/l	103%	0,50
W	2,98	0,0665	µg/l	95%	-0,75
X	2,92	0,1	µg/l	93%	-1,03
Y	2,89	1,35	µg/l	92%	-1,17
Z			µg/l		
AA	2,58	0,42	µg/l	82%	-2,62
AB	<2		µg/l	FN	
AC	3,69	0,533	µg/l	118%	2,58
AD	<5		µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	3,01 ± 0,17	3,01 ± 0,17	µg/l
Recov. ± CI(99%)	96,0 ± 5,4	96,0 ± 5,4	%
SD between labs	0,29	0,29	µg/l
RSD between labs	9,5	9,5	%
n for calculation	23	23	



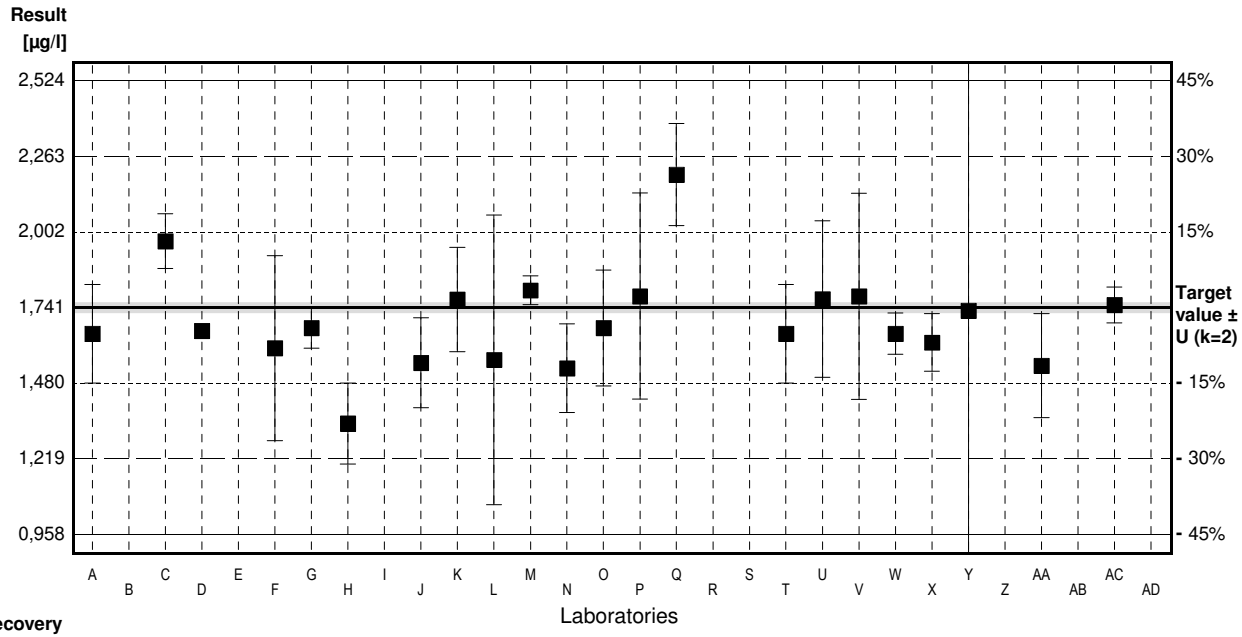


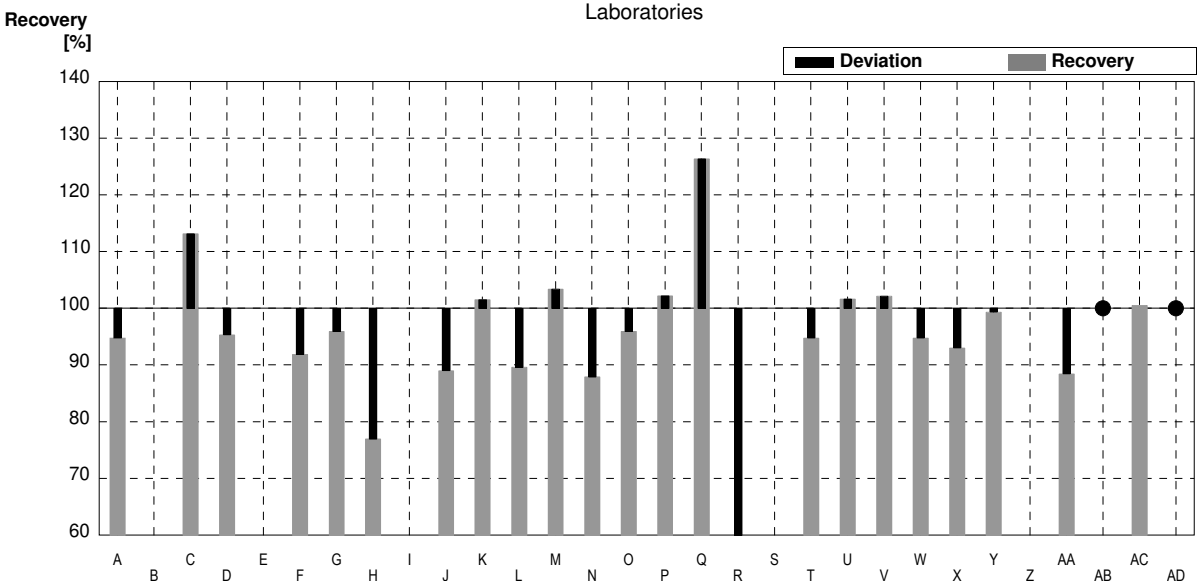
Sample M163B
Parameter Lead

Target value ± U (k=2)	1,741	µg/l	±	0,017	µg/l
IFA result ± U (k=2)	1,65	µg/l	±	0,05	µg/l
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,65	0,17	µg/l	95%	-0,77
B			µg/l		
C	1,97	0,0945	µg/l	113%	1,93
D	1,66		µg/l	95%	-0,68
E			µg/l		
F	1,60	0,32	µg/l	92%	-1,19
G	1,67	0,07	µg/l	96%	-0,60
H	1,34	0,14	µg/l	77%	-3,39
I			µg/l		
J	1,55	0,155	µg/l	89%	-1,61
K	1,768	0,18	µg/l	102%	0,23
L	1,56	0,50	µg/l	90%	-1,53
M	1,80	0,050	µg/l	103%	0,50
N	1,531	0,153	µg/l	88%	-1,77
O	1,67	0,20	µg/l	96%	-0,60
P	1,78	0,356	µg/l	102%	0,33
Q	2,20 *	0,176	µg/l	126%	3,88
R	0,93 *	0,3	µg/l	53%	-6,85
S			µg/l		
T	1,65	0,17	µg/l	95%	-0,77
U	1,77	0,27	µg/l	102%	0,24
V	1,779	0,356	µg/l	102%	0,32
W	1,65	0,0713	µg/l	95%	-0,77
X	1,62	0,1	µg/l	93%	-1,02
Y	1,73	1,35	µg/l	99%	-0,09
Z			µg/l		
AA	1,54	0,18	µg/l	88%	-1,70
AB	<2		µg/l	•	
AC	1,75	0,062	µg/l	101%	0,08
AD	<5		µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,659 ± 0,135	1,668 ± 0,081	µg/l
Recov. ± CI(99%)	95,3 ± 7,8	95,8 ± 4,7	%
SD between labs	0,230	0,131	µg/l
RSD between labs	13,9	7,8	%
n for calculation	23	21	



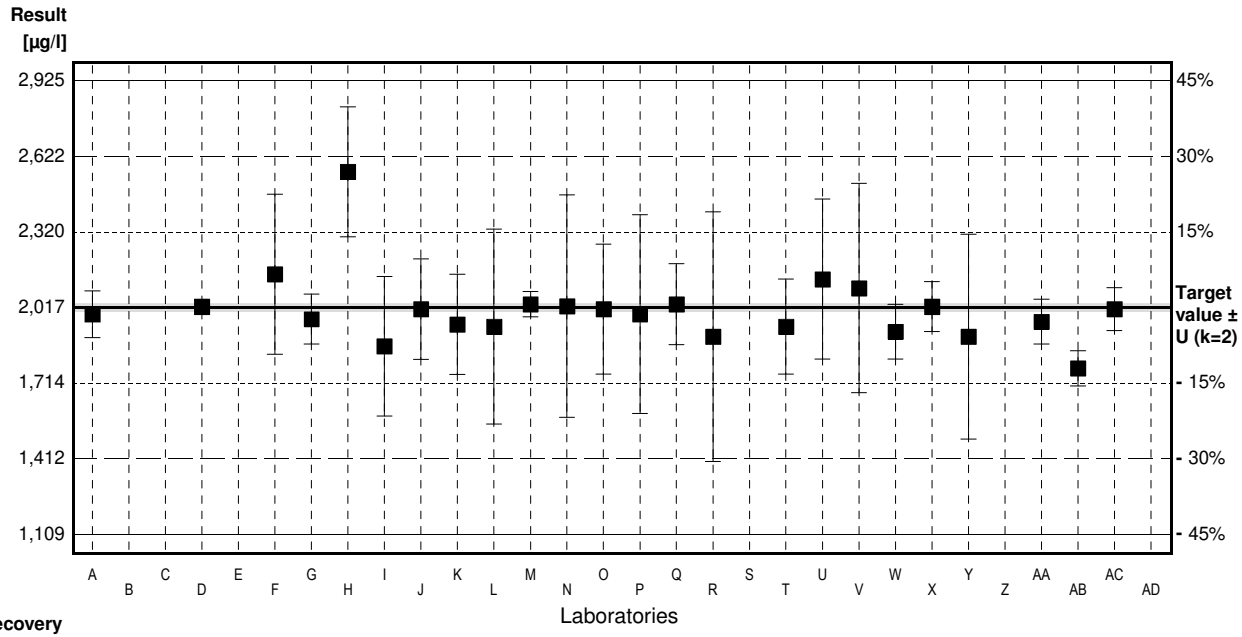


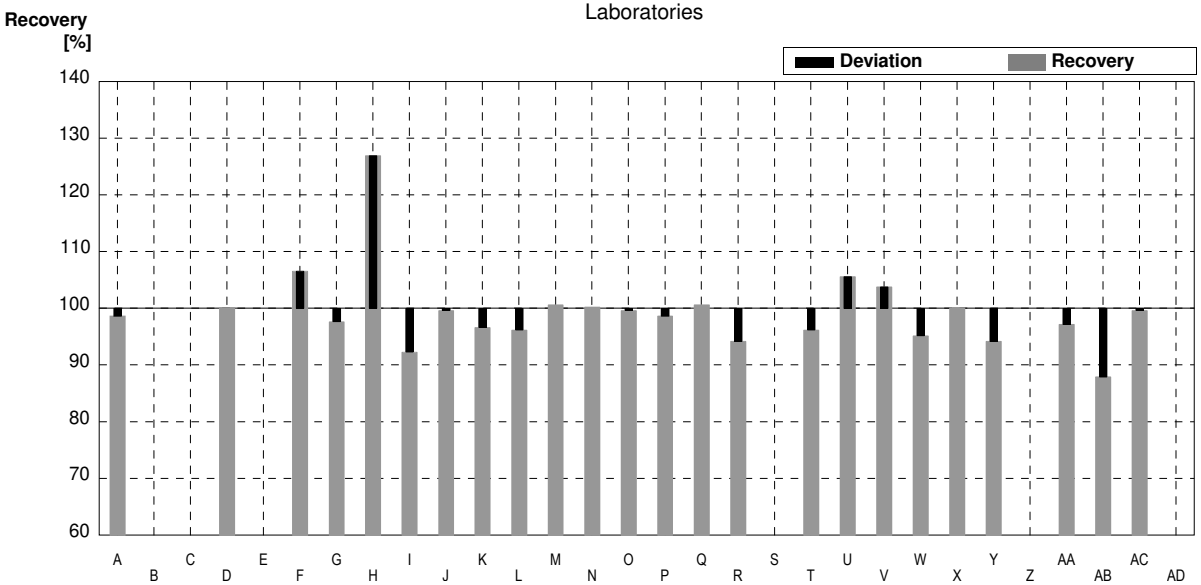
Sample M163A
Parameter Cadmium

Target value ± U (k=2)	2,017	µg/l	±	0,016	µg/l
IFA result ± U (k=2)	1,98	µg/l	±	0,12	µg/l
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,99	0,093	µg/l	99%	-0,24
B			µg/l		
C			µg/l		
D	2,02		µg/l	100%	0,03
E			µg/l		
F	2,15	0,32	µg/l	107%	1,18
G	1,97	0,1	µg/l	98%	-0,42
H	2,56 *	0,26	µg/l	127%	4,81
I	1,862	0,279	µg/l	92%	-1,37
J	2,01	0,201	µg/l	100%	-0,06
K	1,949	0,2	µg/l	97%	-0,60
L	1,94	0,39	µg/l	96%	-0,68
M	2,03	0,051	µg/l	101%	0,12
N	2,022	0,445	µg/l	100%	0,04
O	2,01	0,26	µg/l	100%	-0,06
P	1,99	0,398	µg/l	99%	-0,24
Q	2,03	0,162	µg/l	101%	0,12
R	1,90	0,5	µg/l	94%	-1,04
S			µg/l		
T	1,94	0,19	µg/l	96%	-0,68
U	2,13	0,32	µg/l	106%	1,00
V	2,094	0,419	µg/l	104%	0,68
W	1,92	0,109	µg/l	95%	-0,86
X	2,02	0,1	µg/l	100%	0,03
Y	1,90	0,410	µg/l	94%	-1,04
Z			µg/l		
AA	1,96	0,09	µg/l	97%	-0,50
AB	1,773 *	0,0702	µg/l	88%	-2,16
AC	2,01	0,086	µg/l	100%	-0,06
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,008 ± 0,082	1,993 ± 0,043	µg/l
Recov. ± CI(99%)	99,5 ± 4,1	98,8 ± 2,2	%
SD between labs	0,143	0,072	µg/l
RSD between labs	7,1	3,6	%
n for calculation	24	22	



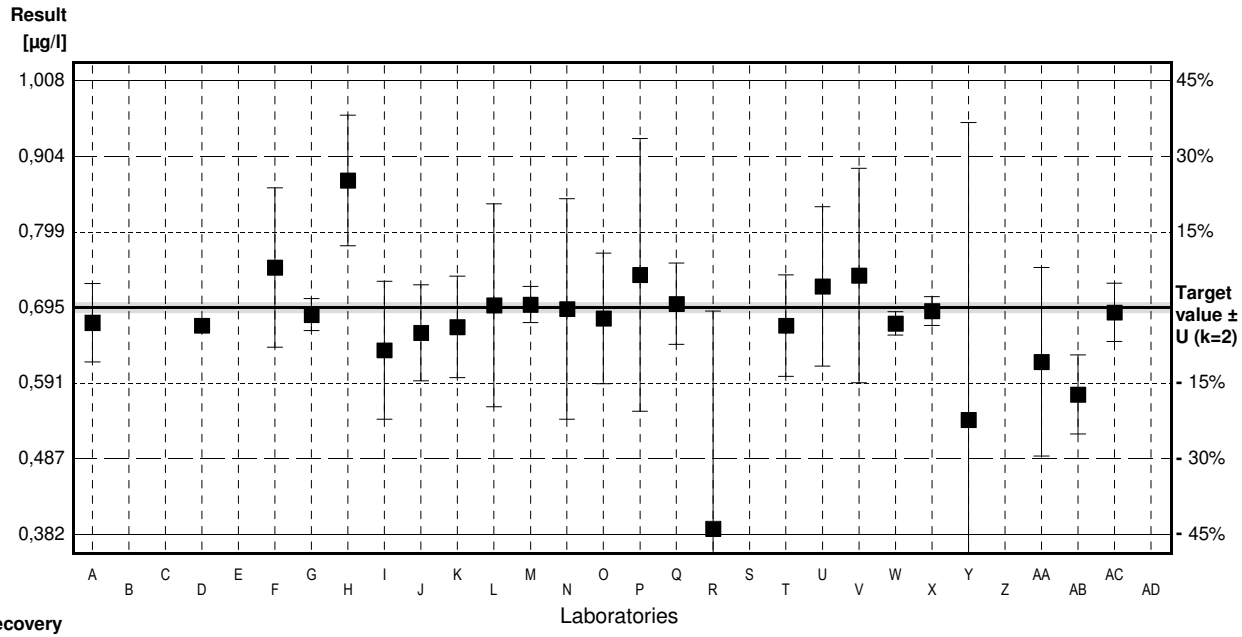


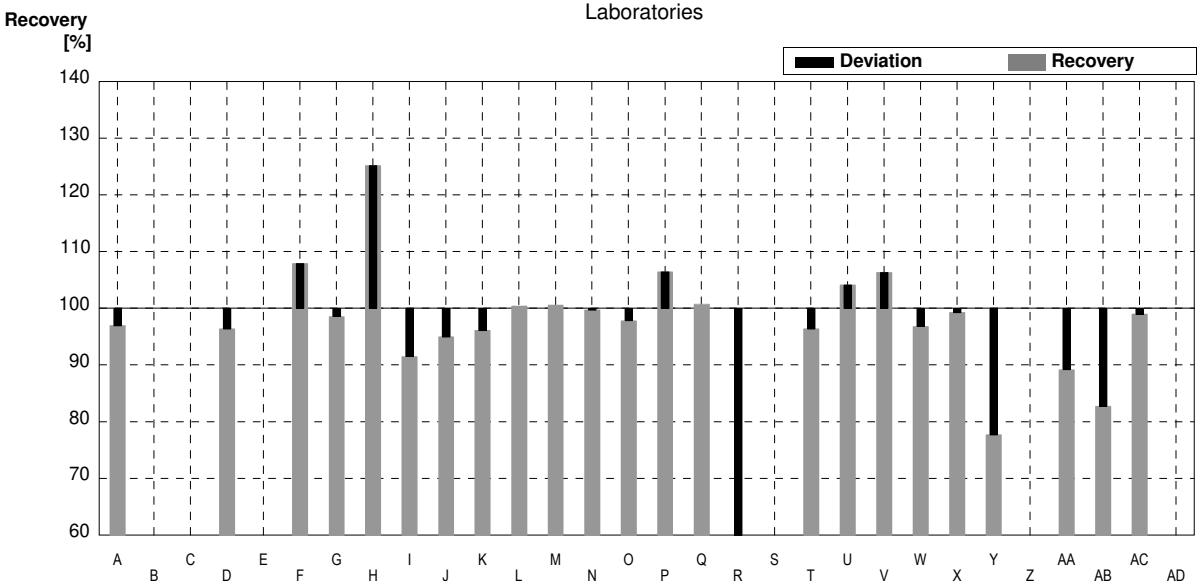
Sample M163B
Parameter Cadmium

Target value ± U (k=2)	0,695	µg/l	±	0,007	µg/l
IFA result ± U (k=2)	0,70	µg/l	±	0,04	µg/l
Stability test		µg/l			

Lab Code	Result		±	Unit	Recovery	z-Score
A	0,674		0,054	µg/l	97%	-0,54
B				µg/l		
C				µg/l		
D	0,67			µg/l	96%	-0,64
E				µg/l		
F	0,75		0,11	µg/l	108%	1,41
G	0,685		0,022	µg/l	99%	-0,26
H	0,87	*	0,09	µg/l	125%	4,50
I	0,636		0,095	µg/l	92%	-1,52
J	0,66		0,066	µg/l	95%	-0,90
K	0,668		0,07	µg/l	96%	-0,69
L	0,698		0,140	µg/l	100%	0,08
M	0,699		0,025	µg/l	101%	0,10
N	0,693		0,152	µg/l	100%	-0,05
O	0,68		0,09	µg/l	98%	-0,39
P	0,74		0,188	µg/l	106%	1,16
Q	0,700		0,056	µg/l	101%	0,13
R	0,390	*	0,3	µg/l	56%	-7,84
S				µg/l		
T	0,67		0,07	µg/l	96%	-0,64
U	0,724		0,11	µg/l	104%	0,75
V	0,739		0,148	µg/l	106%	1,13
W	0,673		0,0160	µg/l	97%	-0,57
X	0,69		0,02	µg/l	99%	-0,13
Y	0,54	*	0,410	µg/l	78%	-3,98
Z				µg/l		
AA	0,62		0,13	µg/l	89%	-1,93
AB	0,575	*	0,0546	µg/l	83%	-3,08
AC	0,688		0,0402	µg/l	99%	-0,18
AD				µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,672 ± 0,049	0,688 ± 0,021	µg/l
Recov. ± CI(99%)	96,7 ± 7,1	99,0 ± 3,0	%
SD between labs	0,086	0,033	µg/l
RSD between labs	12,8	4,8	%
n for calculation	24	20	



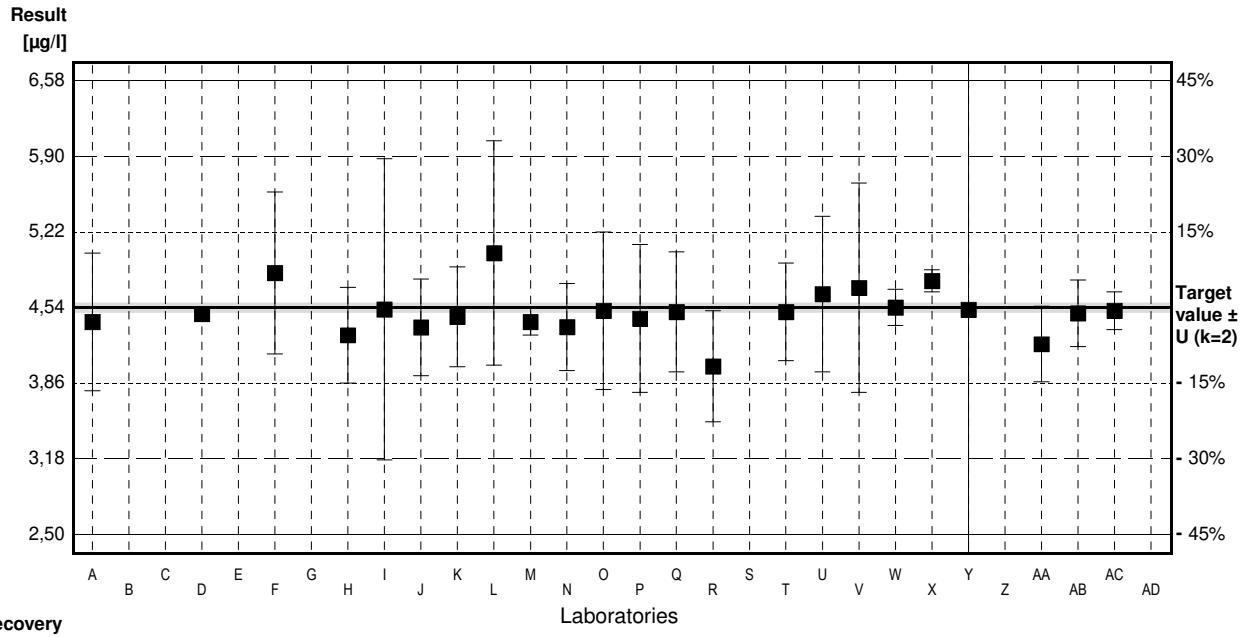


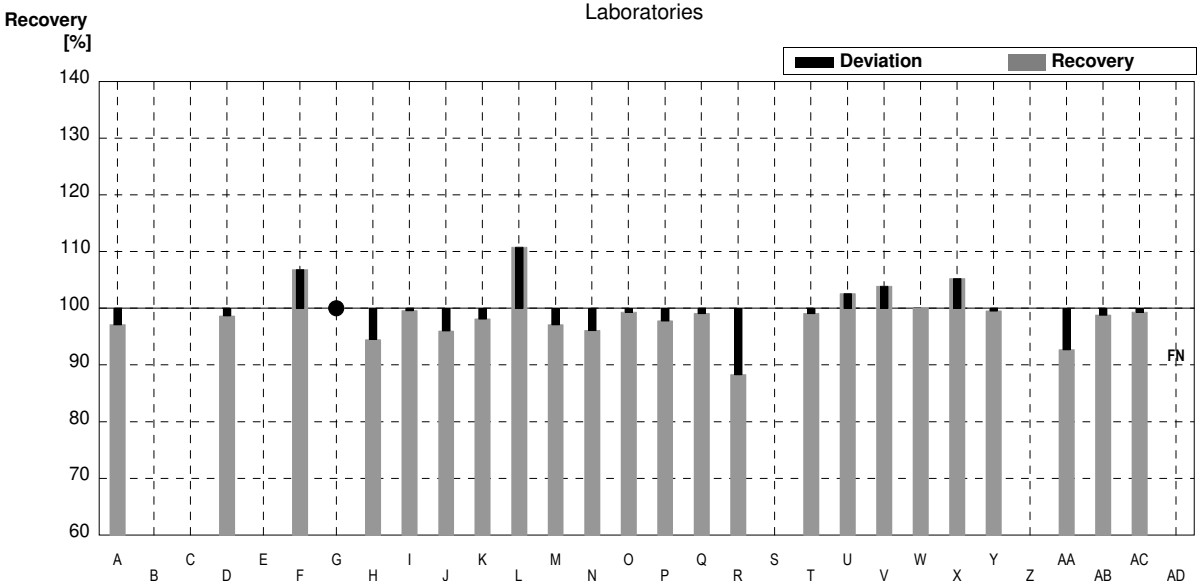
Sample M163A
Parameter Chromium

Target value ± U (k=2)	4,54 µg/l	±	0,04 µg/l
IFA result ± U (k=2)	4,60 µg/l	±	0,15 µg/l
Stability test	µg/l		

Lab Code	Result	±	Unit	Recovery	z-Score
A	4,41	0,62	µg/l	97%	-0,45
B			µg/l		
C			µg/l		
D	4,48		µg/l	99%	-0,21
E			µg/l		
F	4,85	0,73	µg/l	107%	1,08
G	<5		µg/l	•	
H	4,29	0,43	µg/l	94%	-0,87
I	4,522	1,357	µg/l	100%	-0,06
J	4,36	0,436	µg/l	96%	-0,63
K	4,456	0,45	µg/l	98%	-0,29
L	5,03 *	1,01	µg/l	111%	1,71
M	4,41	0,12	µg/l	97%	-0,45
N	4,363	0,393	µg/l	96%	-0,62
O	4,51	0,71	µg/l	99%	-0,10
P	4,44	0,666	µg/l	98%	-0,35
Q	4,50	0,540	µg/l	99%	-0,14
R	4,01 *	0,5	µg/l	88%	-1,85
S			µg/l		
T	4,50	0,44	µg/l	99%	-0,14
U	4,66	0,70	µg/l	103%	0,42
V	4,717	0,943	µg/l	104%	0,62
W	4,54	0,163	µg/l	100%	0,00
X	4,78	0,1	µg/l	105%	0,84
Y	4,52	7,3	µg/l	100%	-0,07
Z			µg/l		
AA	4,21	0,34	µg/l	93%	-1,15
AB	4,487	0,3002	µg/l	99%	-0,19
AC	4,51	0,169	µg/l	99%	-0,10
AD	<4		µg/l	FN	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	4,50 ± 0,12	4,50 ± 0,09	µg/l
Recov. ± CI(99%)	99,2 ± 2,7	99,1 ± 2,1	%
SD between labs	0,21	0,15	µg/l
RSD between labs	4,7	3,4	%
n for calculation	23	21	



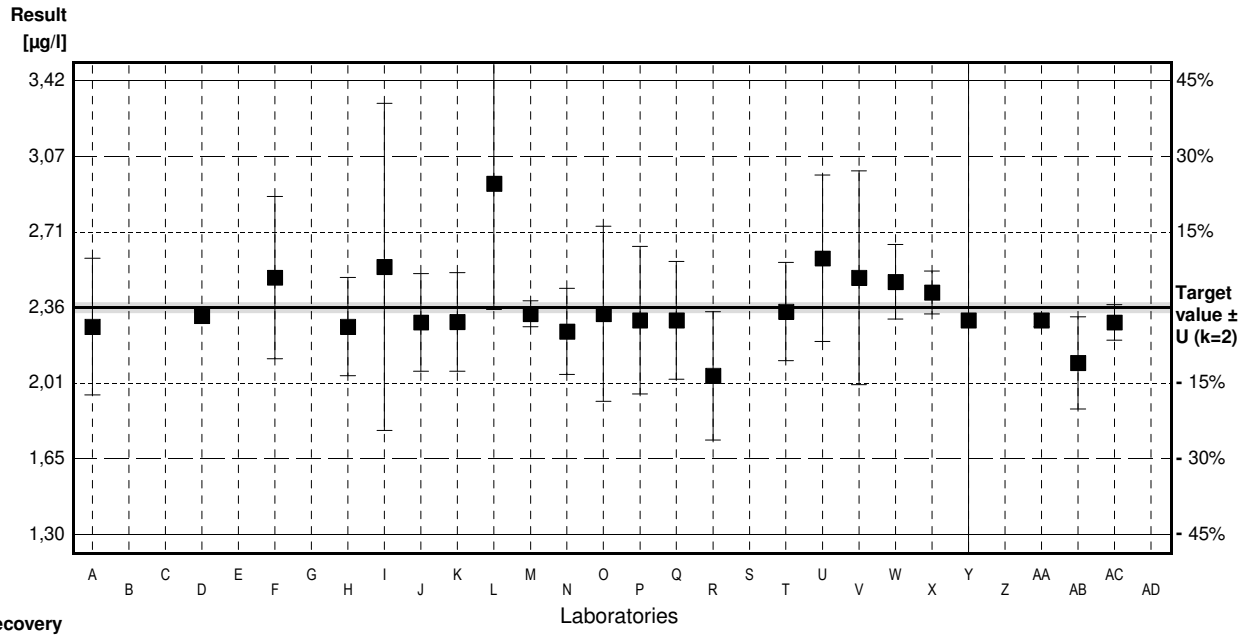


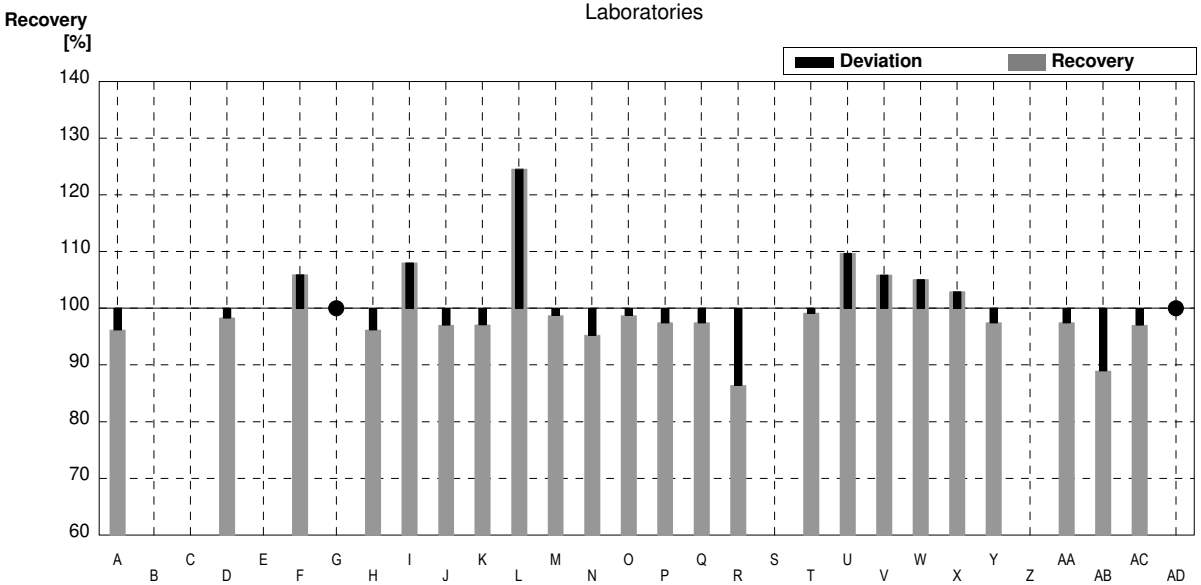
Sample M163B
Parameter Chromium

Target value ± U (k=2)	2,36 µg/l	±	0,02 µg/l
IFA result ± U (k=2)	2,40 µg/l	±	0,09 µg/l
Stability test	µg/l		

Lab Code	Result		±	Unit	Recovery	z-Score
A	2,27		0,32	µg/l	96%	-0,61
B				µg/l		
C				µg/l		
D	2,32			µg/l	98%	-0,27
E				µg/l		
F	2,50	*	0,38	µg/l	106%	0,94
G	<5			µg/l	•	
H	2,27		0,23	µg/l	96%	-0,61
I	2,550	*	0,765	µg/l	108%	1,28
J	2,29		0,229	µg/l	97%	-0,47
K	2,292		0,23	µg/l	97%	-0,46
L	2,94	*	0,59	µg/l	125%	3,90
M	2,33		0,061	µg/l	99%	-0,20
N	2,248		0,202	µg/l	95%	-0,75
O	2,33		0,41	µg/l	99%	-0,20
P	2,30		0,345	µg/l	97%	-0,40
Q	2,30		0,276	µg/l	97%	-0,40
R	2,04	*	0,3	µg/l	86%	-2,15
S				µg/l		
T	2,34		0,23	µg/l	99%	-0,13
U	2,59	*	0,39	µg/l	110%	1,55
V	2,499	*	0,500	µg/l	106%	0,93
W	2,48	*	0,175	µg/l	105%	0,81
X	2,43		0,1	µg/l	103%	0,47
Y	2,30		7,3	µg/l	97%	-0,40
Z				µg/l		
AA	2,30		0,03	µg/l	97%	-0,40
AB	2,100	*	0,216	µg/l	89%	-1,75
AC	2,29		0,083	µg/l	97%	-0,47
AD	<4			µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,36 ± 0,11	2,31 ± 0,03	µg/l
Recov. ± CI(99%)	100,1 ± 4,5	97,8 ± 1,4	%
SD between labs	0,18	0,04	µg/l
RSD between labs	7,6	1,8	%
n for calculation	23	15	



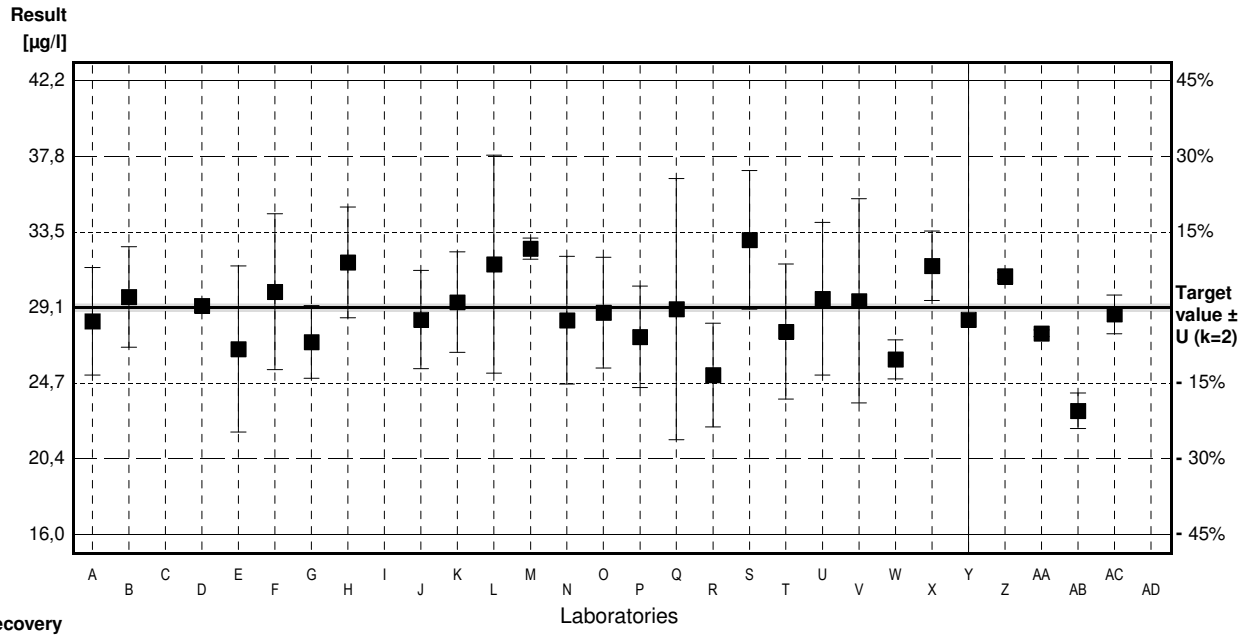


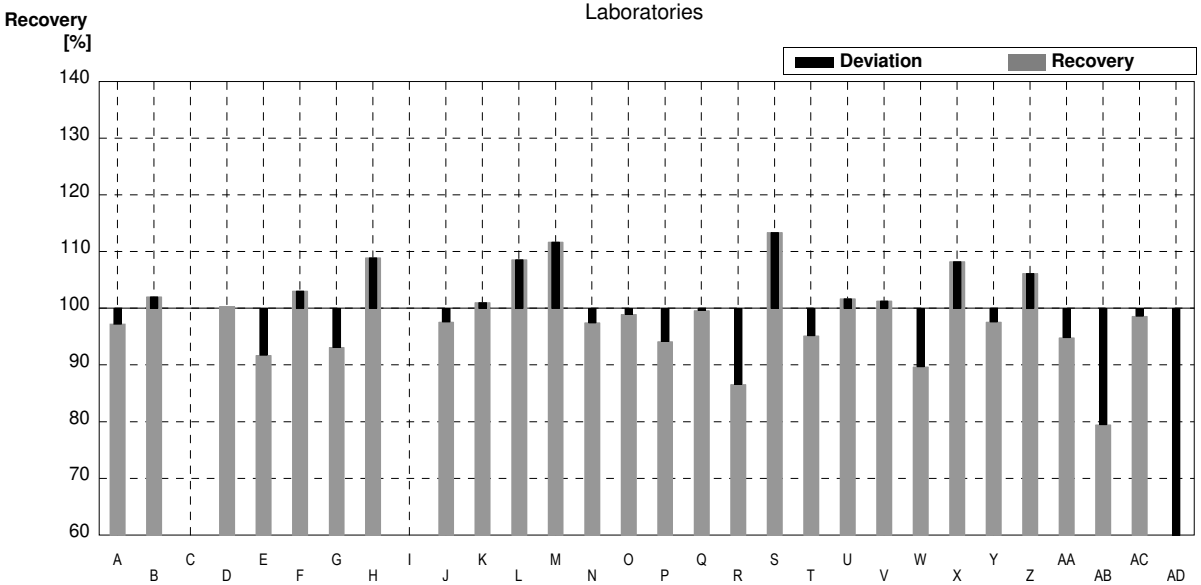
Sample M163A
Parameter Iron

Target value ± U (k=2)	29,1 µg/l	±	0,2 µg/l
IFA result ± U (k=2)	28,9 µg/l	±	2,3 µg/l
Stability test	µg/l		

Lab Code	Result	±	Unit	Recovery	z-Score
A	28,3	3,1	µg/l	97%	-0,42
B	29,7	2,9	µg/l	102%	0,31
C			µg/l		
D	29,2		µg/l	100%	0,05
E	26,7	4,8	µg/l	92%	-1,25
F	30,0	4,50	µg/l	103%	0,47
G	27,1	2,1	µg/l	93%	-1,04
H	31,7	3,2	µg/l	109%	1,35
I			µg/l		
J	28,4	2,84	µg/l	98%	-0,36
K	29,4	2,9	µg/l	101%	0,16
L	31,6	6,3	µg/l	109%	1,30
M	32,5	0,61	µg/l	112%	1,77
N	28,36	3,69	µg/l	97%	-0,39
O	28,8	3,2	µg/l	99%	-0,16
P	27,4	2,93	µg/l	94%	-0,89
Q	29,0	7,54	µg/l	100%	-0,05
R	25,2	3	µg/l	87%	-2,03
S	33,0	4	µg/l	113%	2,03
T	27,7	3,9	µg/l	95%	-0,73
U	29,6	4,4	µg/l	102%	0,26
V	29,477	5,895	µg/l	101%	0,20
W	26,1	1,12	µg/l	90%	-1,56
X	31,5	2	µg/l	108%	1,25
Y	28,4	25,7	µg/l	98%	-0,36
Z	30,9	0,2	µg/l	106%	0,94
AA	27,6	0,2	µg/l	95%	-0,78
AB	23,133 *	1,026	µg/l	79%	-3,11
AC	28,7	1,12	µg/l	99%	-0,21
AD	13,5 *	1,34	µg/l	46%	-8,12

	All results	Outliers excl.	Unit
Mean ± CI(99%)	28,3 ± 1,9	29,1 ± 1,1	µg/l
Recov. ± CI(99%)	97,3 ± 6,5	100,0 ± 3,6	%
SD between labs	3,6	1,9	µg/l
RSD between labs	12,8	6,7	%
n for calculation	28	26	



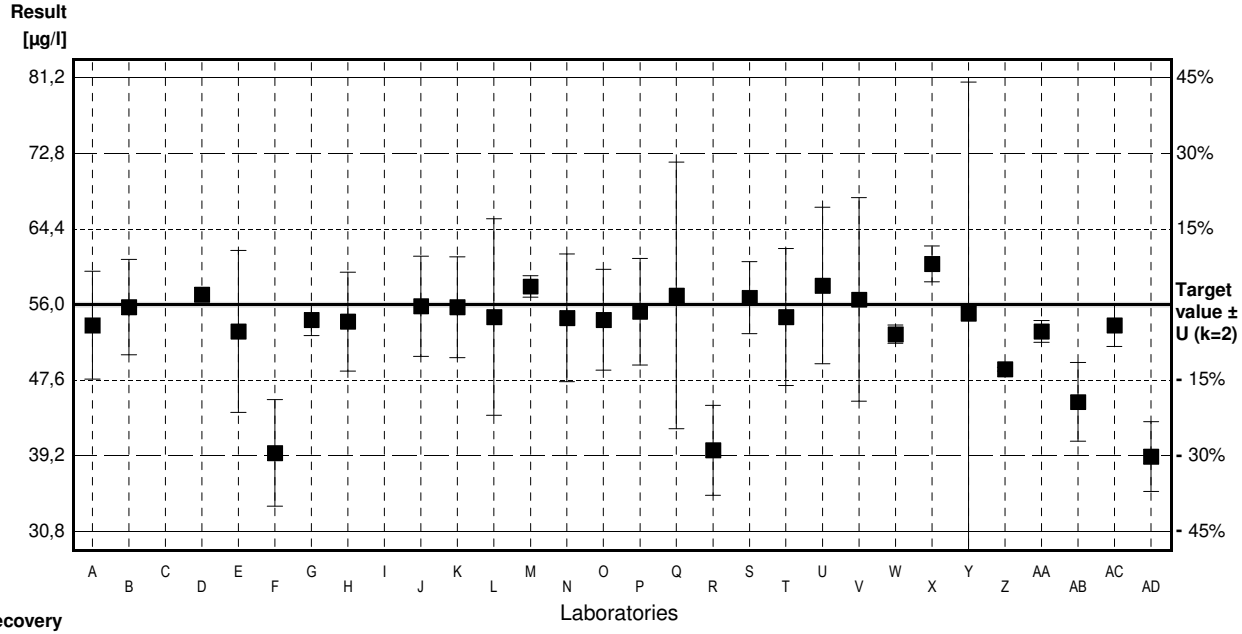


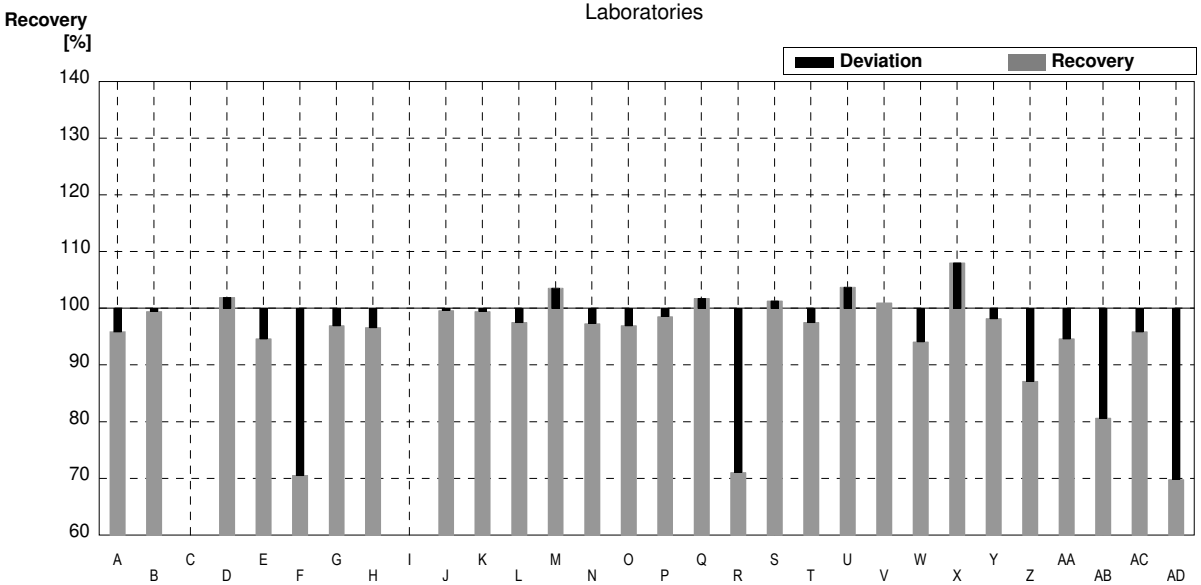
Sample M163B
Parameter Iron

Target value ± U (k=2)	56,0 µg/l	±	0,3 µg/l	
IFA result ± U (k=2)	55 µg/l	±	4 µg/l	
Stability test	µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	53,7	6,0	µg/l	96%	-0,62
B	55,7	5,3	µg/l	99%	-0,08
C			µg/l		
D	57,1		µg/l	102%	0,30
E	53	9	µg/l	95%	-0,81
F	39,5 *	5,93	µg/l	71%	-4,46
G	54,3	1,77	µg/l	97%	-0,46
H	54,1	5,5	µg/l	97%	-0,51
I			µg/l		
J	55,8	5,58	µg/l	100%	-0,05
K	55,7	5,6	µg/l	99%	-0,08
L	54,6	10,9	µg/l	98%	-0,38
M	58,0	1,2	µg/l	104%	0,54
N	54,50	7,09	µg/l	97%	-0,41
O	54,3	5,6	µg/l	97%	-0,46
P	55,2	5,91	µg/l	99%	-0,22
Q	57,0	14,8	µg/l	102%	0,27
R	39,8 *	5	µg/l	71%	-4,38
S	56,75	4	µg/l	101%	0,20
T	54,6	7,6	µg/l	98%	-0,38
U	58,1	8,7	µg/l	104%	0,57
V	56,547	11,309	µg/l	101%	0,15
W	52,7	1,03	µg/l	94%	-0,89
X	60,5	2	µg/l	108%	1,22
Y	55	25,7	µg/l	98%	-0,27
Z	48,8	0,2	µg/l	87%	-1,95
AA	53	1,2	µg/l	95%	-0,81
AB	45,167 *	4,365	µg/l	81%	-2,93
AC	53,7	2,39	µg/l	96%	-0,62
AD	39,1 *	3,871	µg/l	70%	-4,57

	All results	Outliers excl.	Unit
Mean ± CI(99%)	53,1 ± 2,9	55,1 ± 1,3	µg/l
Recov. ± CI(99%)	94,8 ± 5,2	98,4 ± 2,4	%
SD between labs	5,6	2,3	µg/l
RSD between labs	10,5	4,2	%
n for calculation	28	24	



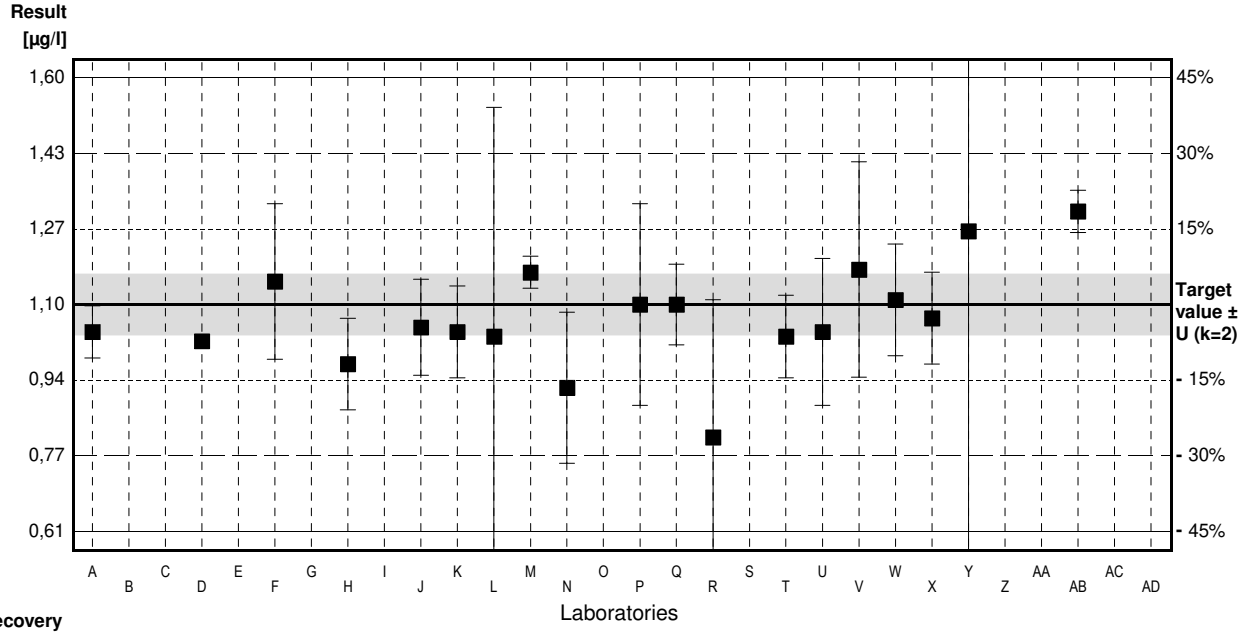


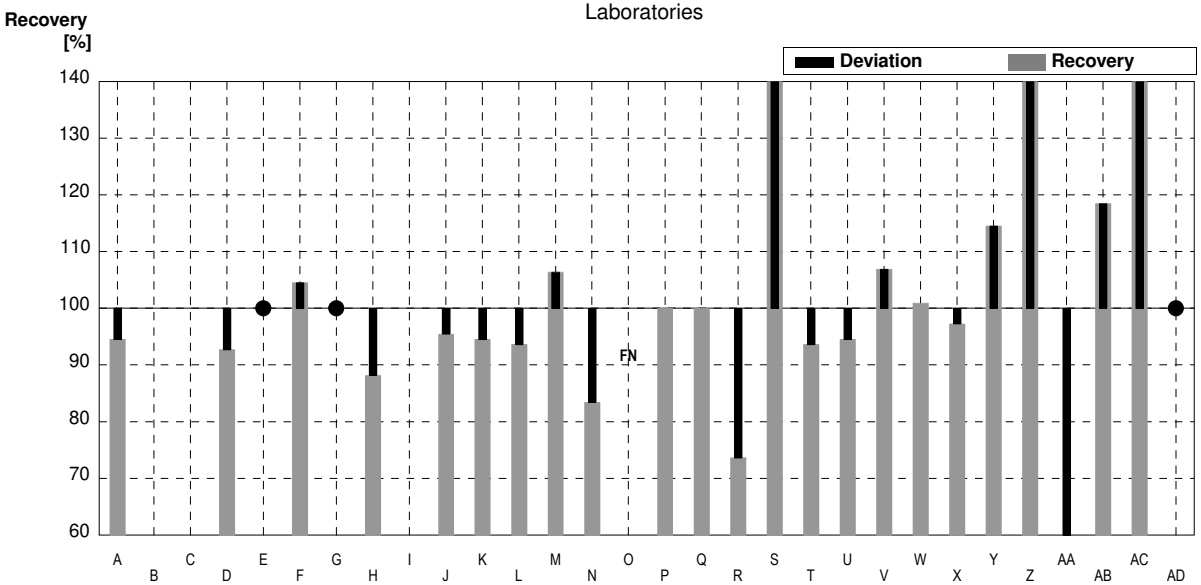
Sample M163A
Parameter Copper

Target value ± U (k=2)	1,10 µg/l	±	0,07 µg/l
IFA result ± U (k=2)	1,14 µg/l	±	0,11 µg/l
Stability test	µg/l		

Lab Code	Result		±	Unit	Recovery	z-Score
A	1,04		0,057	µg/l	95%	-0,70
B				µg/l		
C				µg/l		
D	1,02			µg/l	93%	-0,93
E	<10			µg/l	•	
F	1,15		0,17	µg/l	105%	0,58
G	<5			µg/l	•	
H	0,97		0,10	µg/l	88%	-1,52
I				µg/l		
J	1,05		0,105	µg/l	95%	-0,58
K	1,040		0,1	µg/l	95%	-0,70
L	1,03		0,50	µg/l	94%	-0,82
M	1,17		0,035	µg/l	106%	0,82
N	0,918		0,165	µg/l	83%	-2,12
O	<1			µg/l	FN	
P	1,10		0,22	µg/l	100%	0,00
Q	1,10		0,088	µg/l	100%	0,00
R	0,81		0,3	µg/l	74%	-3,38
S	5,5	*	5	µg/l	500%	51,28
T	1,03		0,09	µg/l	94%	-0,82
U	1,04		0,16	µg/l	95%	-0,70
V	1,176		0,235	µg/l	107%	0,89
W	1,11		0,122	µg/l	101%	0,12
X	1,07		0,1	µg/l	97%	-0,35
Y	1,26		6,9	µg/l	115%	1,86
Z	3,25	*	0,02	µg/l	295%	25,06
AA	0,54	*	0,14	µg/l	49%	-6,53
AB	1,303		0,0462	µg/l	118%	2,37
AC	2,24	*	0,150	µg/l	204%	13,29
AD	<250			µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,39 ± 0,61	1,07 ± 0,07	µg/l
Recov. ± CI(99%)	126,2 ± 55,8	97,5 ± 6,8	%
SD between labs	1,04	0,11	µg/l
RSD between labs	75,2	10,6	%
n for calculation	23	19	



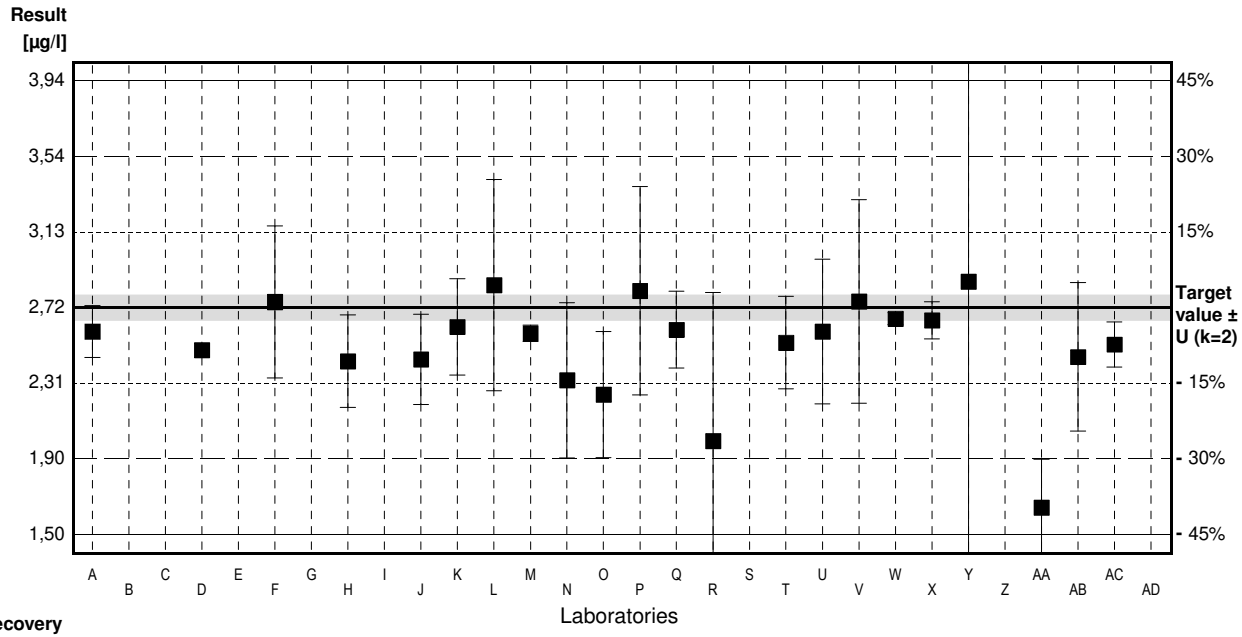


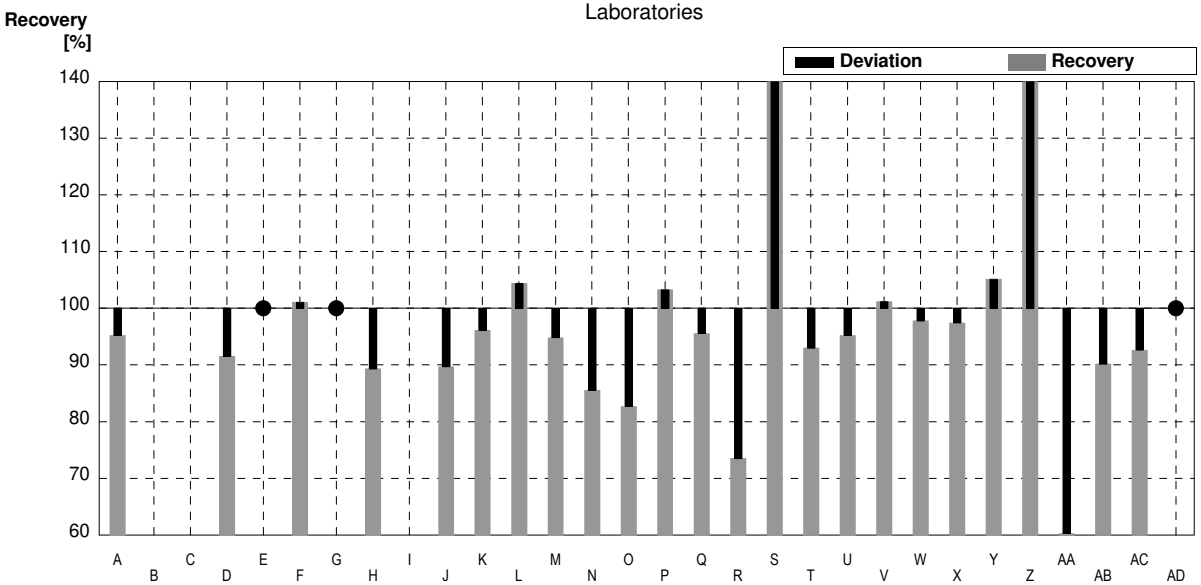
Sample M163B
Parameter Copper

Target value ± U (k=2)	2,72 µg/l	±	0,07 µg/l		
IFA result ± U (k=2)	2,80 µg/l	±	0,17 µg/l		
Stability test	µg/l				

Lab Code	Result	±	Unit	Recovery	z-Score
A	2,59	0,14	µg/l	95%	-0,61
B			µg/l		
C			µg/l		
D	2,49		µg/l	92%	-1,08
E	<10		µg/l	•	
F	2,75	0,41	µg/l	101%	0,14
G	<5		µg/l	•	
H	2,43	0,25	µg/l	89%	-1,37
I			µg/l		
J	2,44	0,244	µg/l	90%	-1,32
K	2,615	0,26	µg/l	96%	-0,49
L	2,84	0,57	µg/l	104%	0,57
M	2,58	0,044	µg/l	95%	-0,66
N	2,327	0,419	µg/l	86%	-1,85
O	2,25	0,34	µg/l	83%	-2,22
P	2,81	0,562	µg/l	103%	0,42
Q	2,60	0,208	µg/l	96%	-0,57
R	2,00	0,8	µg/l	74%	-3,39
S	6,0 *	5	µg/l	221%	15,46
T	2,53	0,25	µg/l	93%	-0,90
U	2,59	0,39	µg/l	95%	-0,61
V	2,752	0,550	µg/l	101%	0,15
W	2,66	0,0320	µg/l	98%	-0,28
X	2,65	0,1	µg/l	97%	-0,33
Y	2,86	6,9	µg/l	105%	0,66
Z	41,2 *	0,02	µg/l	1515%	181,37
AA	1,64 *	0,26	µg/l	60%	-5,09
AB	2,453	0,401	µg/l	90%	-1,26
AC	2,52	0,121	µg/l	93%	-0,94
AD	<250		µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	4,27 ± 4,53	2,56 ± 0,13	µg/l
Recov. ± CI(99%)	157,1 ± 166,6	94,1 ± 4,7	%
SD between labs	7,90	0,21	µg/l
RSD between labs	184,9	8,0	%
n for calculation	24	21	



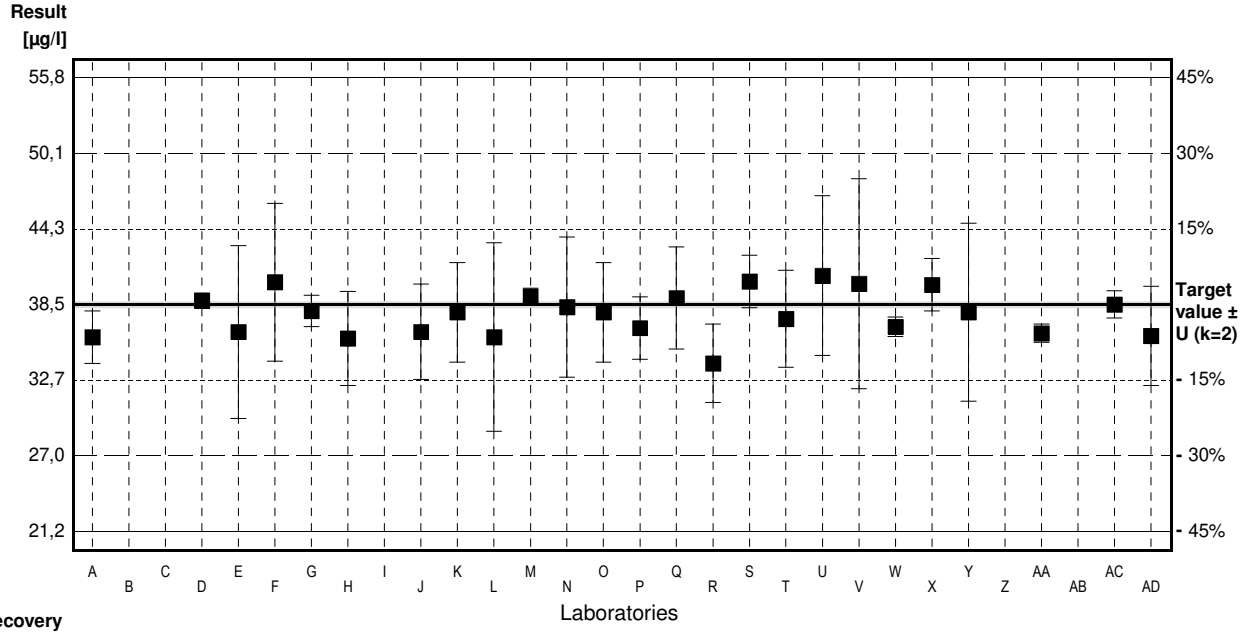


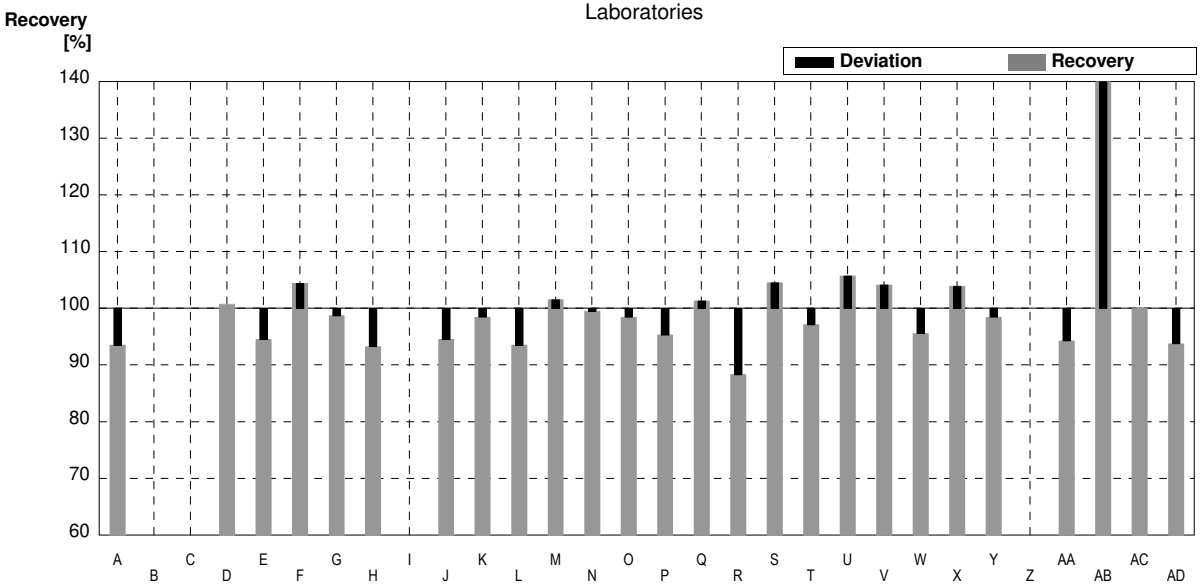
Sample M163A
Parameter Manganese

Target value ± U (k=2)	38,5 µg/l	±	0,2 µg/l		
IFA result ± U (k=2)	39,7 µg/l	±	2,7 µg/l		
Stability test	µg/l				

Lab Code	Result	±	Unit	Recovery	z-Score
A	36,0	2,0	µg/l	94%	-1,20
B			µg/l		
C			µg/l		
D	38,8		µg/l	101%	0,14
E	36,4	6,6	µg/l	95%	-1,01
F	40,2	6,03	µg/l	104%	0,82
G	38,0	1,2	µg/l	99%	-0,24
H	35,9	3,6	µg/l	93%	-1,25
I			µg/l		
J	36,4	3,64	µg/l	95%	-1,01
K	37,9	3,8	µg/l	98%	-0,29
L	36,0	7,2	µg/l	94%	-1,20
M	39,1	0,64	µg/l	102%	0,29
N	38,30	5,36	µg/l	99%	-0,10
O	37,9	3,8	µg/l	98%	-0,29
P	36,7	2,39	µg/l	95%	-0,87
Q	39,0	3,90	µg/l	101%	0,24
R	34,0	3	µg/l	88%	-2,16
S	40,25	2	µg/l	105%	0,84
T	37,4	3,7	µg/l	97%	-0,53
U	40,7	6,1	µg/l	106%	1,06
V	40,083	8,017	µg/l	104%	0,76
W	36,8	0,745	µg/l	96%	-0,82
X	40,0	2	µg/l	104%	0,72
Y	37,9	6,8	µg/l	98%	-0,29
Z			µg/l		
AA	36,3	0,7	µg/l	94%	-1,06
AB	350,3 *	5,033	µg/l	910%	149,98
AC	38,5	1,04	µg/l	100%	0,00
AD	36,1	3,79	µg/l	94%	-1,15

	All results	Outliers excl.	Unit
Mean ± CI(99%)	49,8 ± 33,5	37,8 ± 1,0	µg/l
Recov. ± CI(99%)	129,4 ± 87,1	98,1 ± 2,5	%
SD between labs	61,3	1,7	µg/l
RSD between labs	123,1	4,6	%
n for calculation	26	25	



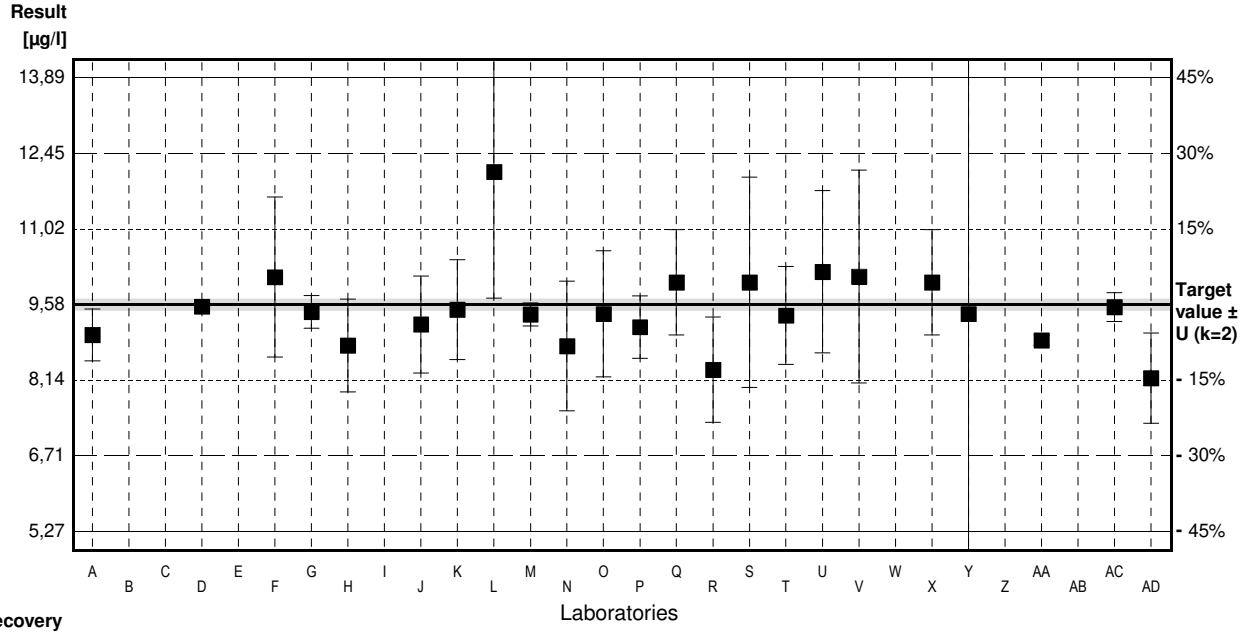


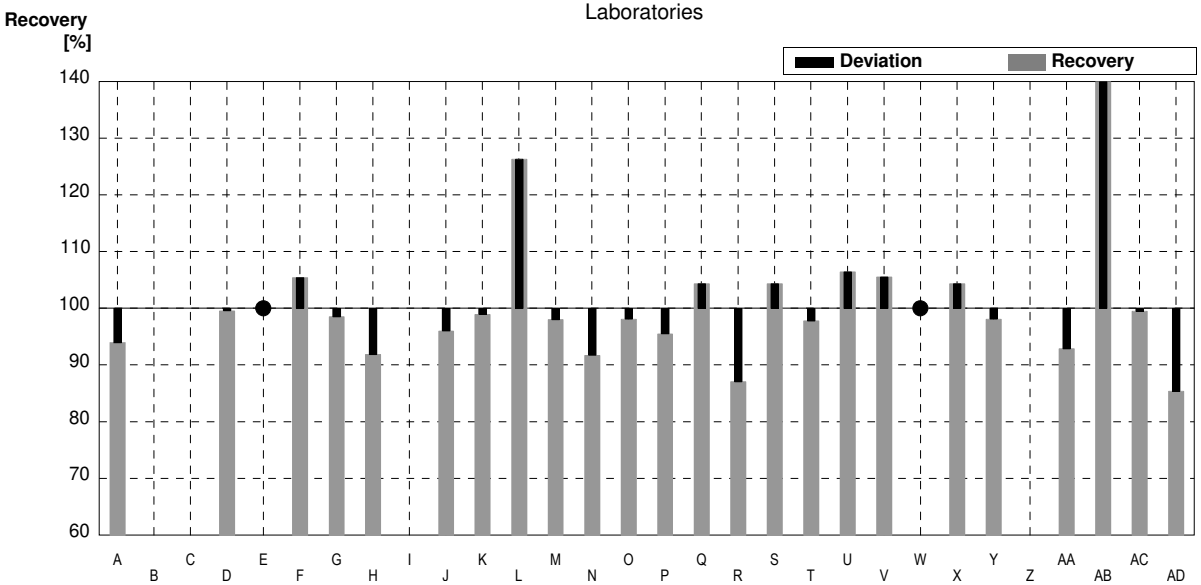
Sample M163B
Parameter Manganese

Target value ± U (k=2)	9,58 µg/l	±	0,11 µg/l		
IFA result ± U (k=2)	9,7 µg/l	±	0,7 µg/l		
Stability test	µg/l				

Lab Code	Result	±	Unit	Recovery	z-Score
A	9,00	0,49	µg/l	94%	-1,12
B			µg/l		
C			µg/l		
D	9,54		µg/l	100%	-0,08
E	<10		µg/l	•	
F	10,1	1,52	µg/l	105%	1,01
G	9,44	0,31	µg/l	99%	-0,27
H	8,80	0,88	µg/l	92%	-1,51
I			µg/l		
J	9,2	0,92	µg/l	96%	-0,73
K	9,48	0,95	µg/l	99%	-0,19
L	12,1 *	2,4	µg/l	126%	4,87
M	9,39	0,22	µg/l	98%	-0,37
N	8,79	1,23	µg/l	92%	-1,53
O	9,4	1,2	µg/l	98%	-0,35
P	9,15	0,595	µg/l	96%	-0,83
Q	10,0	1,00	µg/l	104%	0,81
R	8,34	1	µg/l	87%	-2,40
S	10,0	2	µg/l	104%	0,81
T	9,37	0,93	µg/l	98%	-0,41
U	10,2	1,54	µg/l	106%	1,20
V	10,109	2,022	µg/l	106%	1,02
W	<10		µg/l	•	
X	10,0	1	µg/l	104%	0,81
Y	9,4	6,8	µg/l	98%	-0,35
Z			µg/l		
AA	8,9	0,1	µg/l	93%	-1,31
AB	86,00 *	1,039	µg/l	898%	147,72
AC	9,53	0,272	µg/l	99%	-0,10
AD	8,18	0,859	µg/l	85%	-2,71

	All results	Outliers excl.	Unit
Mean ± CI(99%)	12,68 ± 8,97	9,38 ± 0,34	µg/l
Recov. ± CI(99%)	132,4 ± 93,6	97,9 ± 3,5	%
SD between labs	15,64	0,56	µg/l
RSD between labs	123,3	6,0	%
n for calculation	24	22	



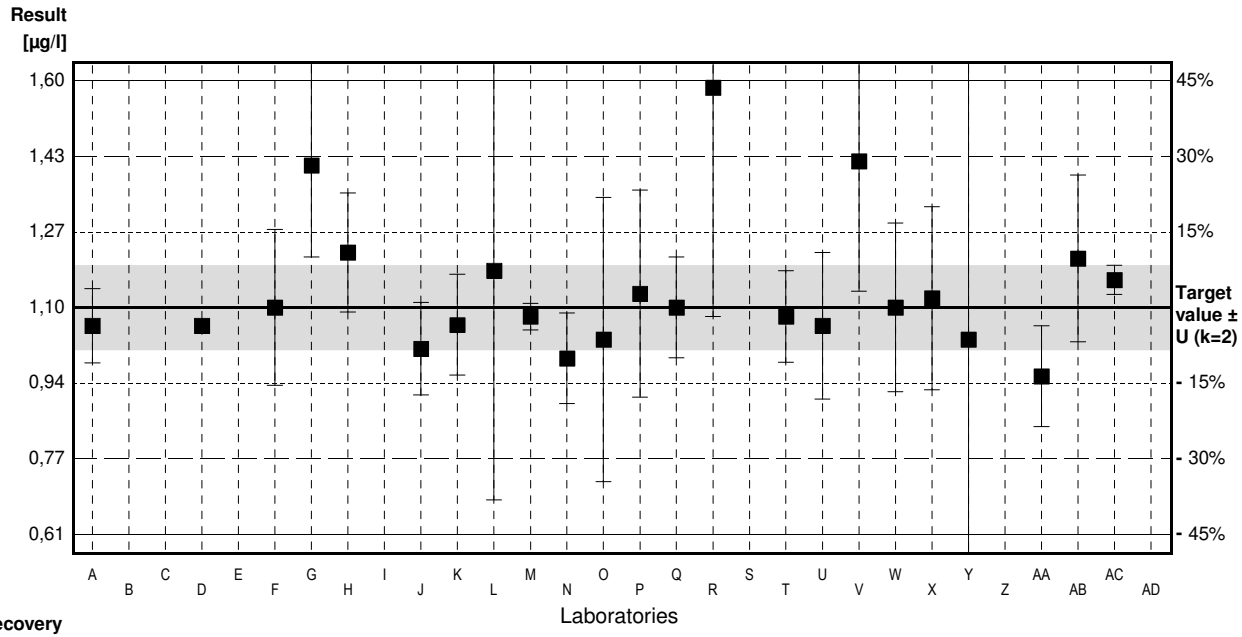


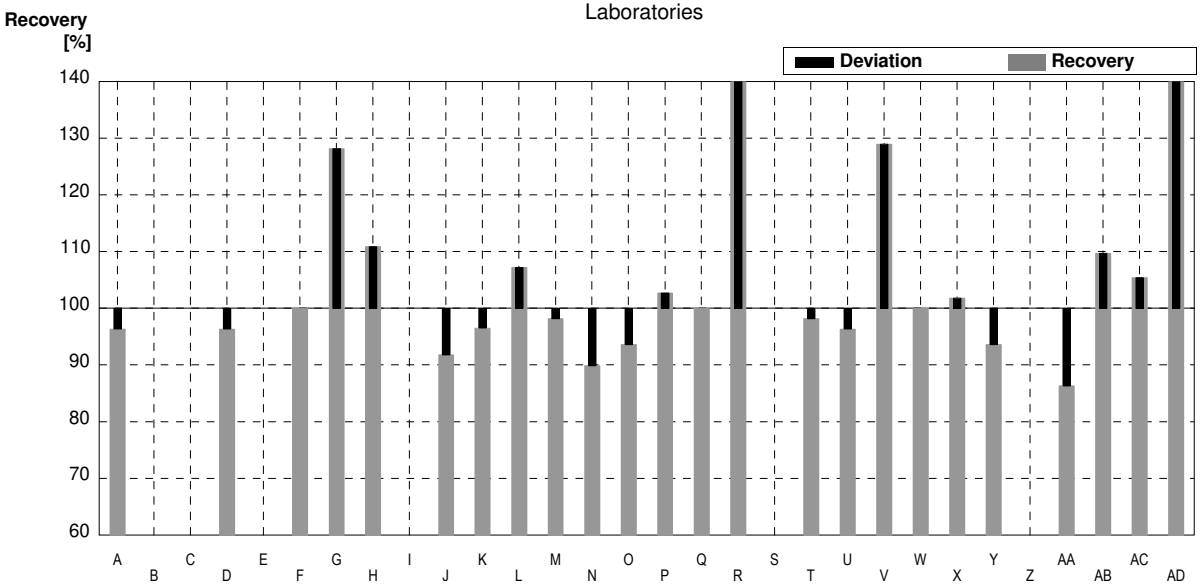
Sample M163A
Parameter Nickel

Target value ± U (k=2)	1,10 µg/l	±	0,09 µg/l
IFA result ± U (k=2)	1,10 µg/l	±	0,10 µg/l
Stability test	µg/l		

Lab Code	Result		±	Unit	Recovery	z-Score
A	1,06		0,081	µg/l	96%	-0,48
B				µg/l		
C				µg/l		
D	1,06			µg/l	96%	-0,48
E				µg/l		
F	1,10		0,17	µg/l	100%	0,00
G	1,41	*	0,2	µg/l	128%	3,76
H	1,22		0,13	µg/l	111%	1,45
I				µg/l		
J	1,01		0,101	µg/l	92%	-1,09
K	1,062		0,11	µg/l	97%	-0,46
L	1,18		0,50	µg/l	107%	0,97
M	1,08		0,029	µg/l	98%	-0,24
N	0,989		0,099	µg/l	90%	-1,35
O	1,03		0,31	µg/l	94%	-0,85
P	1,13		0,226	µg/l	103%	0,36
Q	1,10		0,110	µg/l	100%	0,00
R	1,58	*	0,5	µg/l	144%	5,82
S				µg/l		
T	1,08		0,10	µg/l	98%	-0,24
U	1,06		0,16	µg/l	96%	-0,48
V	1,419	*	0,284	µg/l	129%	3,87
W	1,10		0,184	µg/l	100%	0,00
X	1,12		0,2	µg/l	102%	0,24
Y	1,03		3,51	µg/l	94%	-0,85
Z				µg/l		
AA	0,95		0,11	µg/l	86%	-1,82
AB	1,207		0,182	µg/l	110%	1,30
AC	1,16		0,032	µg/l	105%	0,73
AD	8,57	*	0,866	µg/l	779%	90,55

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,45 ± 0,87	1,09 ± 0,04	µg/l
Recov. ± CI(99%)	131,5 ± 79,5	98,8 ± 4,1	%
SD between labs	1,52	0,07	µg/l
RSD between labs	105,4	6,4	%
n for calculation	24	20	



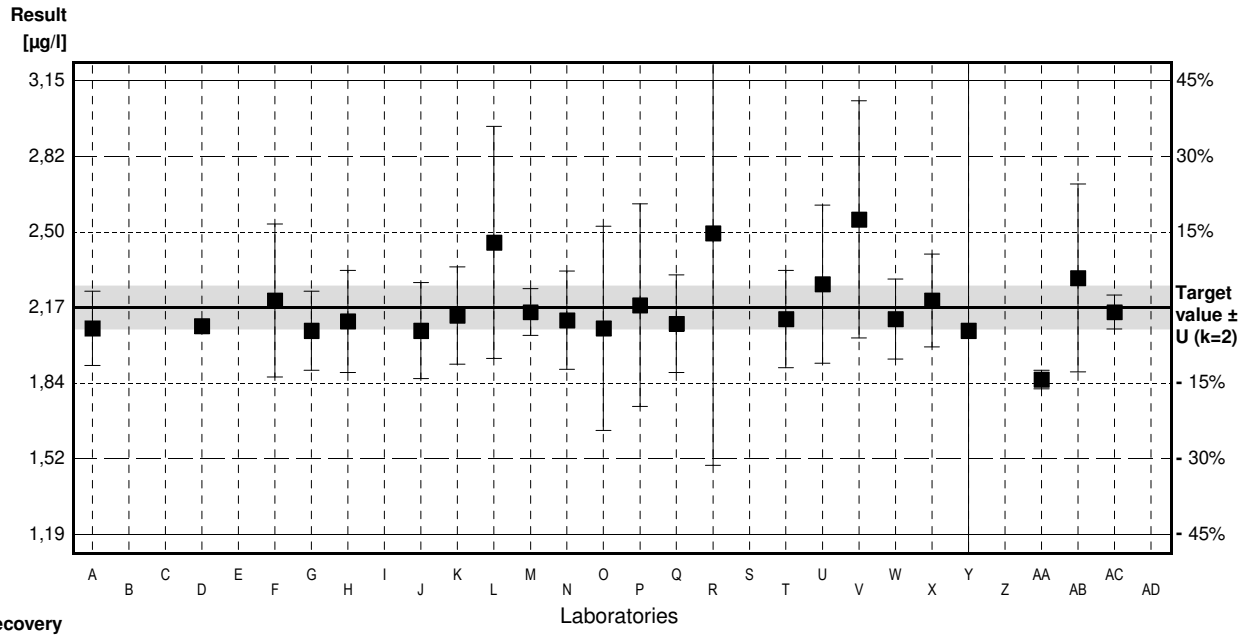


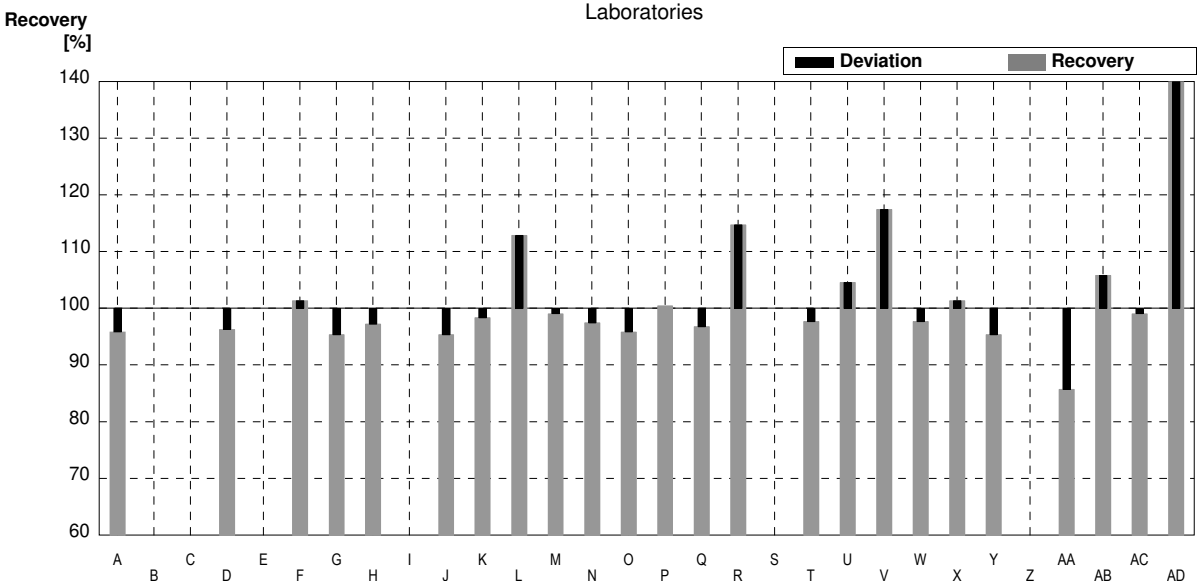
Sample M163B
Parameter Nickel

Target value	± U (k=2)	2,17 µg/l	±	0,09 µg/l	
IFA result	± U (k=2)	2,20 µg/l	±	0,13 µg/l	
Stability test		µg/l			

Lab Code	Result		±	Unit	Recovery	z-Score
A	2,08		0,16	µg/l	96%	-0,55
B				µg/l		
C				µg/l		
D	2,09			µg/l	96%	-0,49
E				µg/l		
F	2,20		0,33	µg/l	101%	0,18
G	2,07		0,17	µg/l	95%	-0,61
H	2,11		0,22	µg/l	97%	-0,37
I				µg/l		
J	2,07		0,207	µg/l	95%	-0,61
K	2,135		0,21	µg/l	98%	-0,22
L	2,45	*	0,50	µg/l	113%	1,72
M	2,15		0,10	µg/l	99%	-0,12
N	2,115		0,211	µg/l	97%	-0,34
O	2,08		0,44	µg/l	96%	-0,55
P	2,18		0,436	µg/l	100%	0,06
Q	2,10		0,210	µg/l	97%	-0,43
R	2,49	*	1	µg/l	115%	1,97
S				µg/l		
T	2,12		0,21	µg/l	98%	-0,31
U	2,27		0,34	µg/l	105%	0,61
V	2,549	*	0,510	µg/l	117%	2,33
W	2,12		0,172	µg/l	98%	-0,31
X	2,20		0,20	µg/l	101%	0,18
Y	2,07		3,51	µg/l	95%	-0,61
Z				µg/l		
AA	1,86	*	0,04	µg/l	86%	-1,90
AB	2,297		0,405	µg/l	106%	0,78
AC	2,15		0,073	µg/l	99%	-0,12
AD	9,51	*	0,961	µg/l	438%	45,10

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,48 ± 0,86	2,14 ± 0,04	µg/l
Recov. ± CI(99%)	114,2 ± 39,8	98,5 ± 2,0	%
SD between labs	1,51	0,07	µg/l
RSD between labs	60,8	3,1	%
n for calculation	24	19	



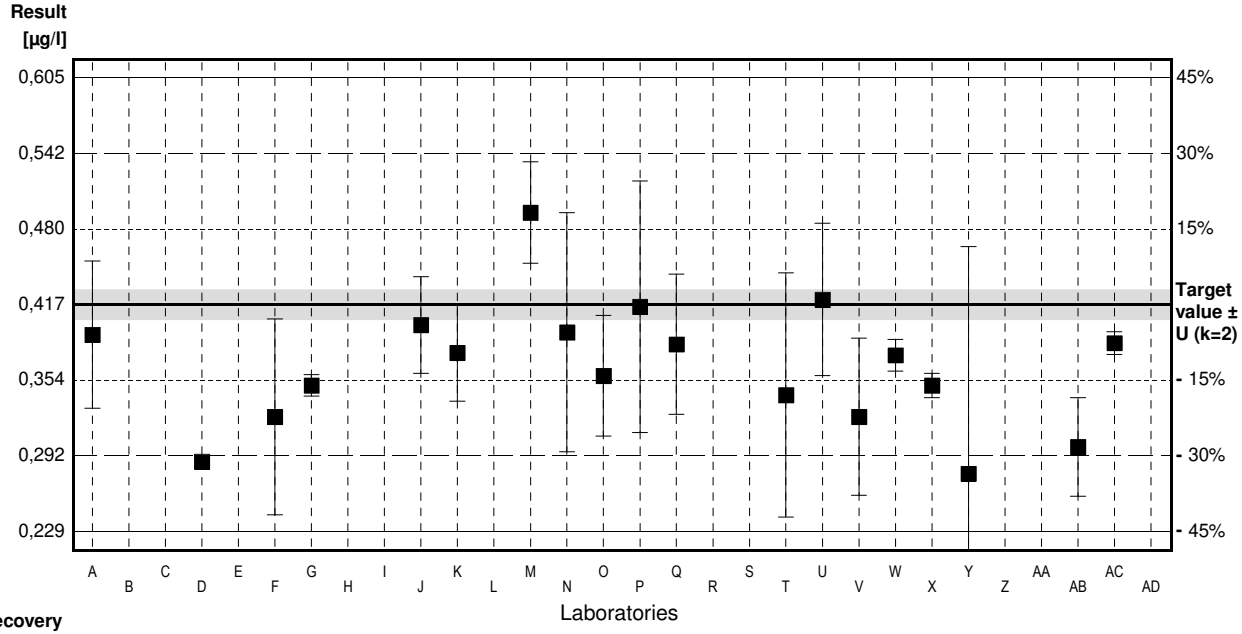


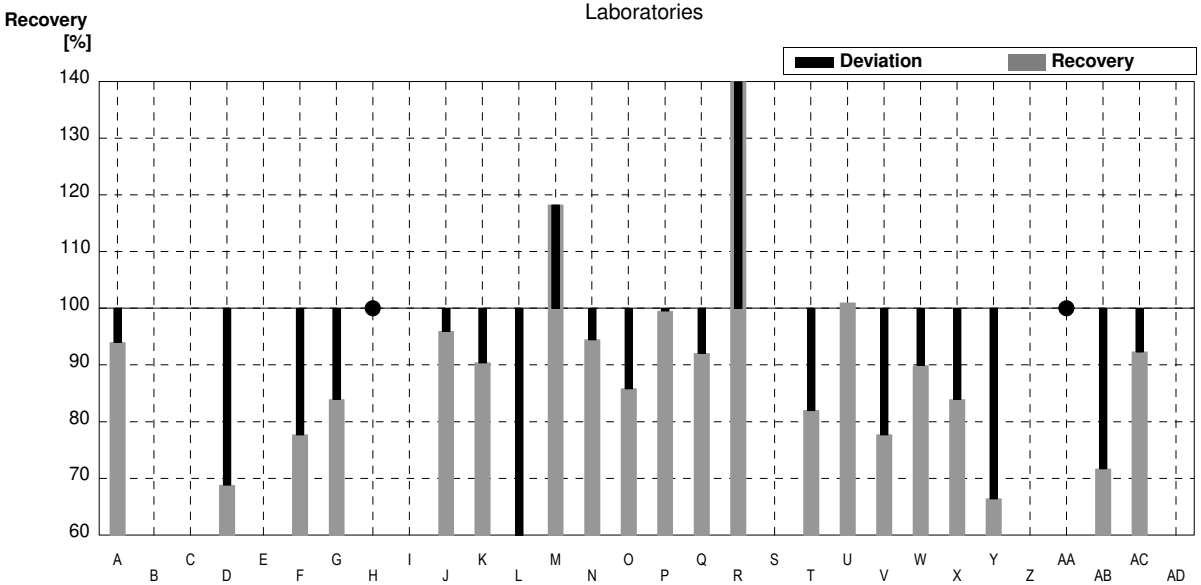
Sample M163A
Parameter Mercury

Target value	± U (k=2)	0,417 µg/l	±	0,012 µg/l	
IFA result	± U (k=2)	0,450 µg/l	±	0,085 µg/l	
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	0,392	0,061	µg/l	94%	-0,55
B			µg/l		
C			µg/l		
D	0,287		µg/l	69%	-2,83
E			µg/l		
F	0,324	0,081	µg/l	78%	-2,03
G	0,350	0,009	µg/l	84%	-1,46
H	<0,5	0,05	µg/l	•	
I			µg/l		
J	0,400	0,0400	µg/l	96%	-0,37
K	0,377	0,04	µg/l	90%	-0,87
L	0,214 *	0,032	µg/l	51%	-4,43
M	0,493	0,042	µg/l	118%	1,66
N	0,394	0,099	µg/l	94%	-0,50
O	0,358	0,050	µg/l	86%	-1,29
P	0,415	0,104	µg/l	100%	-0,04
Q	0,384	0,058	µg/l	92%	-0,72
R	0,69 *	0,2	µg/l	165%	5,95
S			µg/l		
T	0,342	0,101	µg/l	82%	-1,64
U	0,421	0,063	µg/l	101%	0,09
V	0,324	0,065	µg/l	78%	-2,03
W	0,375	0,0132	µg/l	90%	-0,92
X	0,350	0,01	µg/l	84%	-1,46
Y	0,277	0,188	µg/l	66%	-3,05
Z			µg/l		
AA	<0,468	0,249	µg/l	•	
AB	0,299	0,0408	µg/l	72%	-2,57
AC	0,385	0,0095	µg/l	92%	-0,70
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,374 ± 0,058	0,366 ± 0,034	µg/l
Recov. ± CI(99%)	89,7 ± 14,0	87,7 ± 8,2	%
SD between labs	0,094	0,052	µg/l
RSD between labs	25,0	14,2	%
n for calculation	21	19	



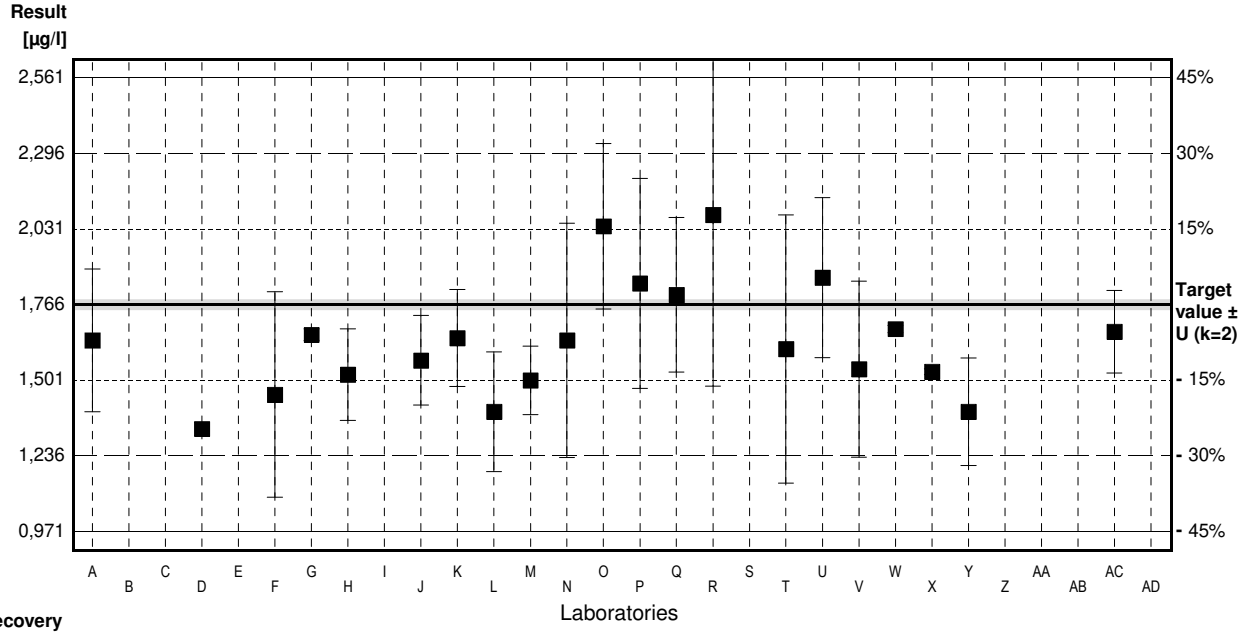


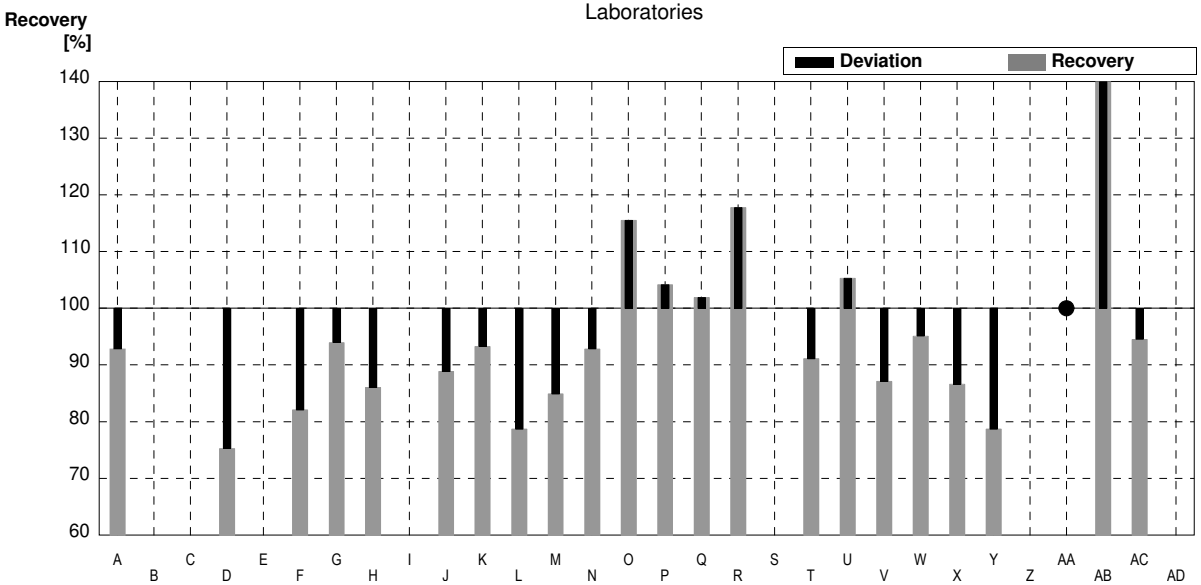
Sample M163B
Parameter Mercury

Target value ± U (k=2)	1,766 µg/l	±	0,018 µg/l		
IFA result ± U (k=2)	1,83 µg/l	±	0,34 µg/l		
Stability test	µg/l				

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,64	0,25	µg/l	93%	-0,65
B			µg/l		
C			µg/l		
D	1,33		µg/l	75%	-2,24
E			µg/l		
F	1,45	0,36	µg/l	82%	-1,63
G	1,66	0,02	µg/l	94%	-0,55
H	1,52	0,16	µg/l	86%	-1,27
I			µg/l		
J	1,57	0,157	µg/l	89%	-1,01
K	1,648	0,17	µg/l	93%	-0,61
L	1,39	0,21	µg/l	79%	-1,94
M	1,50	0,12	µg/l	85%	-1,37
N	1,640	0,410	µg/l	93%	-0,65
O	2,04	0,29	µg/l	116%	1,41
P	1,84	0,368	µg/l	104%	0,38
Q	1,80	0,271	µg/l	102%	0,18
R	2,08	0,6	µg/l	118%	1,62
S			µg/l		
T	1,61	0,47	µg/l	91%	-0,80
U	1,86	0,28	µg/l	105%	0,48
V	1,539	0,308	µg/l	87%	-1,17
W	1,68	0,0127	µg/l	95%	-0,44
X	1,53	0,01	µg/l	87%	-1,21
Y	1,39	0,188	µg/l	79%	-1,94
Z			µg/l		
AA	<1,79	0,18	µg/l	•	
AB	4,045 *	0,322	µg/l	229%	11,73
AC	1,67	0,145	µg/l	95%	-0,49
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,747 ± 0,331	1,637 ± 0,124	µg/l
Recov. ± CI(99%)	98,9 ± 18,7	92,7 ± 7,0	%
SD between labs	0,549	0,199	µg/l
RSD between labs	31,4	12,1	%
n for calculation	22	21	



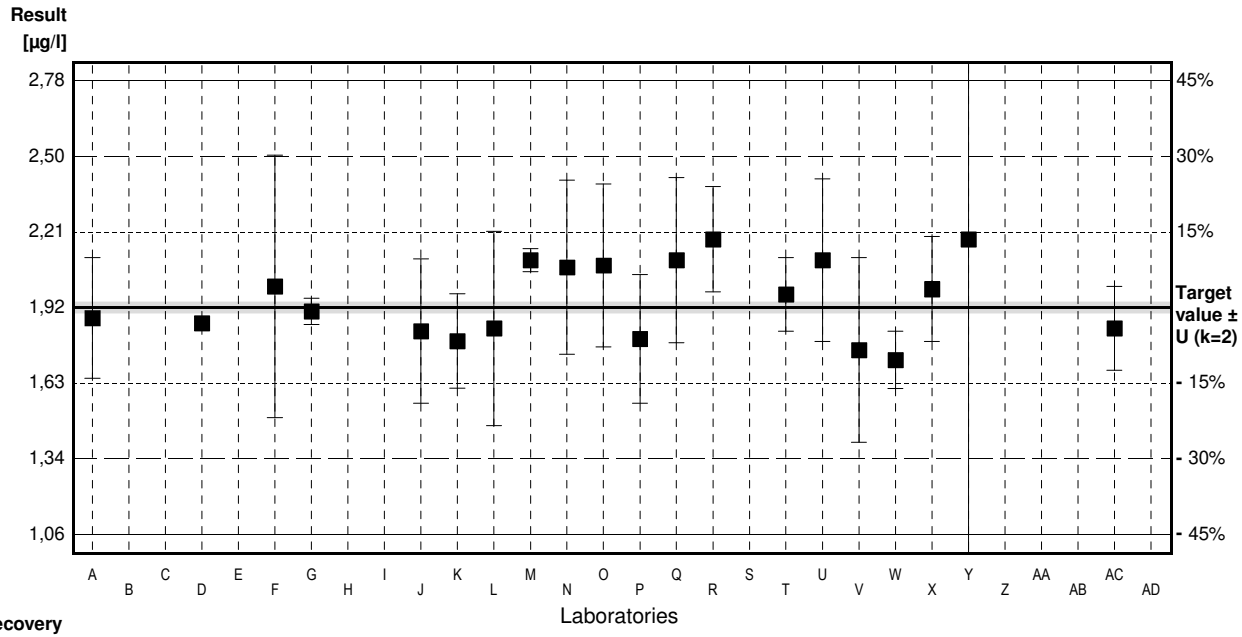


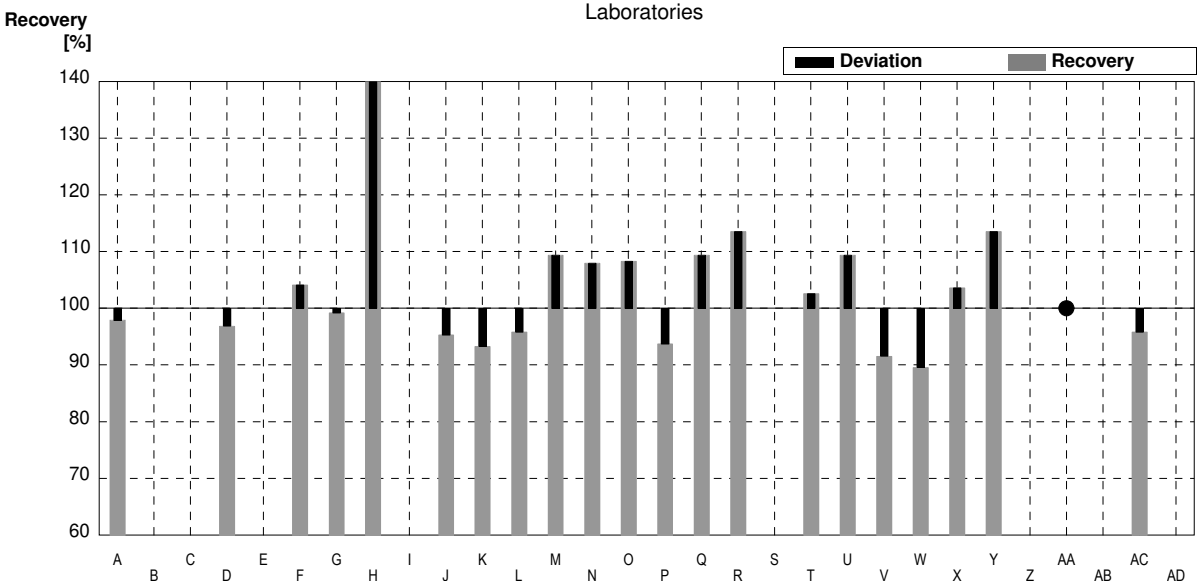
Sample M163A
Parameter Selenium

Target value ± U (k=2)	1,92	µg/l	±	0,02	µg/l
IFA result ± U (k=2)	2,21	µg/l	±	0,26	µg/l
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,88	0,23	µg/l	98%	-0,21
B			µg/l		
C			µg/l		
D	1,86		µg/l	97%	-0,31
E			µg/l		
F	2,00	0,50	µg/l	104%	0,42
G	1,905	0,05	µg/l	99%	-0,08
H	2,93 *	0,30	µg/l	153%	5,26
I			µg/l		
J	1,83	0,275	µg/l	95%	-0,47
K	1,792	0,18	µg/l	93%	-0,67
L	1,84	0,37	µg/l	96%	-0,42
M	2,10	0,044	µg/l	109%	0,94
N	2,073	0,332	µg/l	108%	0,80
O	2,08	0,31	µg/l	108%	0,83
P	1,80	0,245	µg/l	94%	-0,62
Q	2,10	0,315	µg/l	109%	0,94
R	2,18	0,2	µg/l	114%	1,35
S			µg/l		
T	1,97	0,14	µg/l	103%	0,26
U	2,10	0,31	µg/l	109%	0,94
V	1,758	0,352	µg/l	92%	-0,84
W	1,72	0,109	µg/l	90%	-1,04
X	1,99	0,2	µg/l	104%	0,36
Y	2,18	1,32	µg/l	114%	1,35
Z			µg/l		
AA	<2,47	1,32	µg/l	•	
AB			µg/l		
AC	1,84	0,160	µg/l	96%	-0,42
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,00 ± 0,16	1,95 ± 0,09	µg/l
Recov. ± CI(99%)	104,0 ± 8,3	101,6 ± 4,8	%
SD between labs	0,26	0,15	µg/l
RSD between labs	12,8	7,4	%
n for calculation	21	20	



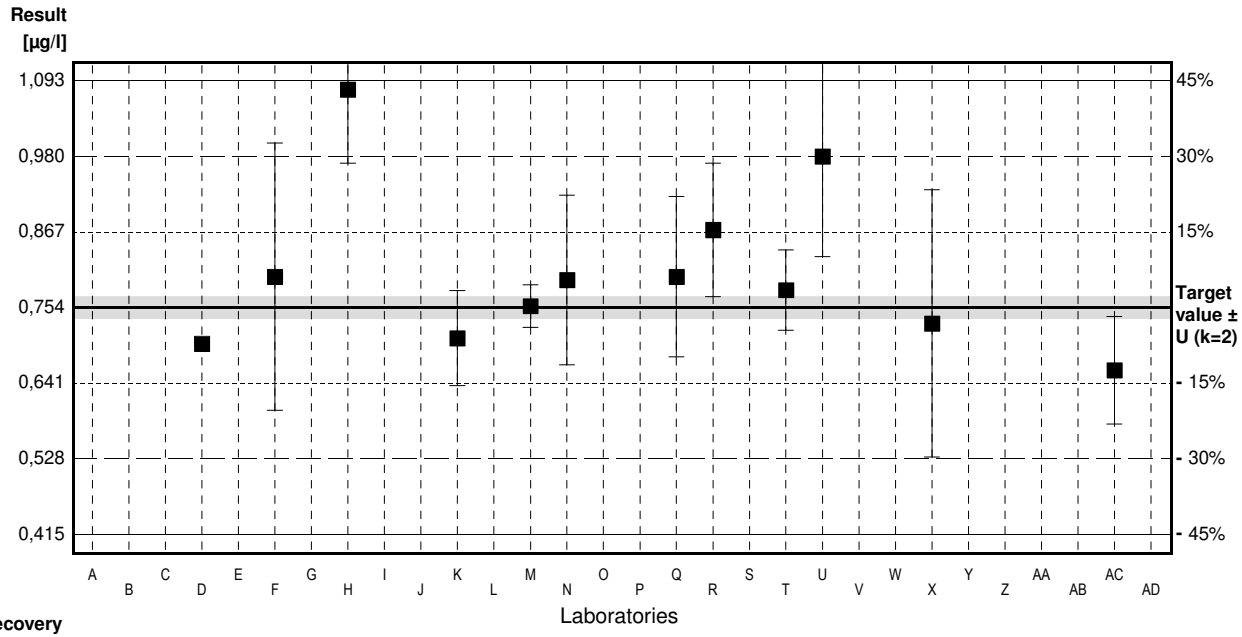


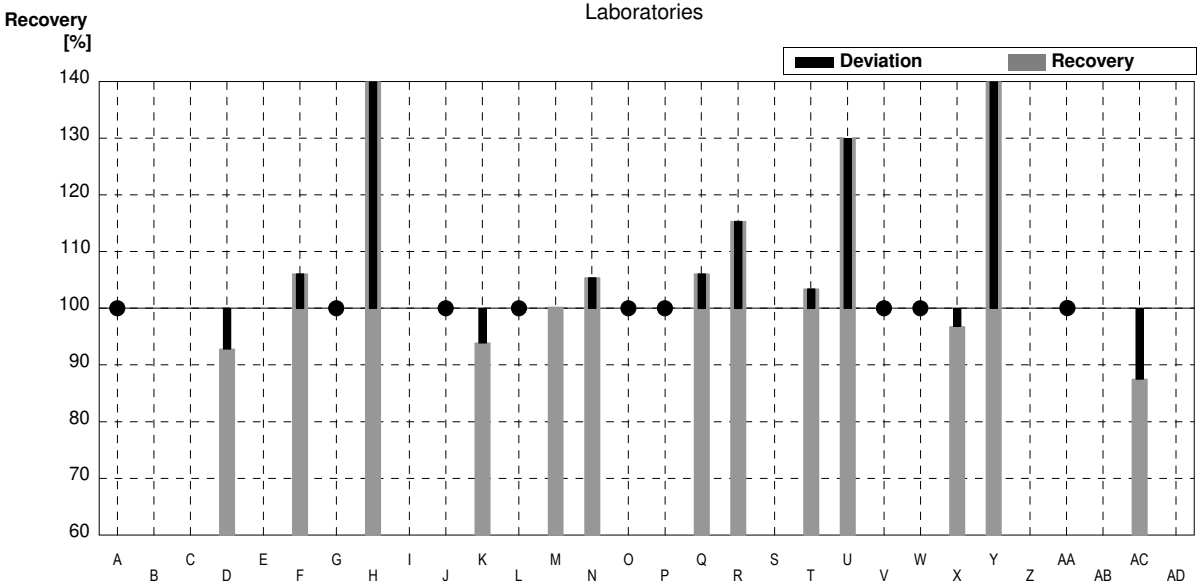
Sample M163B
Parameter Selenium

Target value ± U (k=2)	0,754 µg/l	±	0,017 µg/l		
IFA result ± U (k=2)	0,80 µg/l	±	0,10 µg/l		
Stability test	µg/l				

Lab Code	Result	±	Unit	Recovery	z-Score
A	<1,0		µg/l	•	
B			µg/l		
C			µg/l		
D	0,70		µg/l	93%	-0,72
E			µg/l		
F	0,80	0,20	µg/l	106%	0,61
G	<1		µg/l	•	
H	1,08	0,11	µg/l	143%	4,32
I			µg/l		
J	<1,0		µg/l	•	
K	0,708	0,071	µg/l	94%	-0,61
L	<1		µg/l	•	
M	0,756	0,032	µg/l	100%	0,03
N	0,795	0,127	µg/l	105%	0,54
O	<2		µg/l	•	
P	<1,0		µg/l	•	
Q	0,800	0,120	µg/l	106%	0,61
R	0,87	0,1	µg/l	115%	1,54
S			µg/l		
T	0,78	0,06	µg/l	103%	0,34
U	0,98	0,15	µg/l	130%	3,00
V	<1,250		µg/l	•	
W	<1		µg/l	•	
X	0,73	0,2	µg/l	97%	-0,32
Y	1,29 *	1,32	µg/l	171%	7,11
Z			µg/l		
AA	<0,73	0,36	µg/l	•	
AB			µg/l		
AC	0,660	0,0803	µg/l	88%	-1,25
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,842 ± 0,150	0,805 ± 0,109	µg/l
Recov. ± CI(99%)	111,7 ± 19,9	106,8 ± 14,4	%
SD between labs	0,177	0,121	µg/l
RSD between labs	21,1	15,0	%
n for calculation	13	12	



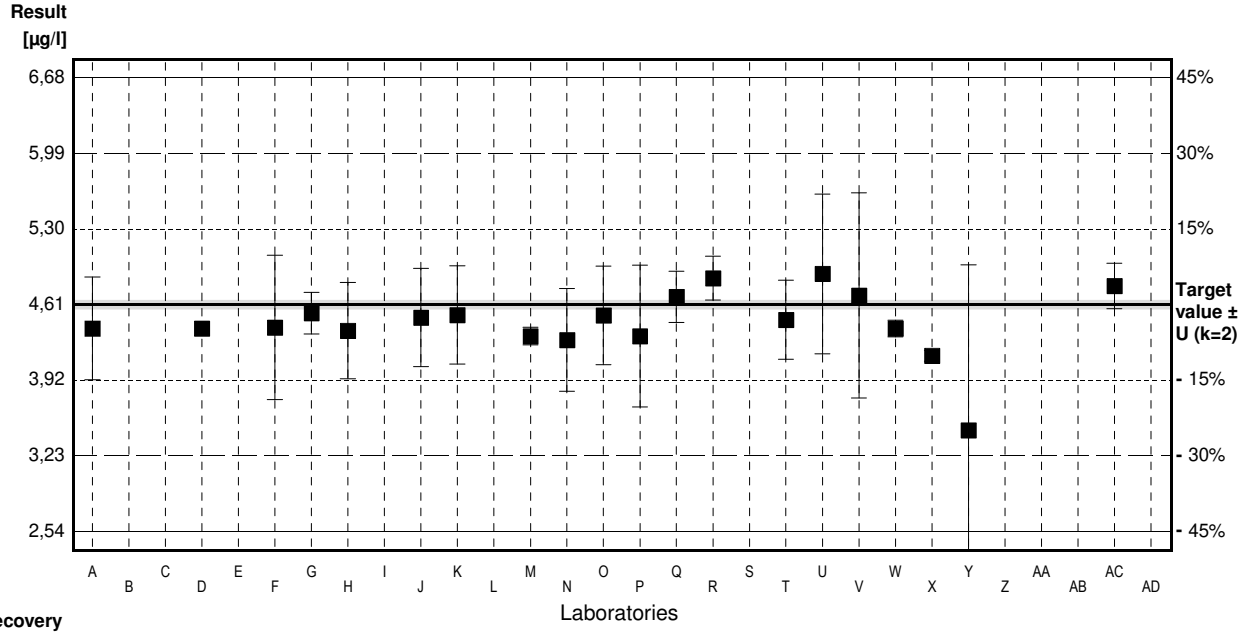


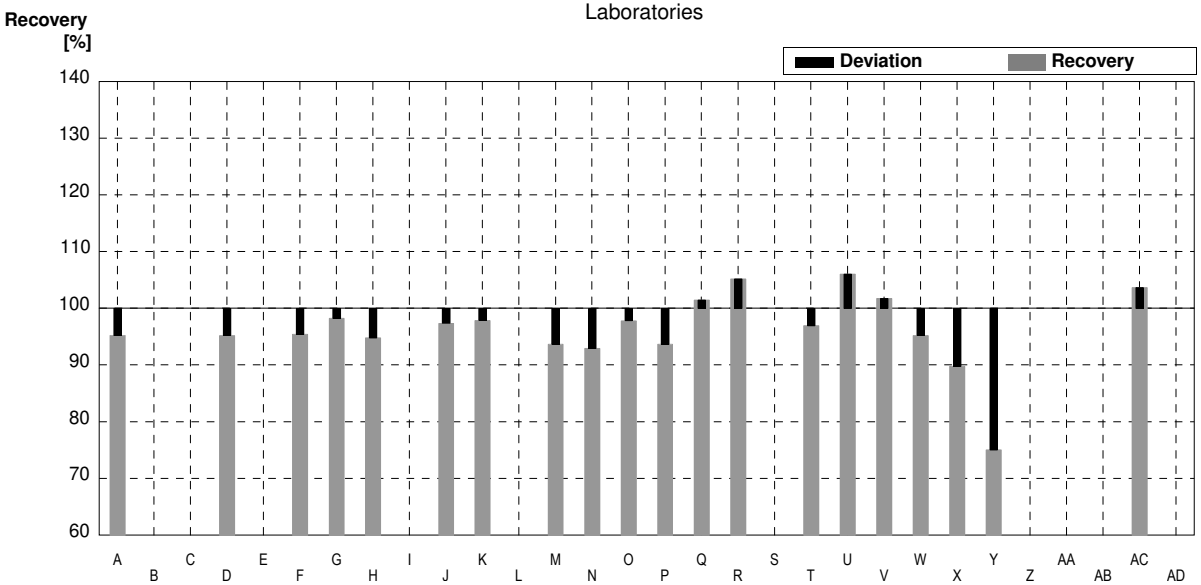
Sample M163A
Parameter Uranium

Target value	± U (k=2)	4,61 µg/l	±	0,04 µg/l	
IFA result	± U (k=2)	4,30 µg/l	±	0,48 µg/l	
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	4,39	0,47	µg/l	95%	-0,85
B			µg/l		
C			µg/l		
D	4,39		µg/l	95%	-0,85
E			µg/l		
F	4,40	0,66	µg/l	95%	-0,81
G	4,53	0,19	µg/l	98%	-0,31
H	4,37	0,44	µg/l	95%	-0,93
I			µg/l		
J	4,49	0,449	µg/l	97%	-0,46
K	4,513	0,45	µg/l	98%	-0,38
L			µg/l		
M	4,32	0,081	µg/l	94%	-1,12
N	4,285	0,471	µg/l	93%	-1,26
O	4,51	0,45	µg/l	98%	-0,39
P	4,32	0,648	µg/l	94%	-1,12
Q	4,68	0,234	µg/l	102%	0,27
R	4,85	0,2	µg/l	105%	0,93
S			µg/l		
T	4,47	0,36	µg/l	97%	-0,54
U	4,89	0,73	µg/l	106%	1,08
V	4,693	0,939	µg/l	102%	0,32
W	4,39	0,0751	µg/l	95%	-0,85
X	4,14	0,05	µg/l	90%	-1,82
Y	3,46 *	1,51	µg/l	75%	-4,45
Z			µg/l		
AA			µg/l		
AB			µg/l		
AC	4,78	0,208	µg/l	104%	0,66
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	4,44 ± 0,19	4,50 ± 0,13	µg/l
Recov. ± CI(99%)	96,4 ± 4,2	97,5 ± 2,9	%
SD between labs	0,30	0,20	µg/l
RSD between labs	6,8	4,5	%
n for calculation	20	19	



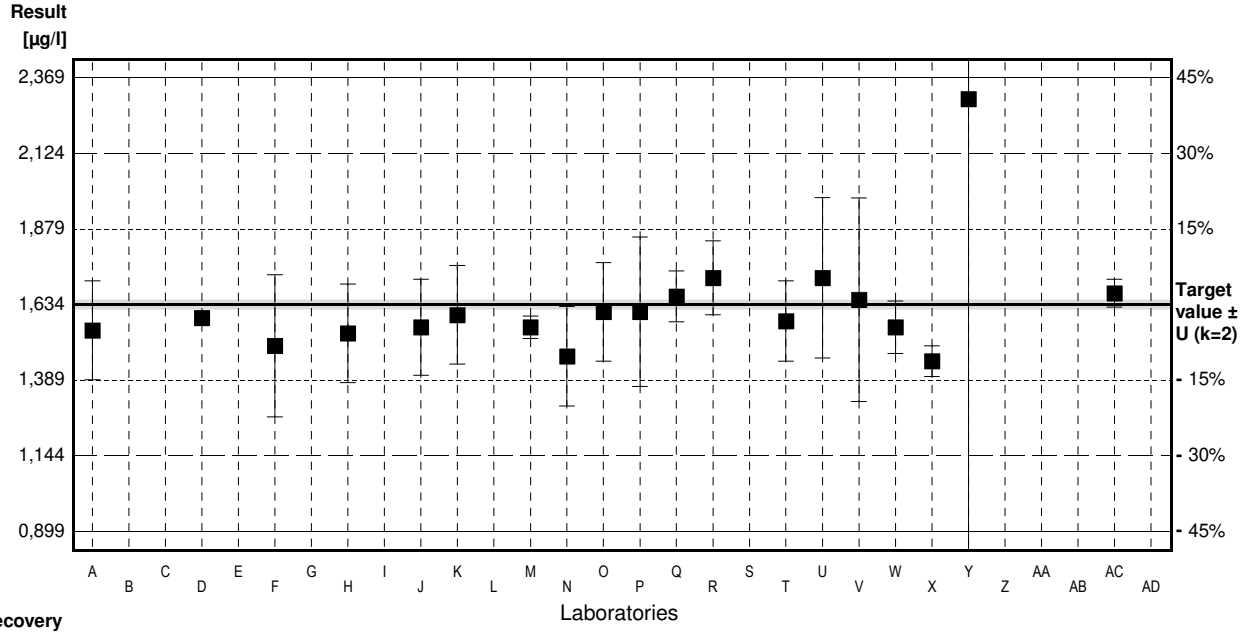


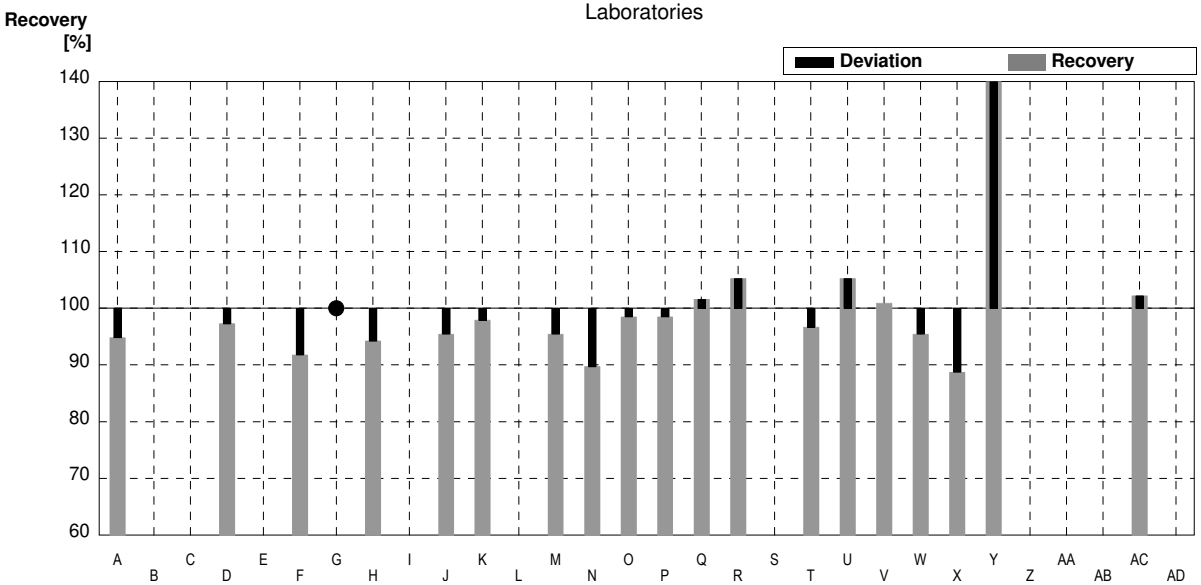
Sample M163B
Parameter Uranium

Target value	± U (k=2)	1,634 µg/l	±	0,015 µg/l	
IFA result	± U (k=2)	1,46 µg/l	±	0,16 µg/l	
Stability test		µg/l			

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,55	0,16	µg/l	95%	-0,92
B			µg/l		
C			µg/l		
D	1,59		µg/l	97%	-0,48
E			µg/l		
F	1,50	0,23	µg/l	92%	-1,46
G	<2		µg/l	•	
H	1,54	0,16	µg/l	94%	-1,03
I			µg/l		
J	1,56	0,156	µg/l	95%	-0,81
K	1,600	0,16	µg/l	98%	-0,37
L			µg/l		
M	1,56	0,036	µg/l	95%	-0,81
N	1,466	0,161	µg/l	90%	-1,84
O	1,61	0,16	µg/l	99%	-0,26
P	1,61	0,242	µg/l	99%	-0,26
Q	1,66	0,083	µg/l	102%	0,28
R	1,72	0,12	µg/l	105%	0,94
S			µg/l		
T	1,58	0,13	µg/l	97%	-0,59
U	1,72	0,26	µg/l	105%	0,94
V	1,649	0,330	µg/l	101%	0,16
W	1,56	0,0850	µg/l	95%	-0,81
X	1,45	0,05	µg/l	89%	-2,01
Y	2,30 *	1,51	µg/l	141%	7,28
Z			µg/l		
AA			µg/l		
AB			µg/l		
AC	1,67	0,045	µg/l	102%	0,39
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,626 ± 0,118	1,589 ± 0,052	µg/l
Recov. ± CI(99%)	99,5 ± 7,3	97,2 ± 3,2	%
SD between labs	0,179	0,076	µg/l
RSD between labs	11,0	4,8	%
n for calculation	19	18	



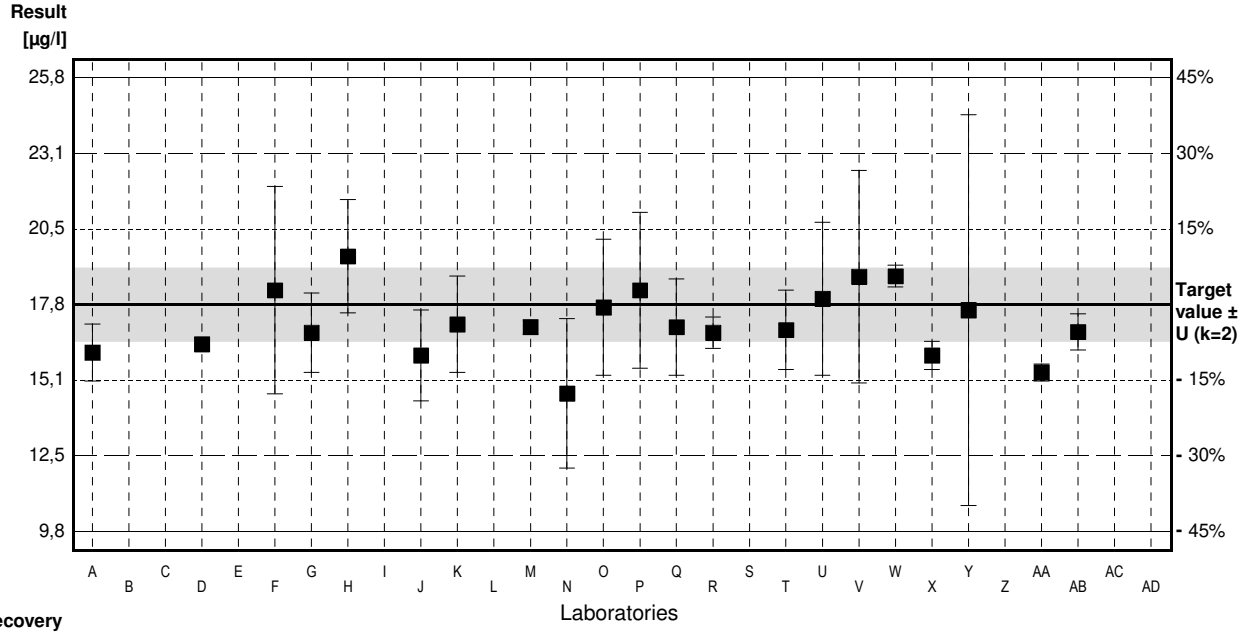


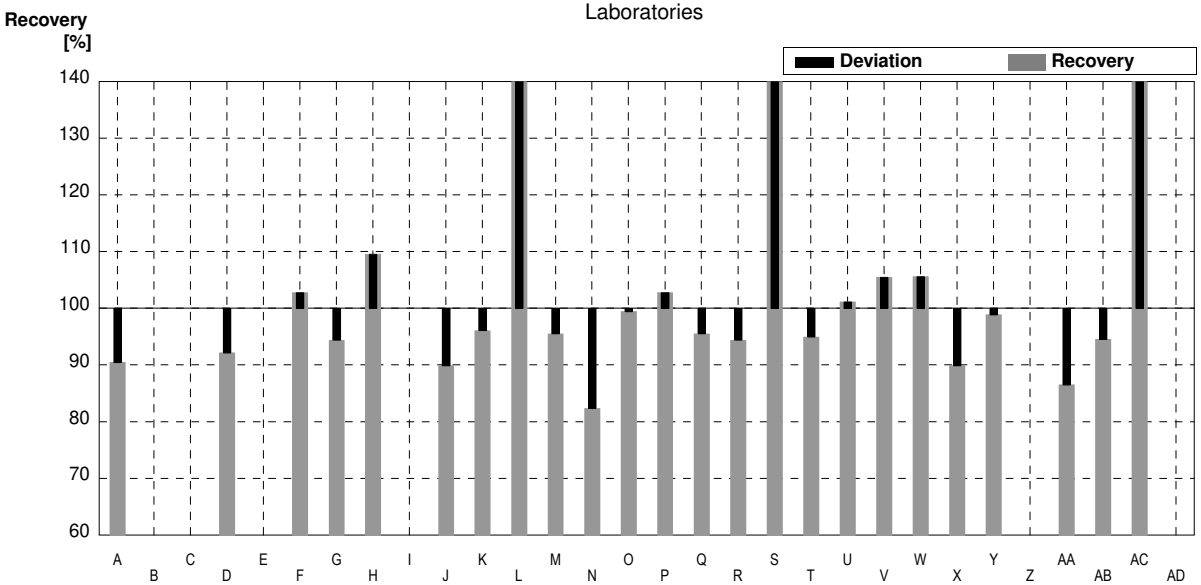
Sample M163A
Parameter Zinc

Target value ± U (k=2)	17,8 µg/l	±	1,3 µg/l
IFA result ± U (k=2)	19,3 µg/l	±	2,4 µg/l
Stability test	µg/l		

Lab Code	Result	±	Unit	Recovery	z-Score
A	16,1	1,0	µg/l	90%	-1,29
B			µg/l		
C			µg/l		
D	16,4		µg/l	92%	-1,06
E			µg/l		
F	18,3	3,66	µg/l	103%	0,38
G	16,8	1,4	µg/l	94%	-0,76
H	19,5	2,0	µg/l	110%	1,29
I			µg/l		
J	16,0	1,6	µg/l	90%	-1,37
K	17,1	1,7	µg/l	96%	-0,53
L	25,9 *	5,2	µg/l	146%	6,15
M	17,0	0,25	µg/l	96%	-0,61
N	14,66	2,64	µg/l	82%	-2,38
O	17,7	2,4	µg/l	99%	-0,08
P	18,3	2,75	µg/l	103%	0,38
Q	17,0	1,70	µg/l	96%	-0,61
R	16,8	0,55	µg/l	94%	-0,76
S	28,5 *	10	µg/l	160%	8,12
T	16,9	1,4	µg/l	95%	-0,68
U	18,0	2,7	µg/l	101%	0,15
V	18,780	3,756	µg/l	106%	0,74
W	18,8	0,381	µg/l	106%	0,76
X	16,0	0,5	µg/l	90%	-1,37
Y	17,6	6,9	µg/l	99%	-0,15
Z			µg/l		
AA	15,4	0,3	µg/l	87%	-1,82
AB	16,83	0,643	µg/l	95%	-0,74
AC	49,1 *	2,81	µg/l	276%	23,76
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	19,3 ± 4,0	17,1 ± 0,7	µg/l
Recov. ± CI(99%)	108,5 ± 22,7	96,3 ± 4,2	%
SD between labs	7,0	1,2	µg/l
RSD between labs	36,5	7,0	%
n for calculation	24	21	



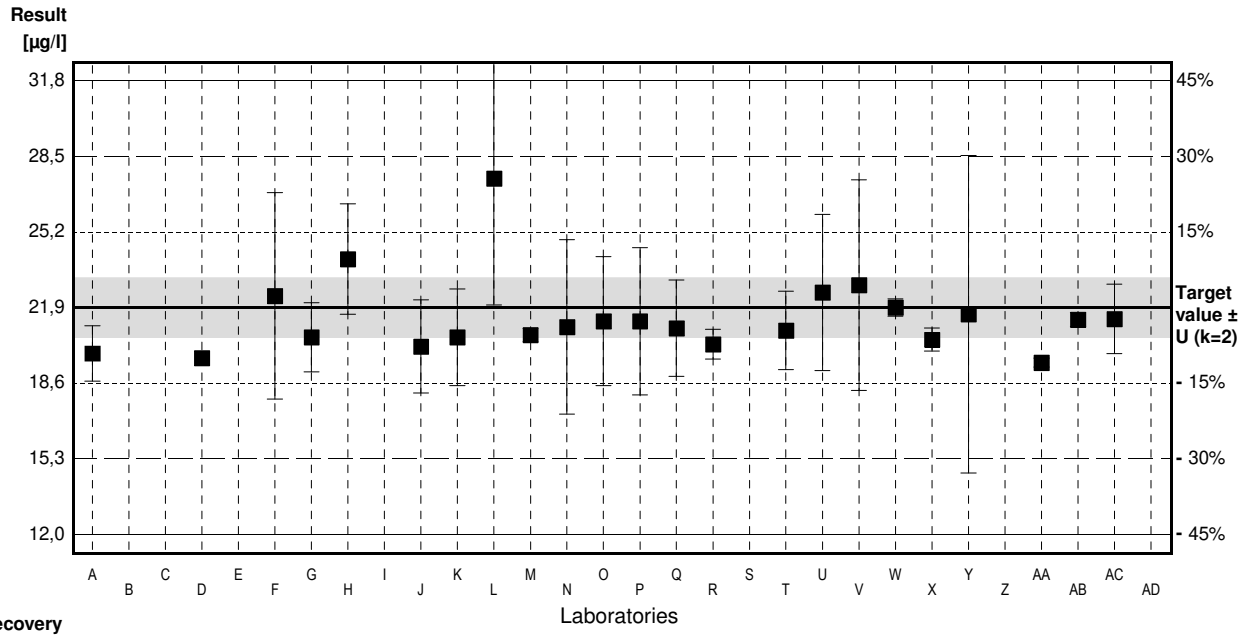


Sample M163B
Parameter Zinc

Target value ± U (k=2)	21,9 µg/l	±	1,3 µg/l
IFA result ± U (k=2)	23,0 µg/l	±	2,8 µg/l
Stability test	µg/l		

Lab Code	Result	±	Unit	Recovery	z-Score
A	19,9	1,2	µg/l	91%	-1,23
B			µg/l		
C			µg/l		
D	19,7		µg/l	90%	-1,36
E			µg/l		
F	22,4	4,48	µg/l	102%	0,31
G	20,6	1,50	µg/l	94%	-0,80
H	24,0	2,4	µg/l	110%	1,30
I			µg/l		
J	20,2	2,02	µg/l	92%	-1,05
K	20,6	2,1	µg/l	94%	-0,80
L	27,5 *	5,5	µg/l	126%	3,46
M	20,7	0,29	µg/l	95%	-0,74
N	21,05	3,79	µg/l	96%	-0,52
O	21,3	2,8	µg/l	97%	-0,37
P	21,3	3,20	µg/l	97%	-0,37
Q	21,0	2,10	µg/l	96%	-0,56
R	20,3	0,65	µg/l	93%	-0,99
S	34,5 *	10	µg/l	158%	7,77
T	20,9	1,7	µg/l	95%	-0,62
U	22,55	3,4	µg/l	103%	0,40
V	22,865	4,573	µg/l	104%	0,60
W	21,9	0,376	µg/l	100%	0,00
X	20,5	0,5	µg/l	94%	-0,86
Y	21,6	6,9	µg/l	99%	-0,19
Z			µg/l		
AA	19,5	0,2	µg/l	89%	-1,48
AB	21,367	0,306	µg/l	98%	-0,33
AC	21,4	1,51	µg/l	98%	-0,31
AD			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)	22,0 ± 1,8	21,2 ± 0,7	µg/l
Recov. ± CI(99%)	100,4 ± 8,2	96,6 ± 3,0	%
SD between labs	3,1	1,1	µg/l
RSD between labs	14,3	5,1	%
n for calculation	24	22	



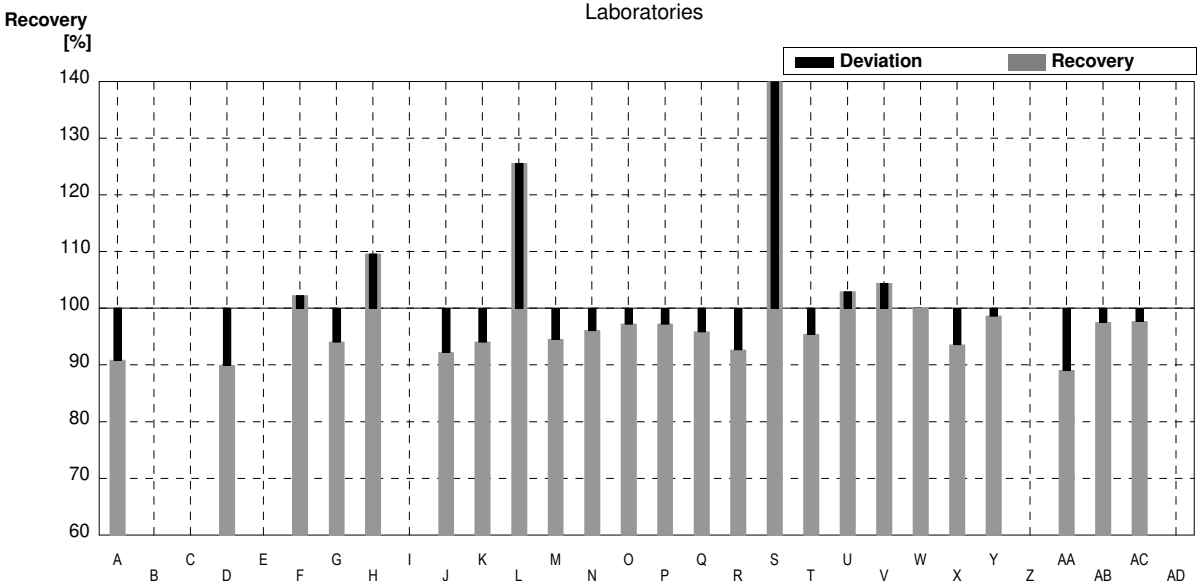


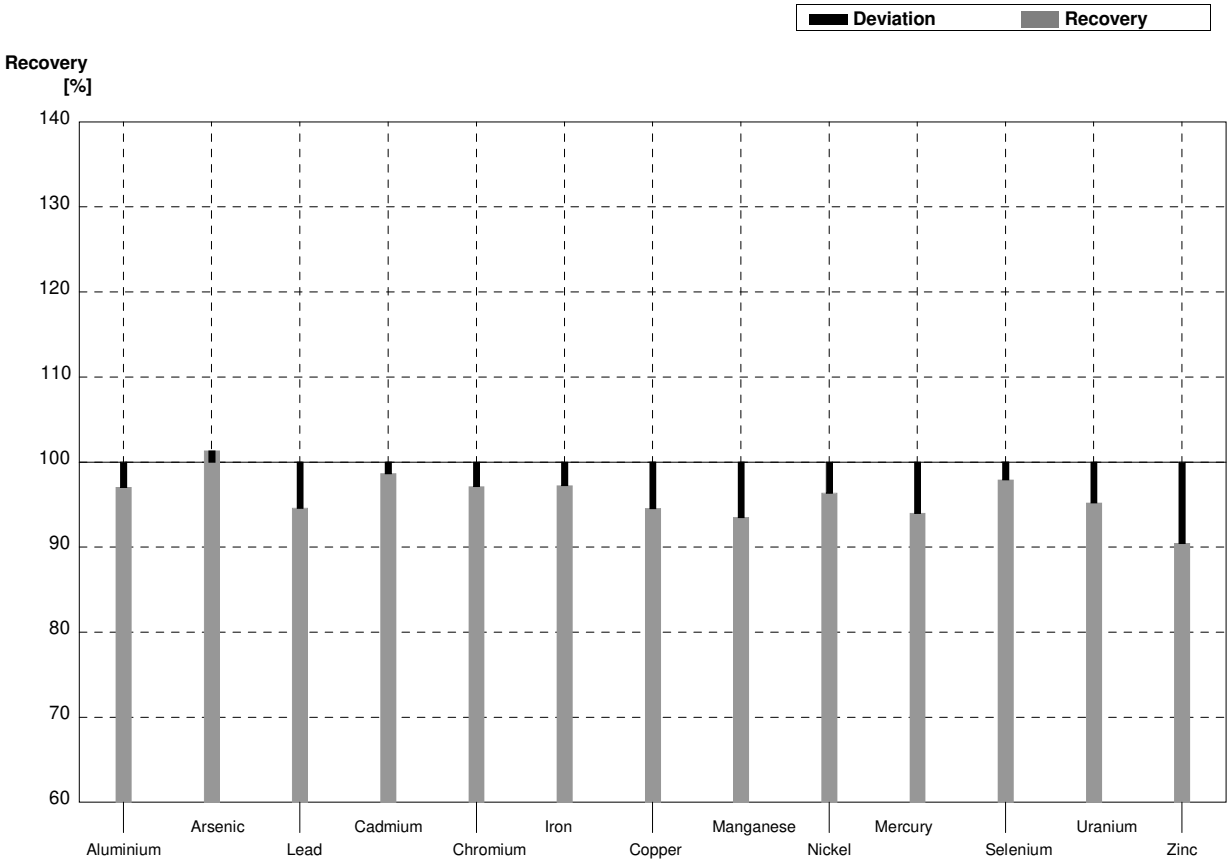
Illustration of Results
Laboratory Oriented Part

Round M163
Metals

Sample Dispatch: 5 September 2022

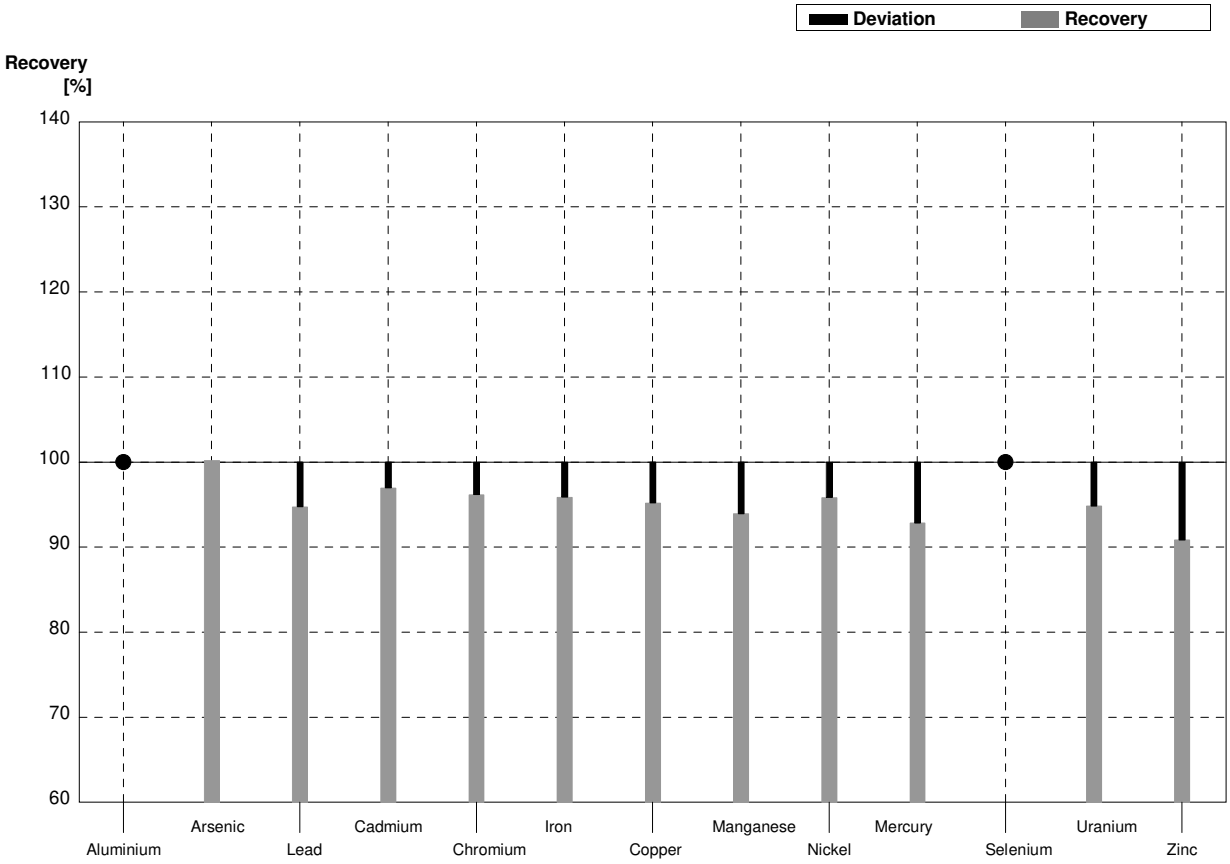
Sample **M163A**
Laboratory **A**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	19,7	2,2	µg/l	97%
Arsenic	1,056	0,010	1,07	0,060	µg/l	101%
Lead	3,14	0,03	2,97	0,31	µg/l	95%
Cadmium	2,017	0,016	1,99	0,093	µg/l	99%
Chromium	4,54	0,04	4,41	0,62	µg/l	97%
Iron	29,1	0,2	28,3	3,1	µg/l	97%
Copper	1,10	0,07	1,04	0,057	µg/l	95%
Manganese	38,5	0,2	36,0	2,0	µg/l	94%
Nickel	1,10	0,09	1,06	0,081	µg/l	96%
Mercury	0,417	0,012	0,392	0,061	µg/l	94%
Selenium	1,92	0,02	1,88	0,23	µg/l	98%
Uranium	4,61	0,04	4,39	0,47	µg/l	95%
Zinc	17,8	1,3	16,1	1,0	µg/l	90%



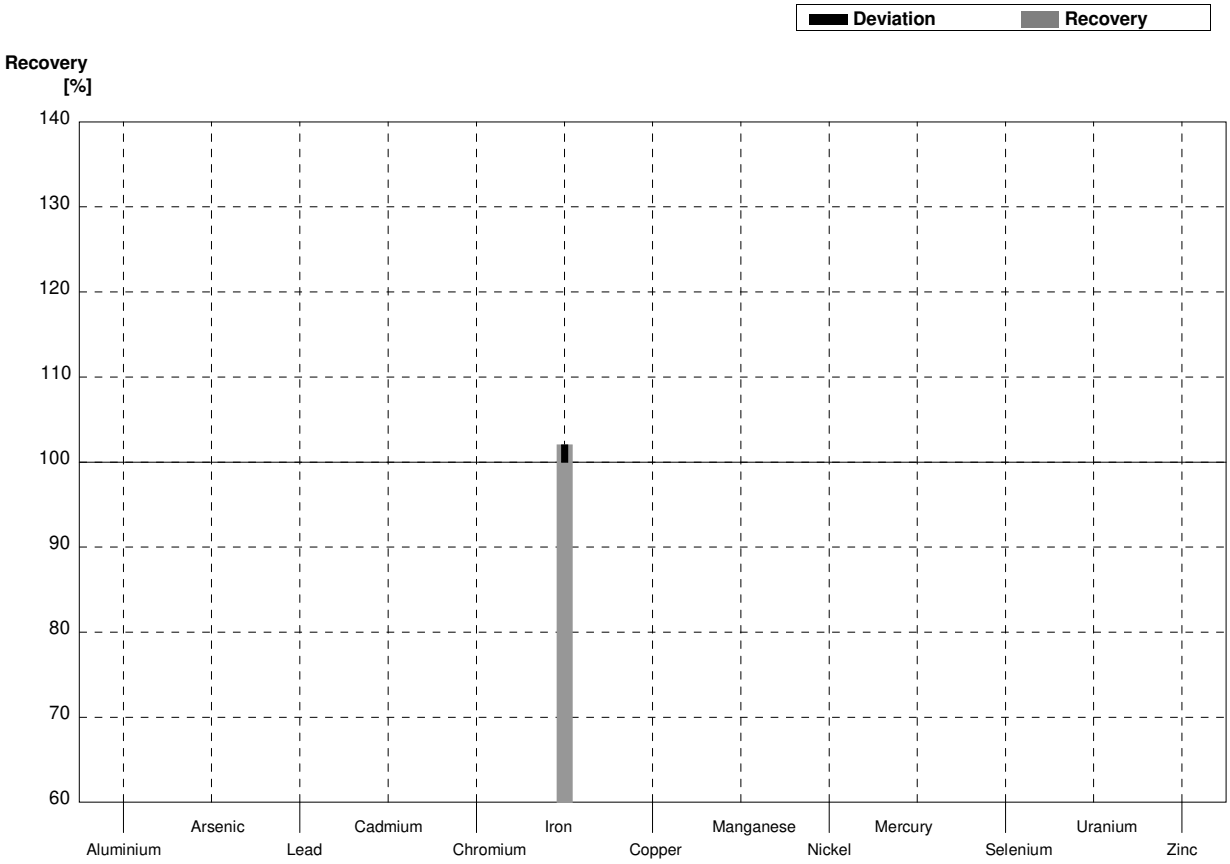
Sample **M163B**
Laboratory **A**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	<10,0		µg/l	•
Arsenic	1,537	0,013	1,54	0,086	µg/l	100%
Lead	1,741	0,017	1,65	0,17	µg/l	95%
Cadmium	0,695	0,007	0,674	0,054	µg/l	97%
Chromium	2,36	0,02	2,27	0,32	µg/l	96%
Iron	56,0	0,3	53,7	6,0	µg/l	96%
Copper	2,72	0,07	2,59	0,14	µg/l	95%
Manganese	9,58	0,11	9,00	0,49	µg/l	94%
Nickel	2,17	0,09	2,08	0,16	µg/l	96%
Mercury	1,766	0,018	1,64	0,25	µg/l	93%
Selenium	0,754	0,017	<1,0		µg/l	•
Uranium	1,634	0,015	1,55	0,16	µg/l	95%
Zinc	21,9	1,3	19,9	1,2	µg/l	91%



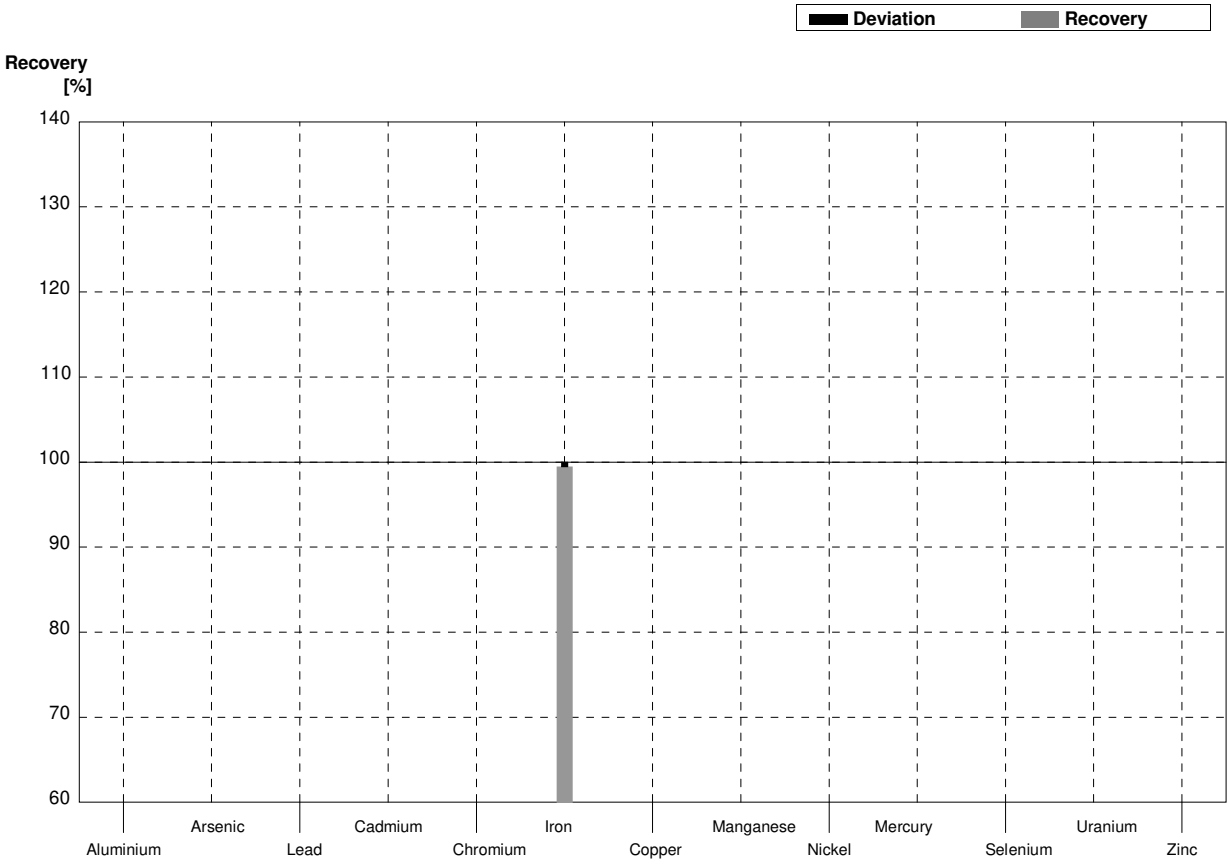
Sample **M163A**
Laboratory **B**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3			µg/l	
Arsenic	1,056	0,010			µg/l	
Lead	3,14	0,03			µg/l	
Cadmium	2,017	0,016			µg/l	
Chromium	4,54	0,04			µg/l	
Iron	29,1	0,2	29,7	2,9	µg/l	102%
Copper	1,10	0,07			µg/l	
Manganese	38,5	0,2			µg/l	
Nickel	1,10	0,09			µg/l	
Mercury	0,417	0,012			µg/l	
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3			µg/l	



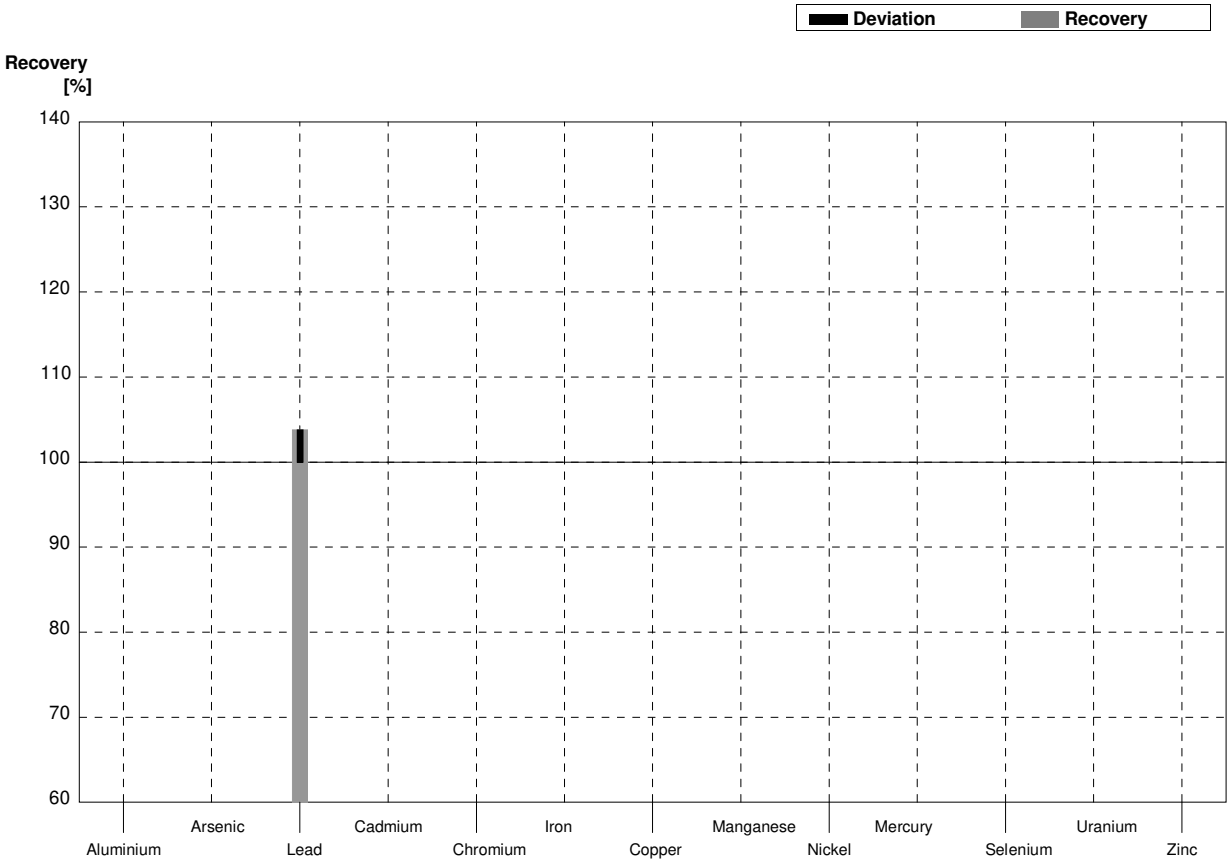
Sample **M163B**
Laboratory **B**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3			µg/l	
Arsenic	1,537	0,013			µg/l	
Lead	1,741	0,017			µg/l	
Cadmium	0,695	0,007			µg/l	
Chromium	2,36	0,02			µg/l	
Iron	56,0	0,3	55,7	5,3	µg/l	99%
Copper	2,72	0,07			µg/l	
Manganese	9,58	0,11			µg/l	
Nickel	2,17	0,09			µg/l	
Mercury	1,766	0,018			µg/l	
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3			µg/l	



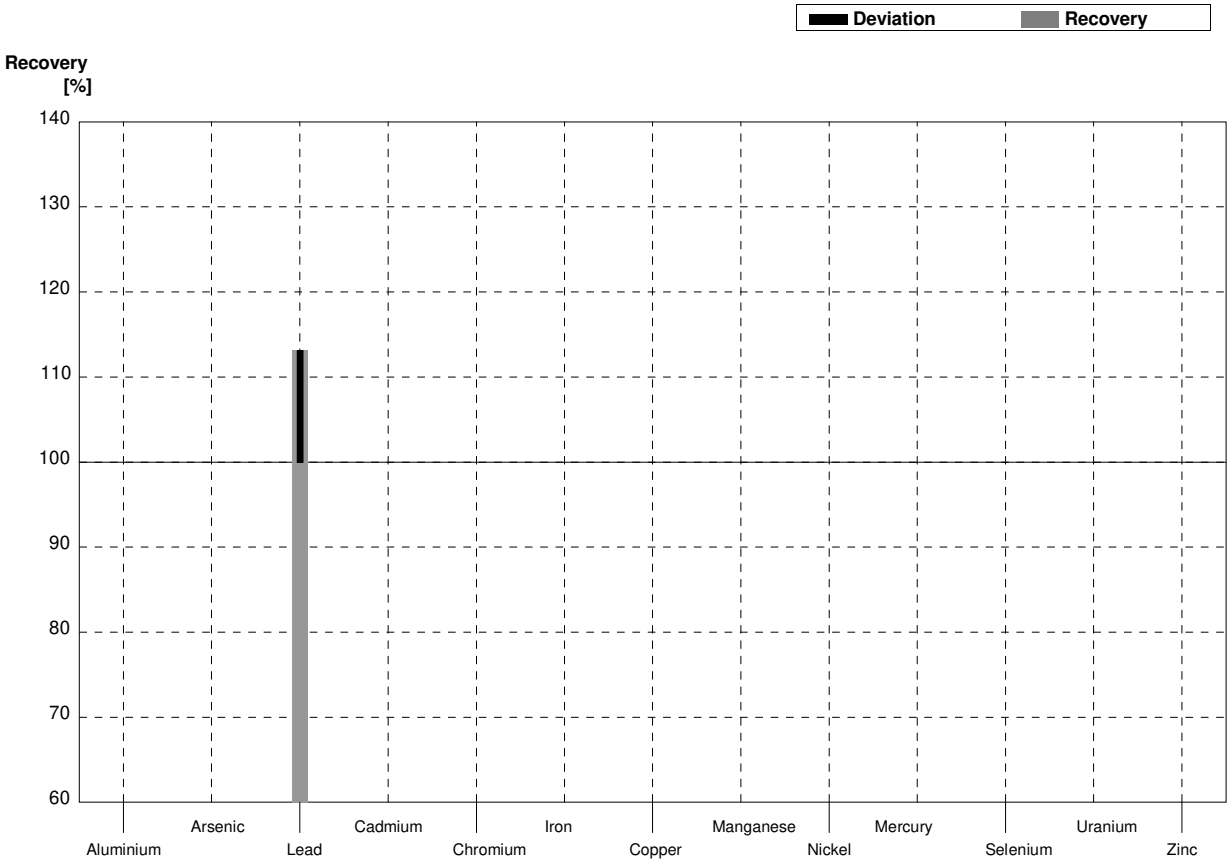
Sample **M163A**
Laboratory **C**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3			µg/l	
Arsenic	1,056	0,010			µg/l	
Lead	3,14	0,03	3,26	0,156	µg/l	104%
Cadmium	2,017	0,016			µg/l	
Chromium	4,54	0,04			µg/l	
Iron	29,1	0,2			µg/l	
Copper	1,10	0,07			µg/l	
Manganese	38,5	0,2			µg/l	
Nickel	1,10	0,09			µg/l	
Mercury	0,417	0,012			µg/l	
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3			µg/l	



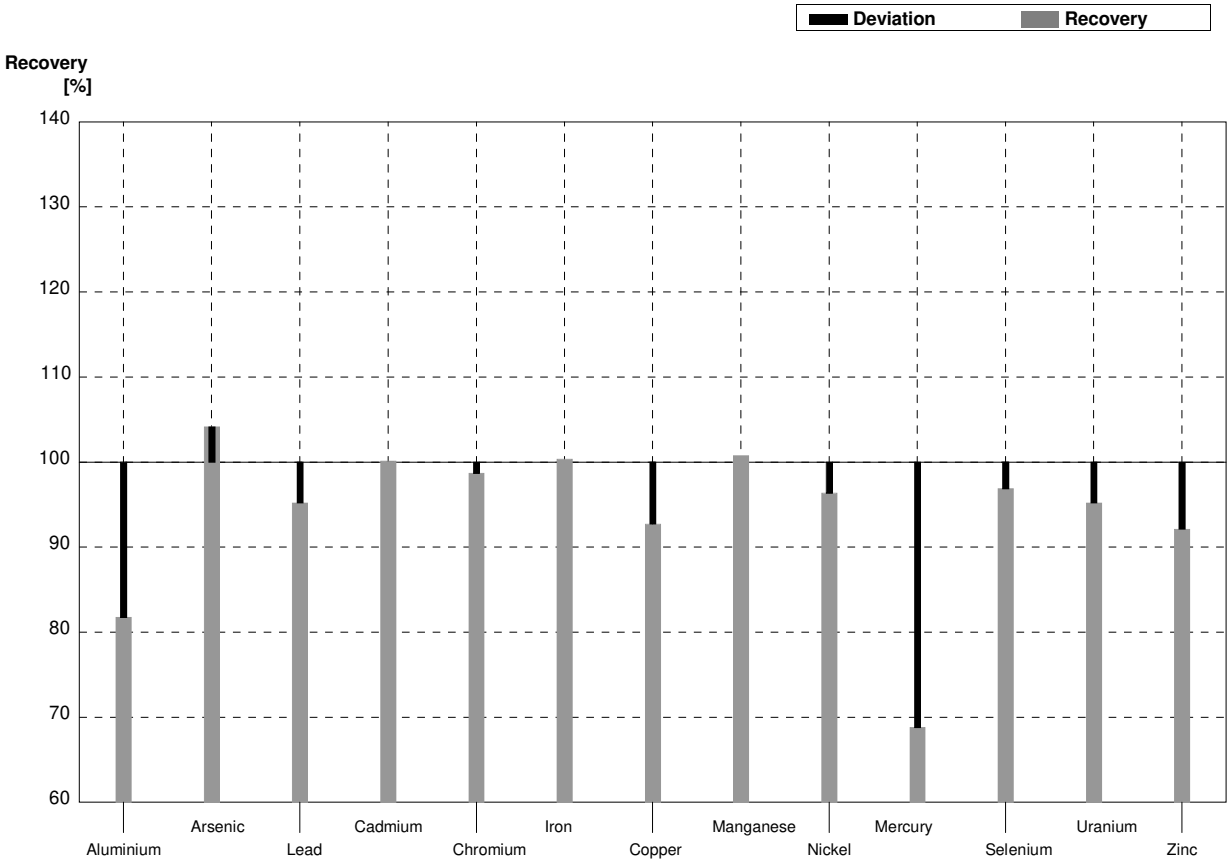
Sample **M163B**
Laboratory **C**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3			µg/l	
Arsenic	1,537	0,013			µg/l	
Lead	1,741	0,017	1,97	0,0945	µg/l	113%
Cadmium	0,695	0,007			µg/l	
Chromium	2,36	0,02			µg/l	
Iron	56,0	0,3			µg/l	
Copper	2,72	0,07			µg/l	
Manganese	9,58	0,11			µg/l	
Nickel	2,17	0,09			µg/l	
Mercury	1,766	0,018			µg/l	
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3			µg/l	



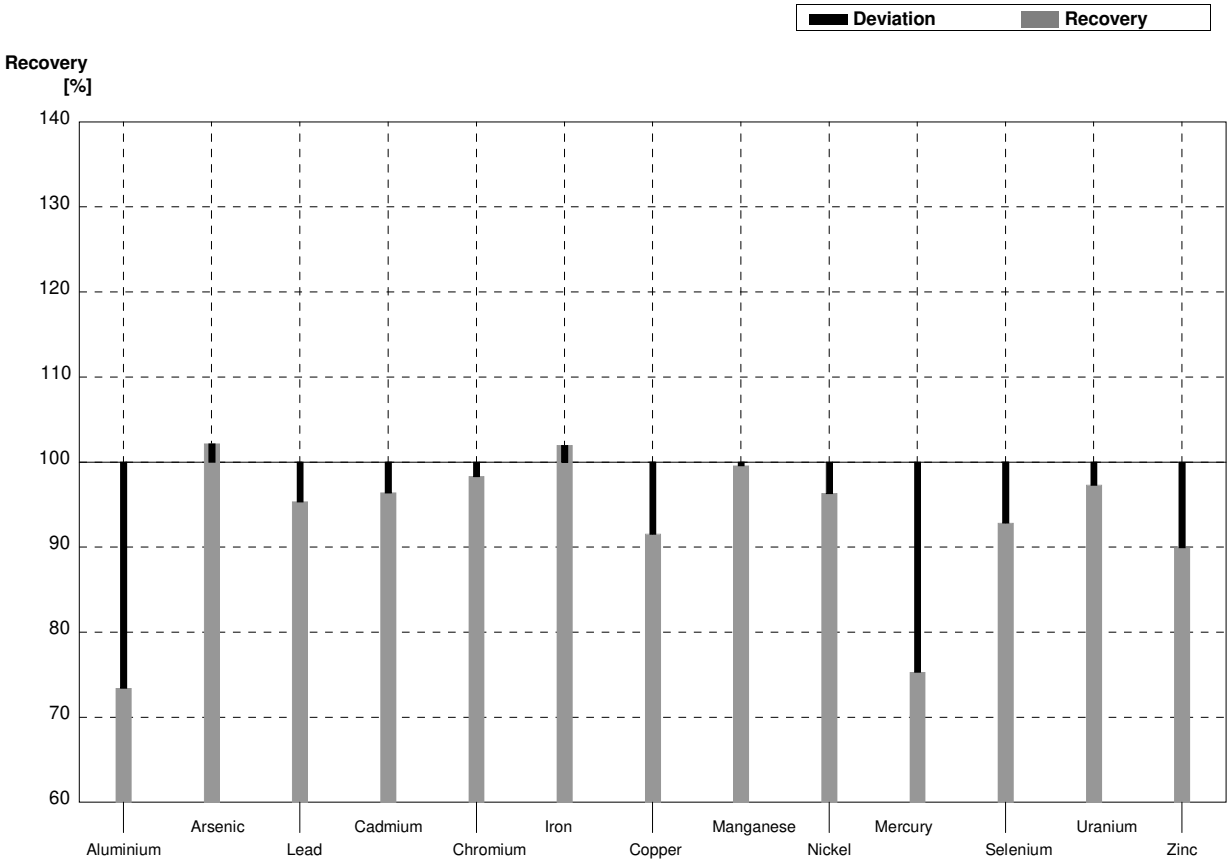
Sample **M163A**
Laboratory **D**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	16,6		µg/l	82%
Arsenic	1,056	0,010	1,10		µg/l	104%
Lead	3,14	0,03	2,99		µg/l	95%
Cadmium	2,017	0,016	2,02		µg/l	100%
Chromium	4,54	0,04	4,48		µg/l	99%
Iron	29,1	0,2	29,2		µg/l	100%
Copper	1,10	0,07	1,02		µg/l	93%
Manganese	38,5	0,2	38,8		µg/l	101%
Nickel	1,10	0,09	1,06		µg/l	96%
Mercury	0,417	0,012	0,287		µg/l	69%
Selenium	1,92	0,02	1,86		µg/l	97%
Uranium	4,61	0,04	4,39		µg/l	95%
Zinc	17,8	1,3	16,4		µg/l	92%



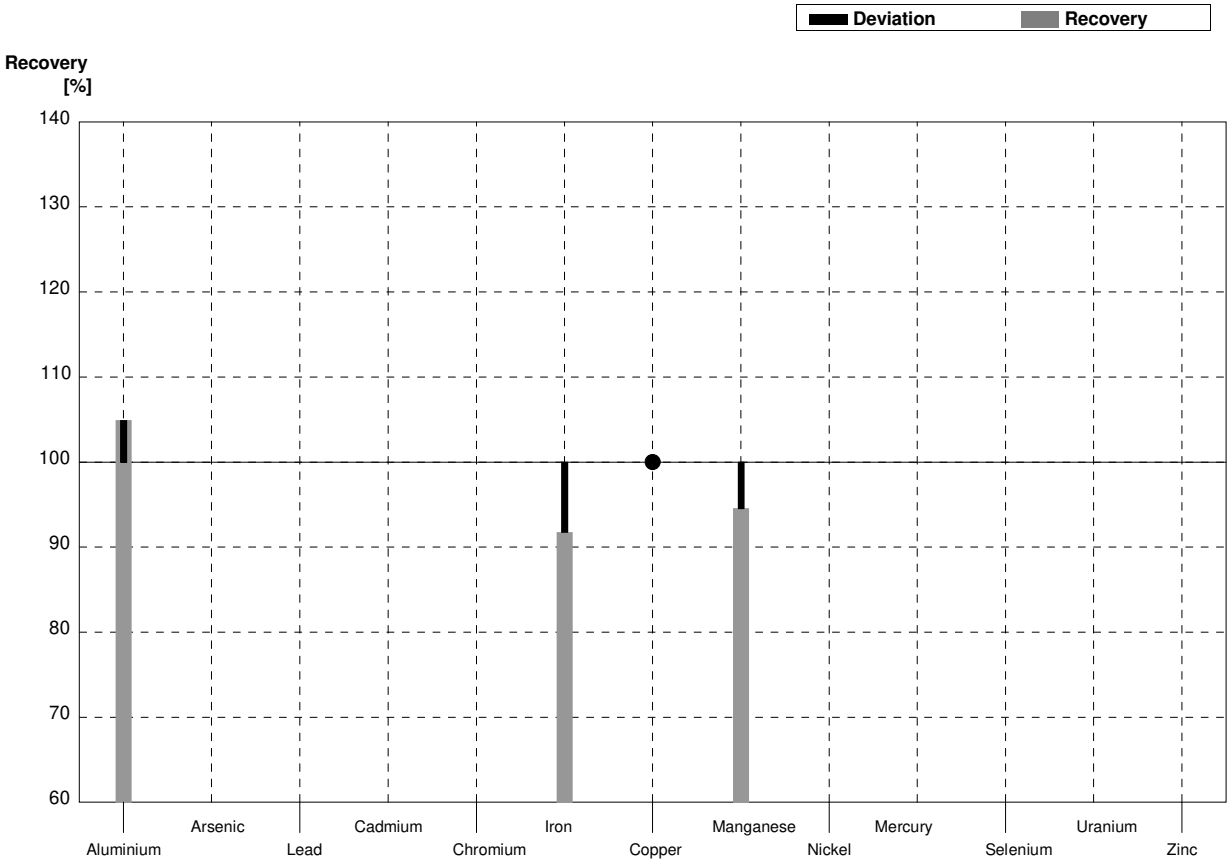
Sample **M163B**
Laboratory **D**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	5,36		µg/l	73%
Arsenic	1,537	0,013	1,57		µg/l	102%
Lead	1,741	0,017	1,66		µg/l	95%
Cadmium	0,695	0,007	0,67		µg/l	96%
Chromium	2,36	0,02	2,32		µg/l	98%
Iron	56,0	0,3	57,1		µg/l	102%
Copper	2,72	0,07	2,49		µg/l	92%
Manganese	9,58	0,11	9,54		µg/l	100%
Nickel	2,17	0,09	2,09		µg/l	96%
Mercury	1,766	0,018	1,33		µg/l	75%
Selenium	0,754	0,017	0,70		µg/l	93%
Uranium	1,634	0,015	1,59		µg/l	97%
Zinc	21,9	1,3	19,7		µg/l	90%



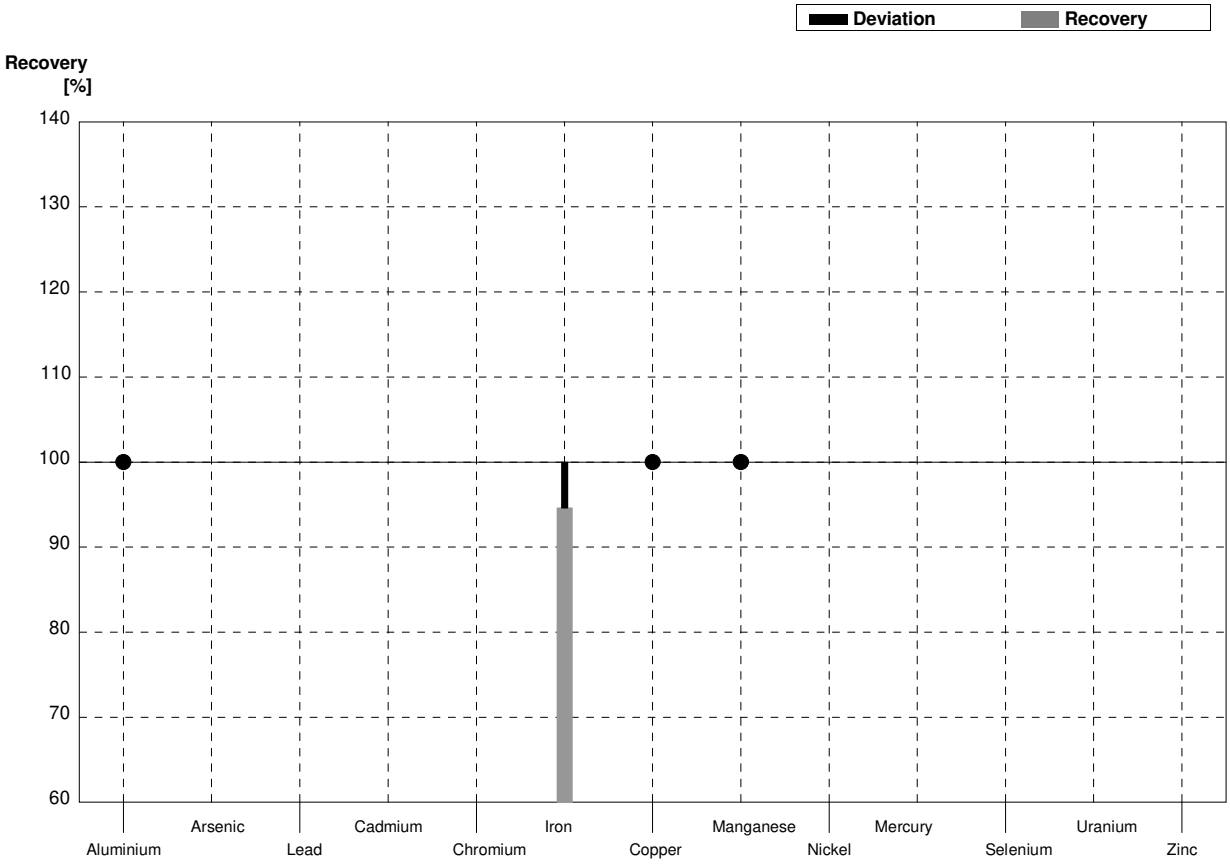
Sample **M163A**
Laboratory **E**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	21,3	3,6	µg/l	105%
Arsenic	1,056	0,010			µg/l	
Lead	3,14	0,03			µg/l	
Cadmium	2,017	0,016			µg/l	
Chromium	4,54	0,04			µg/l	
Iron	29,1	0,2	26,7	4,8	µg/l	92%
Copper	1,10	0,07	<10		µg/l	•
Manganese	38,5	0,2	36,4	6,6	µg/l	95%
Nickel	1,10	0,09			µg/l	
Mercury	0,417	0,012			µg/l	
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3			µg/l	



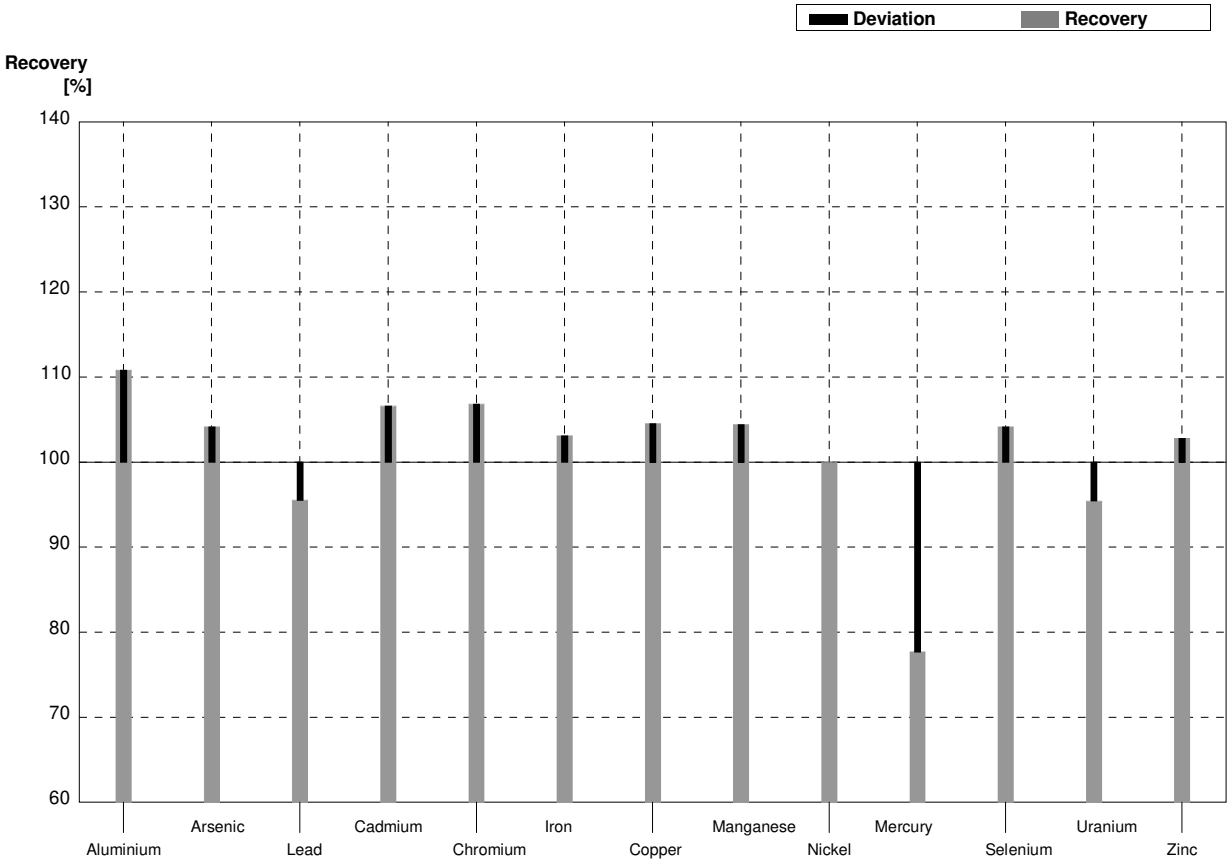
Sample **M163B**
Laboratory **E**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	<10		µg/l	•
Arsenic	1,537	0,013			µg/l	
Lead	1,741	0,017			µg/l	
Cadmium	0,695	0,007			µg/l	
Chromium	2,36	0,02			µg/l	
Iron	56,0	0,3	53	9	µg/l	95%
Copper	2,72	0,07	<10		µg/l	•
Manganese	9,58	0,11	<10		µg/l	•
Nickel	2,17	0,09			µg/l	
Mercury	1,766	0,018			µg/l	
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3			µg/l	



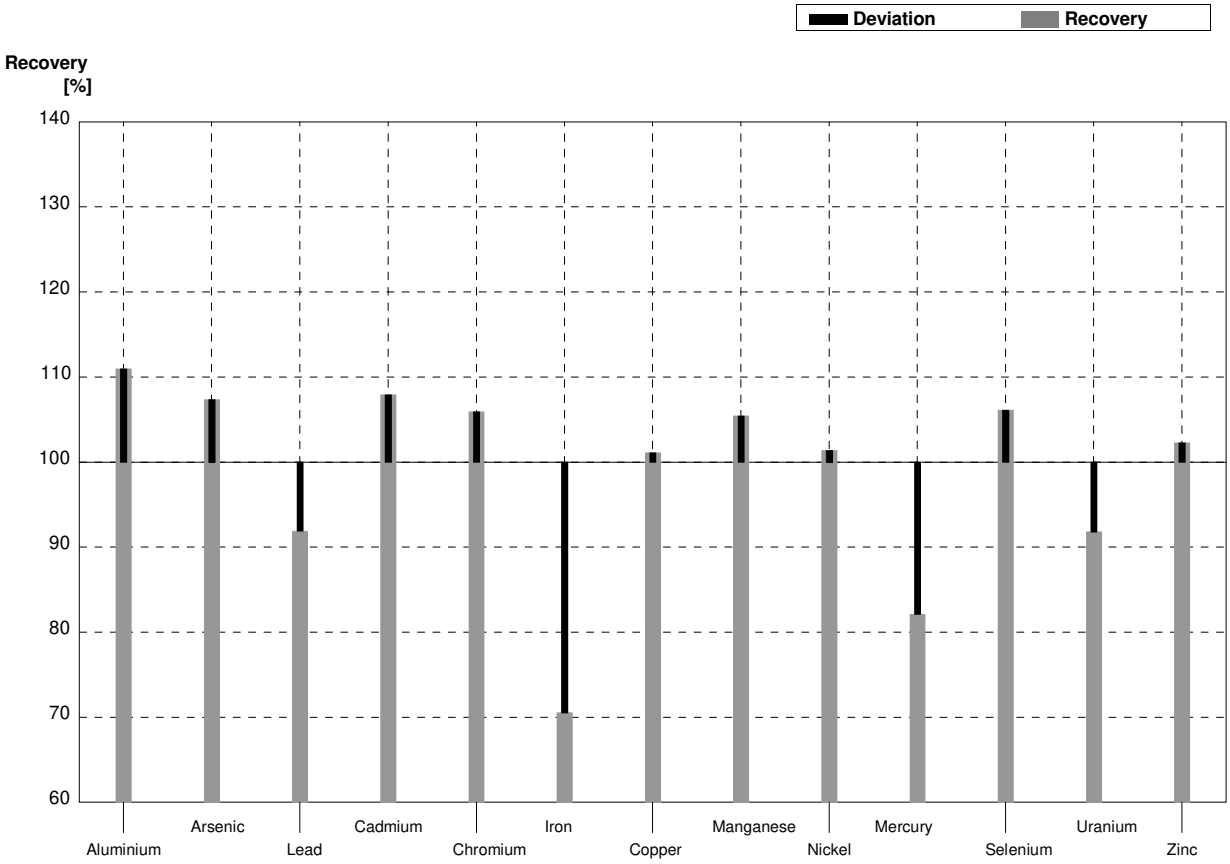
Sample **M163A**
Laboratory **F**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	22,5	3,38	µg/l	111%
Arsenic	1,056	0,010	1,10	0,22	µg/l	104%
Lead	3,14	0,03	3,00	0,60	µg/l	96%
Cadmium	2,017	0,016	2,15	0,32	µg/l	107%
Chromium	4,54	0,04	4,85	0,73	µg/l	107%
Iron	29,1	0,2	30,0	4,50	µg/l	103%
Copper	1,10	0,07	1,15	0,17	µg/l	105%
Manganese	38,5	0,2	40,2	6,03	µg/l	104%
Nickel	1,10	0,09	1,10	0,17	µg/l	100%
Mercury	0,417	0,012	0,324	0,081	µg/l	78%
Selenium	1,92	0,02	2,00	0,50	µg/l	104%
Uranium	4,61	0,04	4,40	0,66	µg/l	95%
Zinc	17,8	1,3	18,3	3,66	µg/l	103%



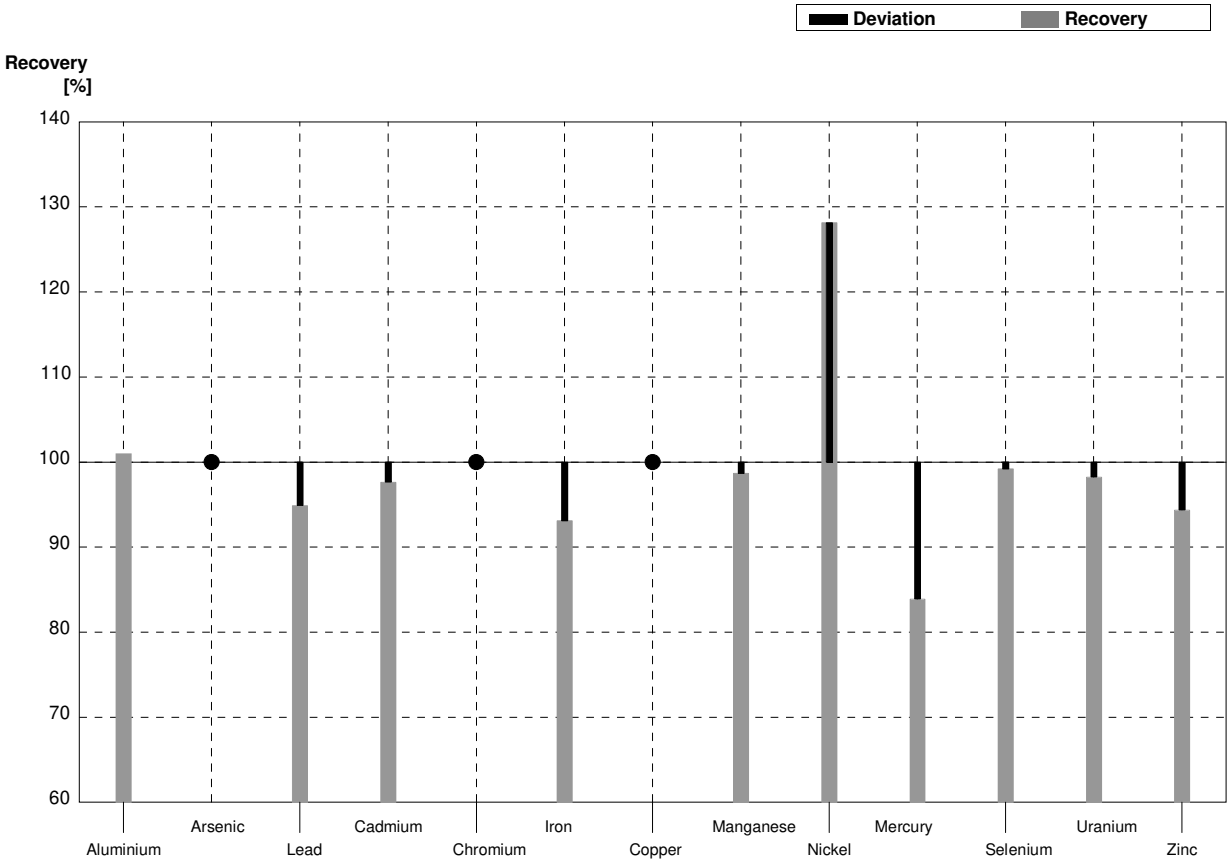
Sample M163B
Laboratory F

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	8,1	1,22	µg/l	111%
Arsenic	1,537	0,013	1,65	0,33	µg/l	107%
Lead	1,741	0,017	1,60	0,32	µg/l	92%
Cadmium	0,695	0,007	0,75	0,11	µg/l	108%
Chromium	2,36	0,02	2,50	0,38	µg/l	106%
Iron	56,0	0,3	39,5	5,93	µg/l	71%
Copper	2,72	0,07	2,75	0,41	µg/l	101%
Manganese	9,58	0,11	10,1	1,52	µg/l	105%
Nickel	2,17	0,09	2,20	0,33	µg/l	101%
Mercury	1,766	0,018	1,45	0,36	µg/l	82%
Selenium	0,754	0,017	0,80	0,20	µg/l	106%
Uranium	1,634	0,015	1,50	0,23	µg/l	92%
Zinc	21,9	1,3	22,4	4,48	µg/l	102%



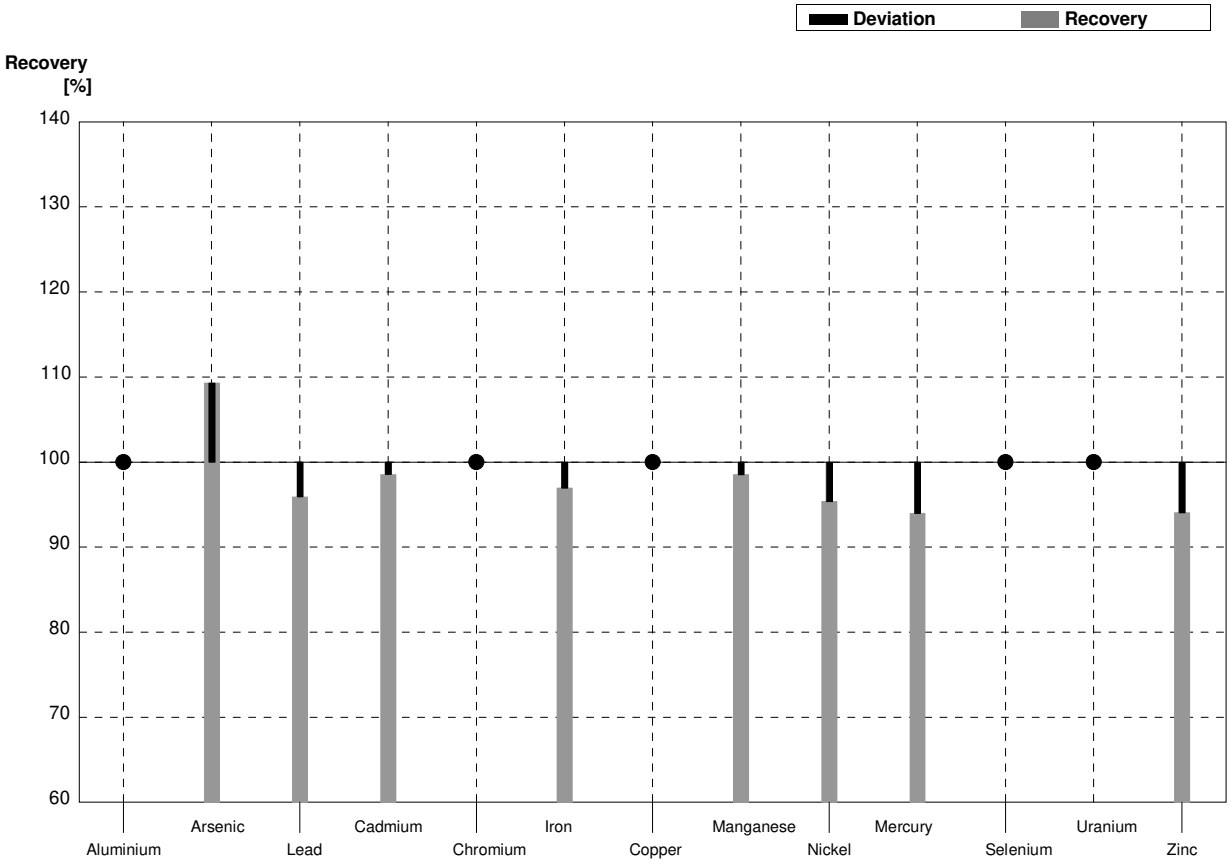
Sample **M163A**
Laboratory **G**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	20,5	0,6	µg/l	101%
Arsenic	1,056	0,010	<1,5		µg/l	•
Lead	3,14	0,03	2,98	0,06	µg/l	95%
Cadmium	2,017	0,016	1,97	0,1	µg/l	98%
Chromium	4,54	0,04	<5		µg/l	•
Iron	29,1	0,2	27,1	2,1	µg/l	93%
Copper	1,10	0,07	<5		µg/l	•
Manganese	38,5	0,2	38,0	1,2	µg/l	99%
Nickel	1,10	0,09	1,41	0,2	µg/l	128%
Mercury	0,417	0,012	0,350	0,009	µg/l	84%
Selenium	1,92	0,02	1,905	0,05	µg/l	99%
Uranium	4,61	0,04	4,53	0,19	µg/l	98%
Zinc	17,8	1,3	16,8	1,4	µg/l	94%



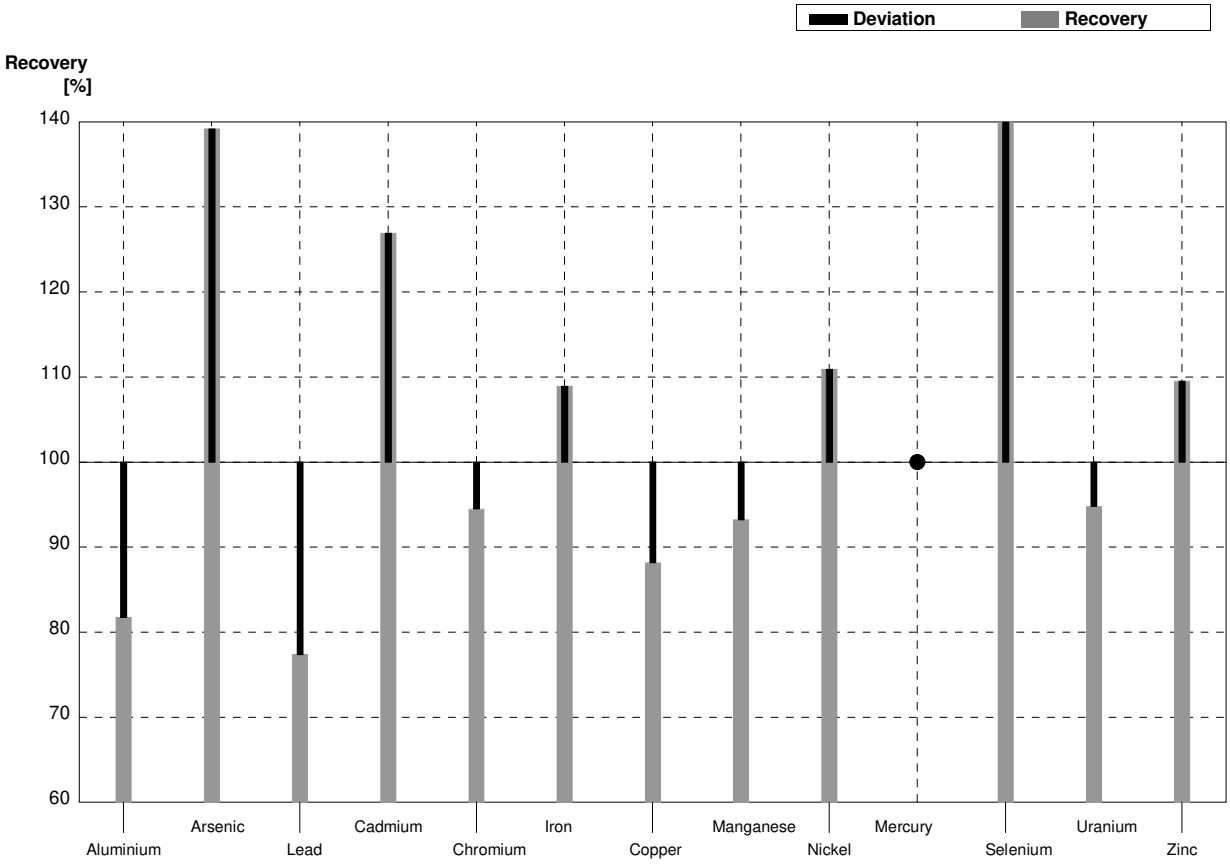
Sample **M163B**
Laboratory **G**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	<10		µg/l	•
Arsenic	1,537	0,013	1,68	0,18	µg/l	109%
Lead	1,741	0,017	1,67	0,07	µg/l	96%
Cadmium	0,695	0,007	0,685	0,022	µg/l	99%
Chromium	2,36	0,02	<5		µg/l	•
Iron	56,0	0,3	54,3	1,77	µg/l	97%
Copper	2,72	0,07	<5		µg/l	•
Manganese	9,58	0,11	9,44	0,31	µg/l	99%
Nickel	2,17	0,09	2,07	0,17	µg/l	95%
Mercury	1,766	0,018	1,66	0,02	µg/l	94%
Selenium	0,754	0,017	<1		µg/l	•
Uranium	1,634	0,015	<2		µg/l	•
Zinc	21,9	1,3	20,6	1,50	µg/l	94%



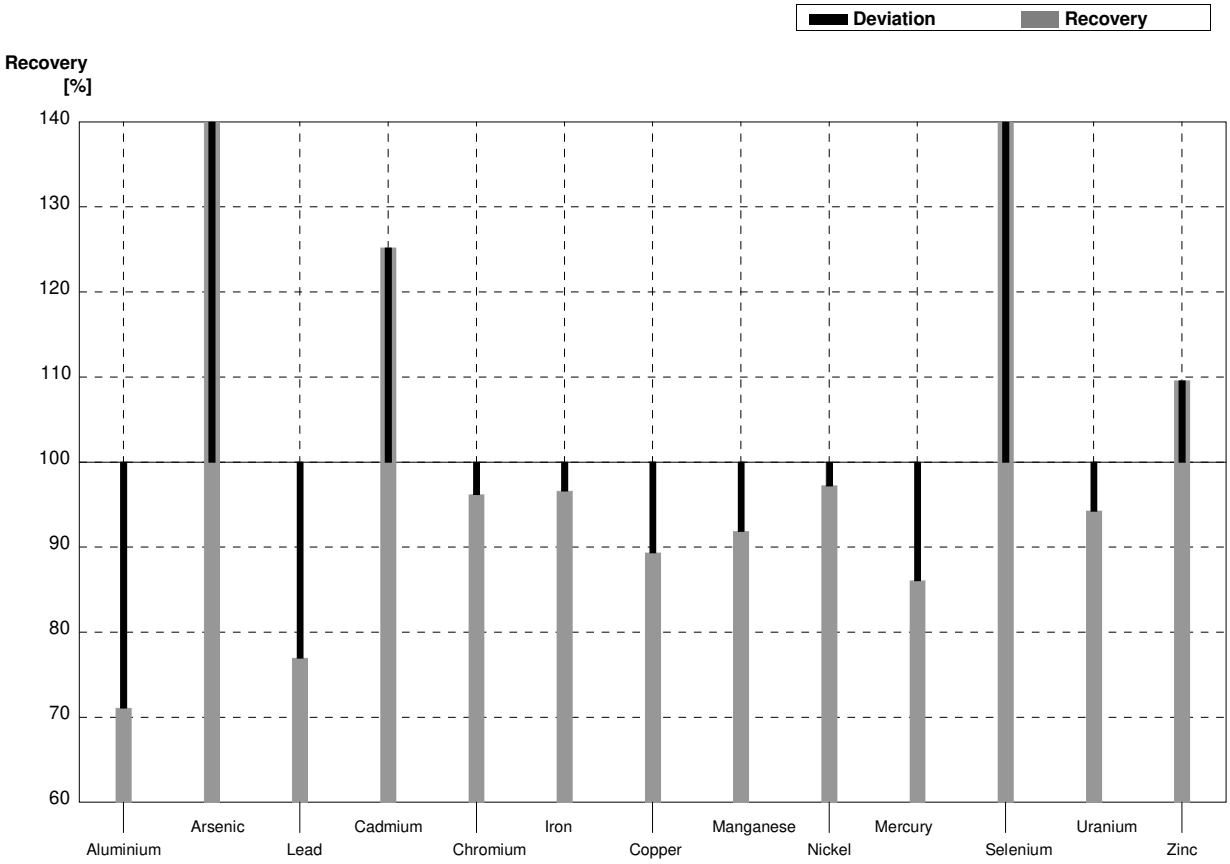
Sample **M163A**
Laboratory **H**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	16,6	1,7	µg/l	82%
Arsenic	1,056	0,010	1,47	0,15	µg/l	139%
Lead	3,14	0,03	2,43	0,25	µg/l	77%
Cadmium	2,017	0,016	2,56	0,26	µg/l	127%
Chromium	4,54	0,04	4,29	0,43	µg/l	94%
Iron	29,1	0,2	31,7	3,2	µg/l	109%
Copper	1,10	0,07	0,97	0,10	µg/l	88%
Manganese	38,5	0,2	35,9	3,6	µg/l	93%
Nickel	1,10	0,09	1,22	0,13	µg/l	111%
Mercury	0,417	0,012	<0,5	0,05	µg/l	•
Selenium	1,92	0,02	2,93	0,30	µg/l	153%
Uranium	4,61	0,04	4,37	0,44	µg/l	95%
Zinc	17,8	1,3	19,5	2,0	µg/l	110%



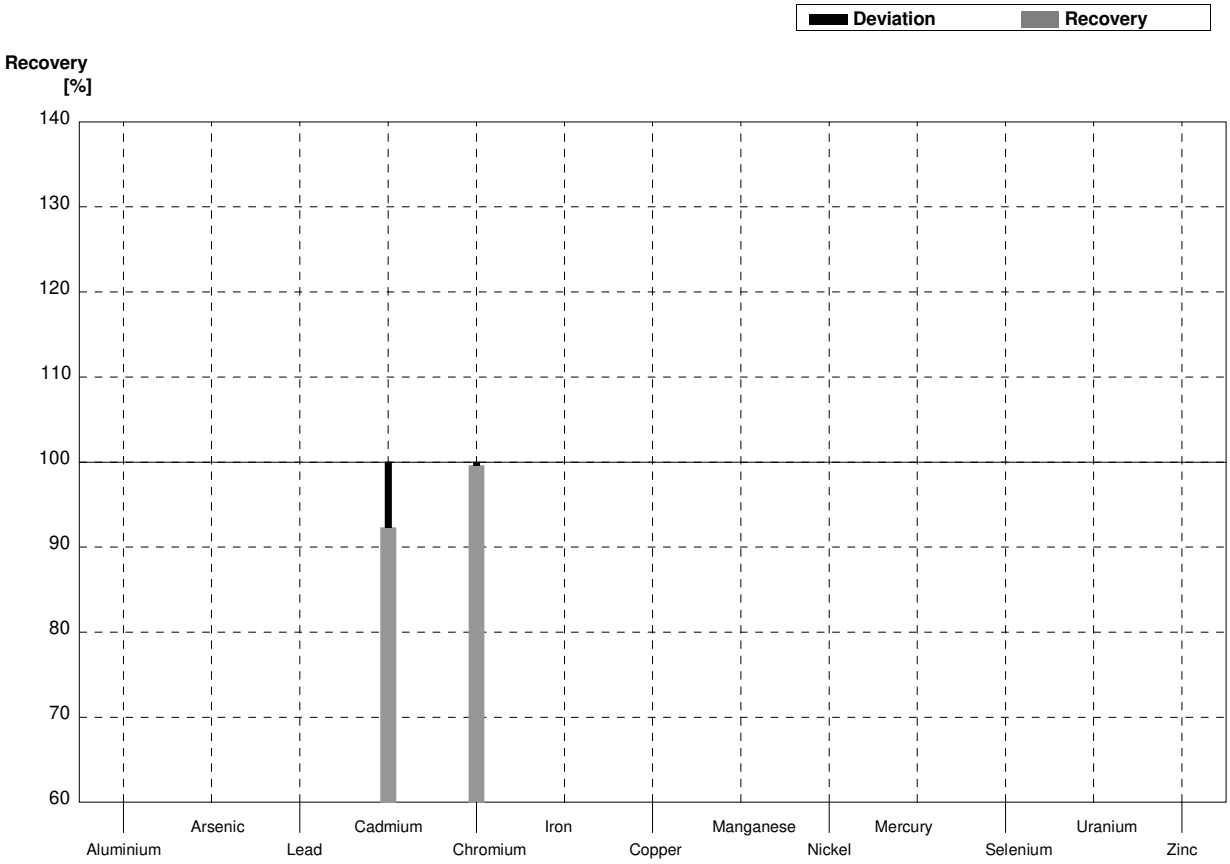
Sample **M163B**
Laboratory **H**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	5,19	0,52	µg/l	71%
Arsenic	1,537	0,013	2,19	0,22	µg/l	142%
Lead	1,741	0,017	1,34	0,14	µg/l	77%
Cadmium	0,695	0,007	0,87	0,09	µg/l	125%
Chromium	2,36	0,02	2,27	0,23	µg/l	96%
Iron	56,0	0,3	54,1	5,5	µg/l	97%
Copper	2,72	0,07	2,43	0,25	µg/l	89%
Manganese	9,58	0,11	8,80	0,88	µg/l	92%
Nickel	2,17	0,09	2,11	0,22	µg/l	97%
Mercury	1,766	0,018	1,52	0,16	µg/l	86%
Selenium	0,754	0,017	1,08	0,11	µg/l	143%
Uranium	1,634	0,015	1,54	0,16	µg/l	94%
Zinc	21,9	1,3	24,0	2,4	µg/l	110%



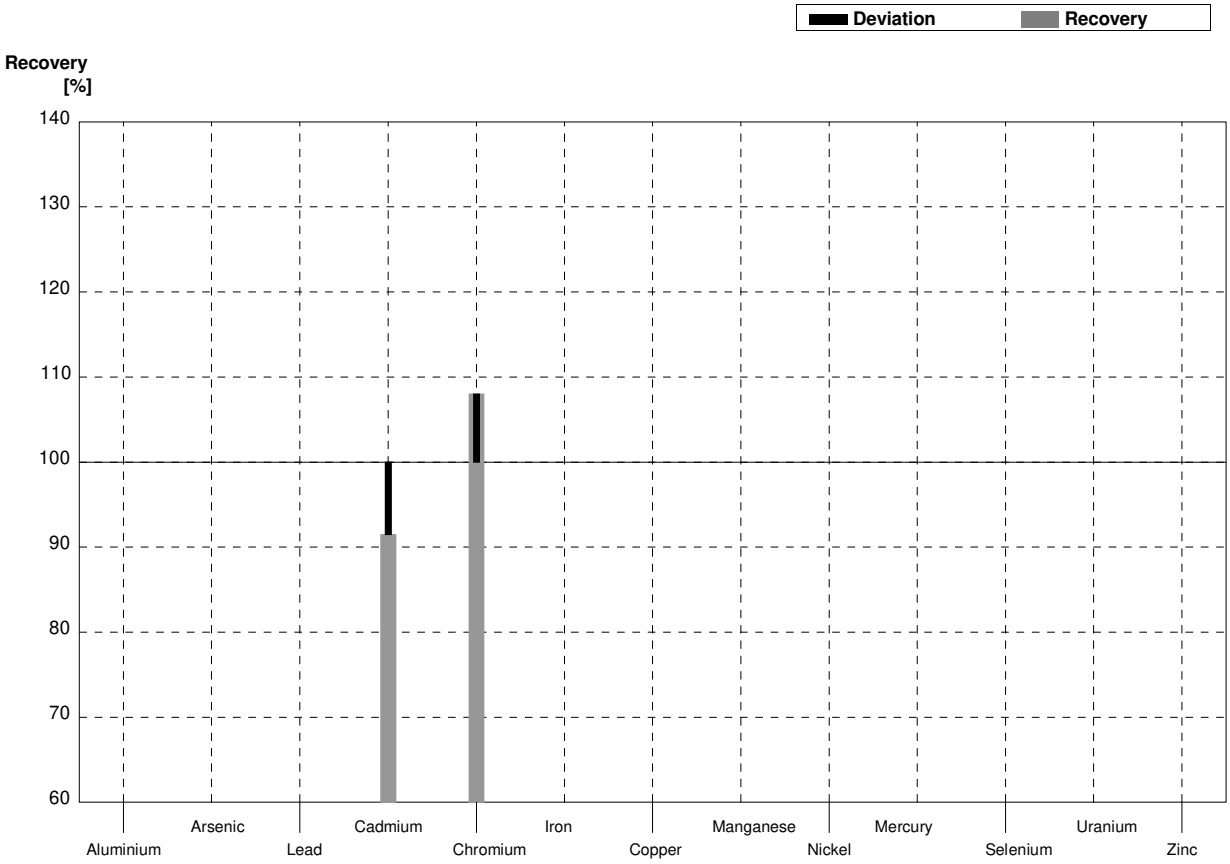
Sample M163A
Laboratory I

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3			µg/l	
Arsenic	1,056	0,010			µg/l	
Lead	3,14	0,03			µg/l	
Cadmium	2,017	0,016	1,862	0,279	µg/l	92%
Chromium	4,54	0,04	4,522	1,357	µg/l	100%
Iron	29,1	0,2			µg/l	
Copper	1,10	0,07			µg/l	
Manganese	38,5	0,2			µg/l	
Nickel	1,10	0,09			µg/l	
Mercury	0,417	0,012			µg/l	
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3			µg/l	



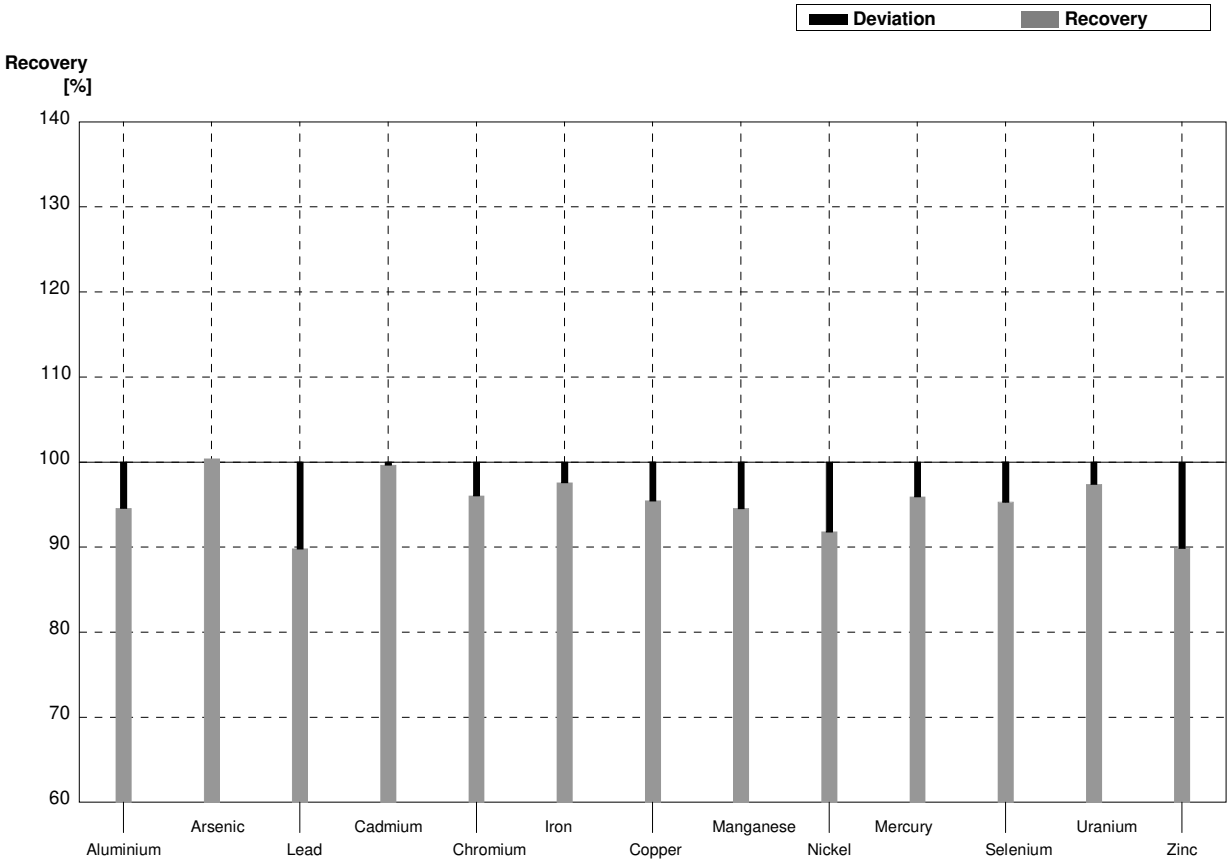
Sample M163B
Laboratory I

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3			µg/l	
Arsenic	1,537	0,013			µg/l	
Lead	1,741	0,017			µg/l	
Cadmium	0,695	0,007	0,636	0,095	µg/l	92%
Chromium	2,36	0,02	2,550	0,765	µg/l	108%
Iron	56,0	0,3			µg/l	
Copper	2,72	0,07			µg/l	
Manganese	9,58	0,11			µg/l	
Nickel	2,17	0,09			µg/l	
Mercury	1,766	0,018			µg/l	
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3			µg/l	



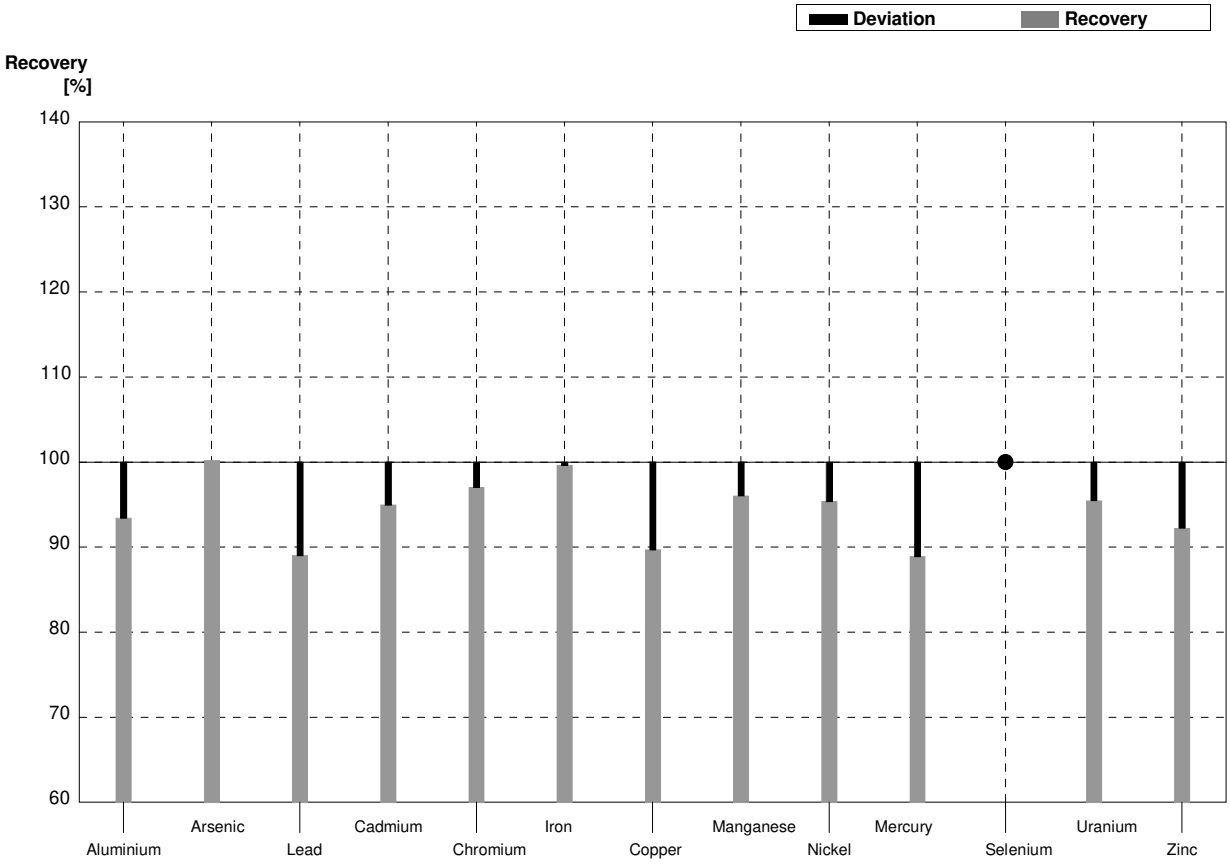
Sample M163A
Laboratory J

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	19,2	1,92	µg/l	95%
Arsenic	1,056	0,010	1,06	0,159	µg/l	100%
Lead	3,14	0,03	2,82	0,282	µg/l	90%
Cadmium	2,017	0,016	2,01	0,201	µg/l	100%
Chromium	4,54	0,04	4,36	0,436	µg/l	96%
Iron	29,1	0,2	28,4	2,84	µg/l	98%
Copper	1,10	0,07	1,05	0,105	µg/l	95%
Manganese	38,5	0,2	36,4	3,64	µg/l	95%
Nickel	1,10	0,09	1,01	0,101	µg/l	92%
Mercury	0,417	0,012	0,400	0,0400	µg/l	96%
Selenium	1,92	0,02	1,83	0,275	µg/l	95%
Uranium	4,61	0,04	4,49	0,449	µg/l	97%
Zinc	17,8	1,3	16,0	1,6	µg/l	90%



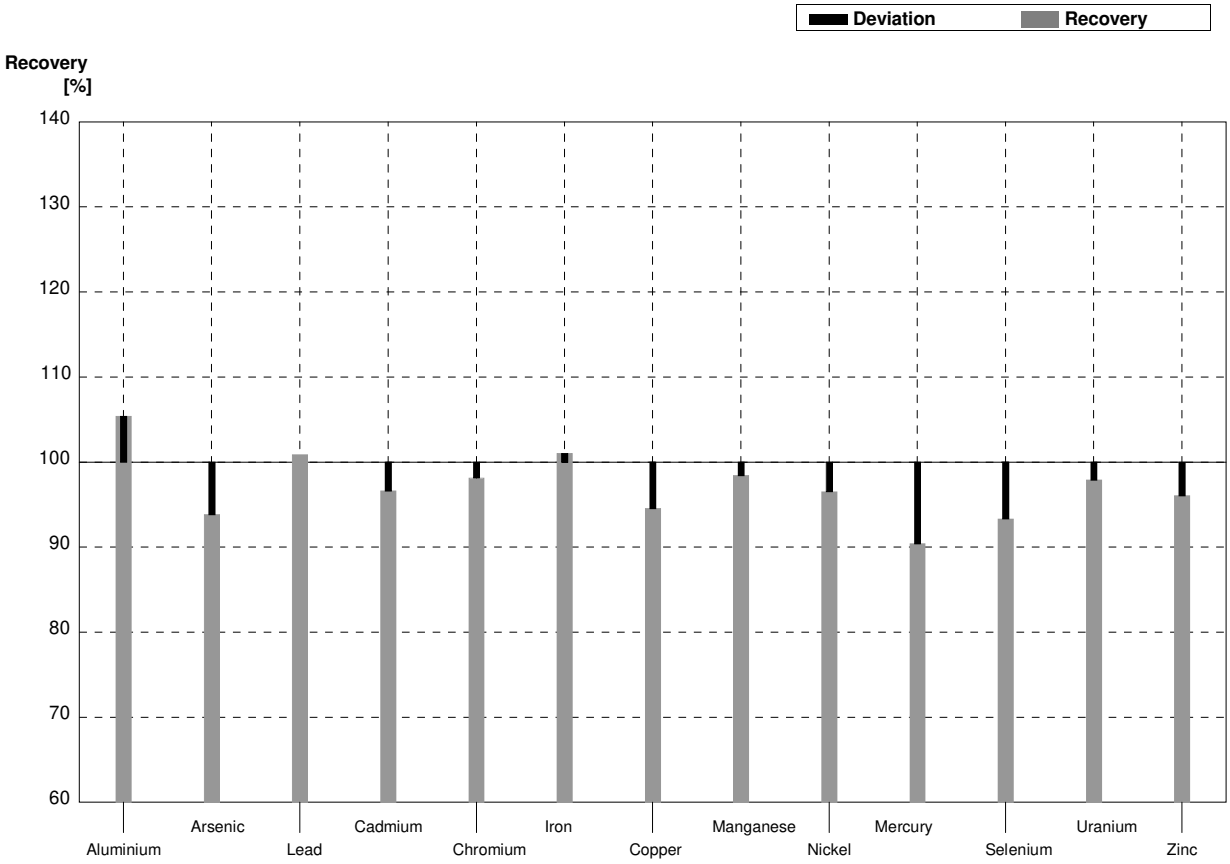
Sample M163B
Laboratory J

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	6,82	0,682	µg/l	93%
Arsenic	1,537	0,013	1,54	0,231	µg/l	100%
Lead	1,741	0,017	1,55	0,155	µg/l	89%
Cadmium	0,695	0,007	0,66	0,066	µg/l	95%
Chromium	2,36	0,02	2,29	0,229	µg/l	97%
Iron	56,0	0,3	55,8	5,58	µg/l	100%
Copper	2,72	0,07	2,44	0,244	µg/l	90%
Manganese	9,58	0,11	9,2	0,92	µg/l	96%
Nickel	2,17	0,09	2,07	0,207	µg/l	95%
Mercury	1,766	0,018	1,57	0,157	µg/l	89%
Selenium	0,754	0,017	<1,0		µg/l	•
Uranium	1,634	0,015	1,56	0,156	µg/l	95%
Zinc	21,9	1,3	20,2	2,02	µg/l	92%



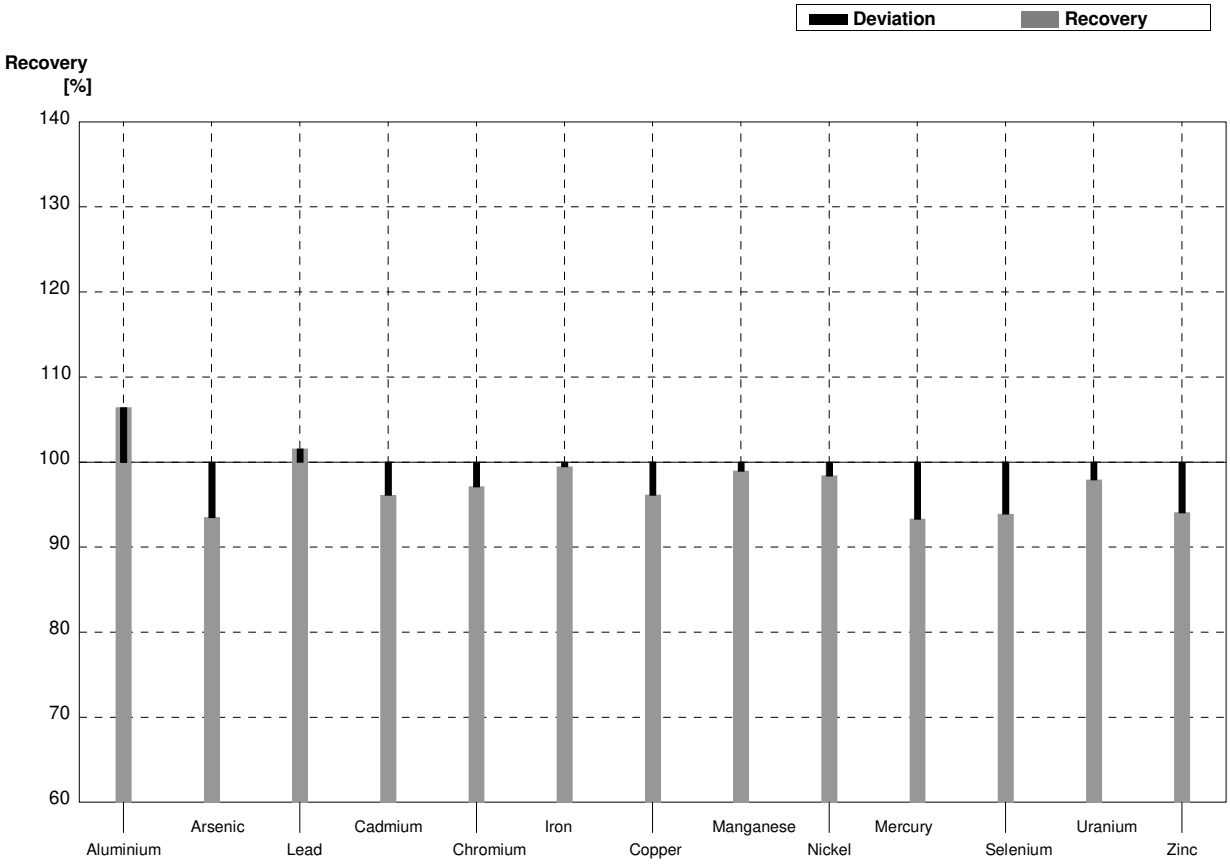
Sample **M163A**
Laboratory **K**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	21,4	2,1	µg/l	105%
Arsenic	1,056	0,010	0,991	0,1	µg/l	94%
Lead	3,14	0,03	3,168	0,32	µg/l	101%
Cadmium	2,017	0,016	1,949	0,2	µg/l	97%
Chromium	4,54	0,04	4,456	0,45	µg/l	98%
Iron	29,1	0,2	29,4	2,9	µg/l	101%
Copper	1,10	0,07	1,040	0,1	µg/l	95%
Manganese	38,5	0,2	37,9	3,8	µg/l	98%
Nickel	1,10	0,09	1,062	0,11	µg/l	97%
Mercury	0,417	0,012	0,377	0,04	µg/l	90%
Selenium	1,92	0,02	1,792	0,18	µg/l	93%
Uranium	4,61	0,04	4,513	0,45	µg/l	98%
Zinc	17,8	1,3	17,1	1,7	µg/l	96%



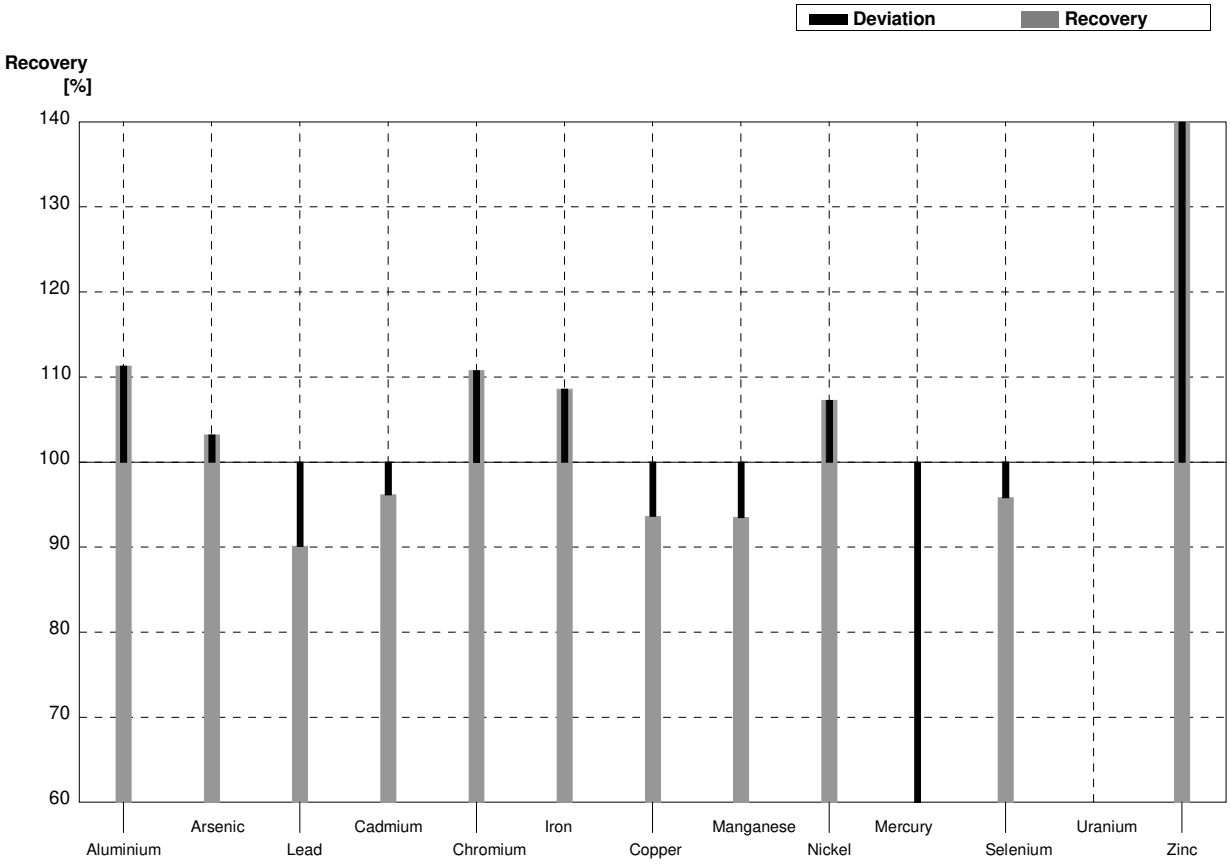
Sample **M163B**
Laboratory **K**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	7,77	0,78	µg/l	106%
Arsenic	1,537	0,013	1,437	0,14	µg/l	93%
Lead	1,741	0,017	1,768	0,18	µg/l	102%
Cadmium	0,695	0,007	0,668	0,07	µg/l	96%
Chromium	2,36	0,02	2,292	0,23	µg/l	97%
Iron	56,0	0,3	55,7	5,6	µg/l	99%
Copper	2,72	0,07	2,615	0,26	µg/l	96%
Manganese	9,58	0,11	9,48	0,95	µg/l	99%
Nickel	2,17	0,09	2,135	0,21	µg/l	98%
Mercury	1,766	0,018	1,648	0,17	µg/l	93%
Selenium	0,754	0,017	0,708	0,071	µg/l	94%
Uranium	1,634	0,015	1,600	0,16	µg/l	98%
Zinc	21,9	1,3	20,6	2,1	µg/l	94%



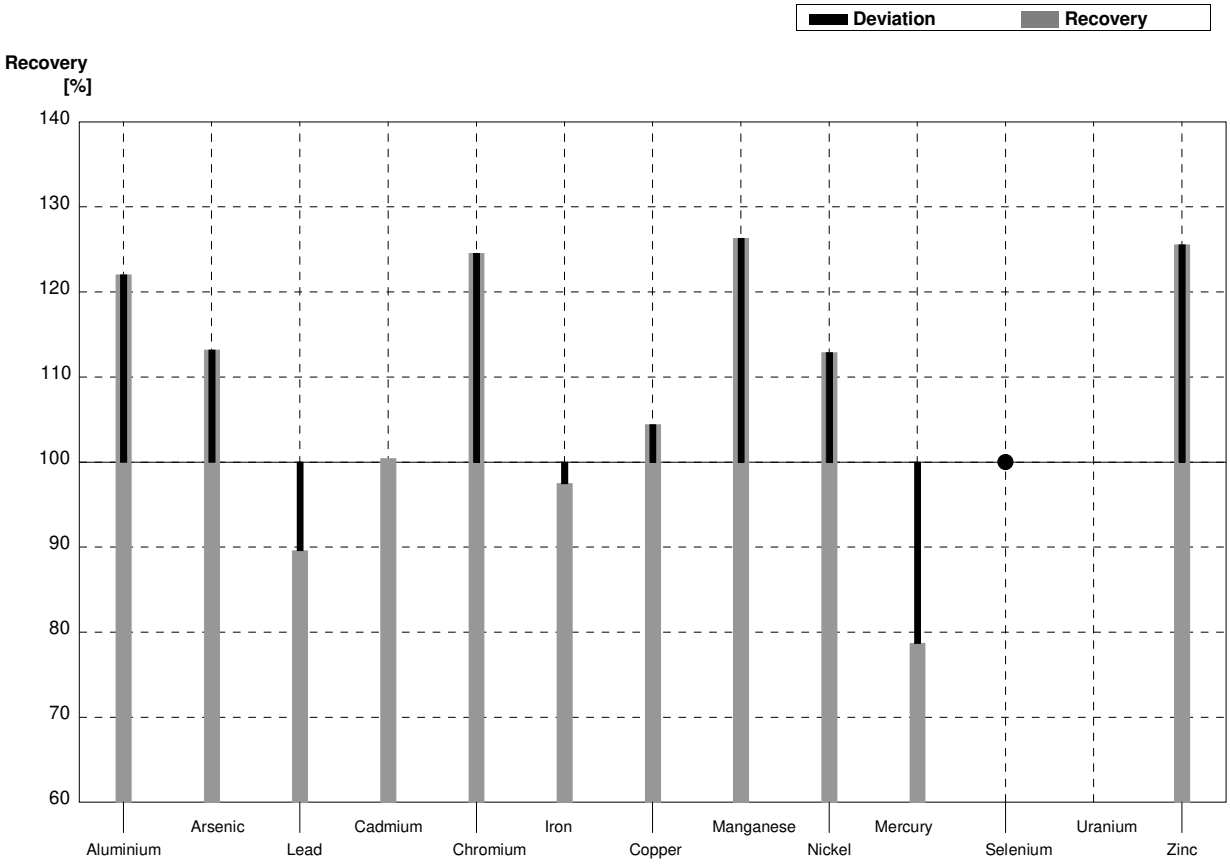
Sample **M163A**
Laboratory **L**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	22,6	4,5	µg/l	111%
Arsenic	1,056	0,010	1,09	0,50	µg/l	103%
Lead	3,14	0,03	2,83	0,57	µg/l	90%
Cadmium	2,017	0,016	1,94	0,39	µg/l	96%
Chromium	4,54	0,04	5,03	1,01	µg/l	111%
Iron	29,1	0,2	31,6	6,3	µg/l	109%
Copper	1,10	0,07	1,03	0,50	µg/l	94%
Manganese	38,5	0,2	36,0	7,2	µg/l	94%
Nickel	1,10	0,09	1,18	0,50	µg/l	107%
Mercury	0,417	0,012	0,214	0,032	µg/l	51%
Selenium	1,92	0,02	1,84	0,37	µg/l	96%
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3	25,9	5,2	µg/l	146%



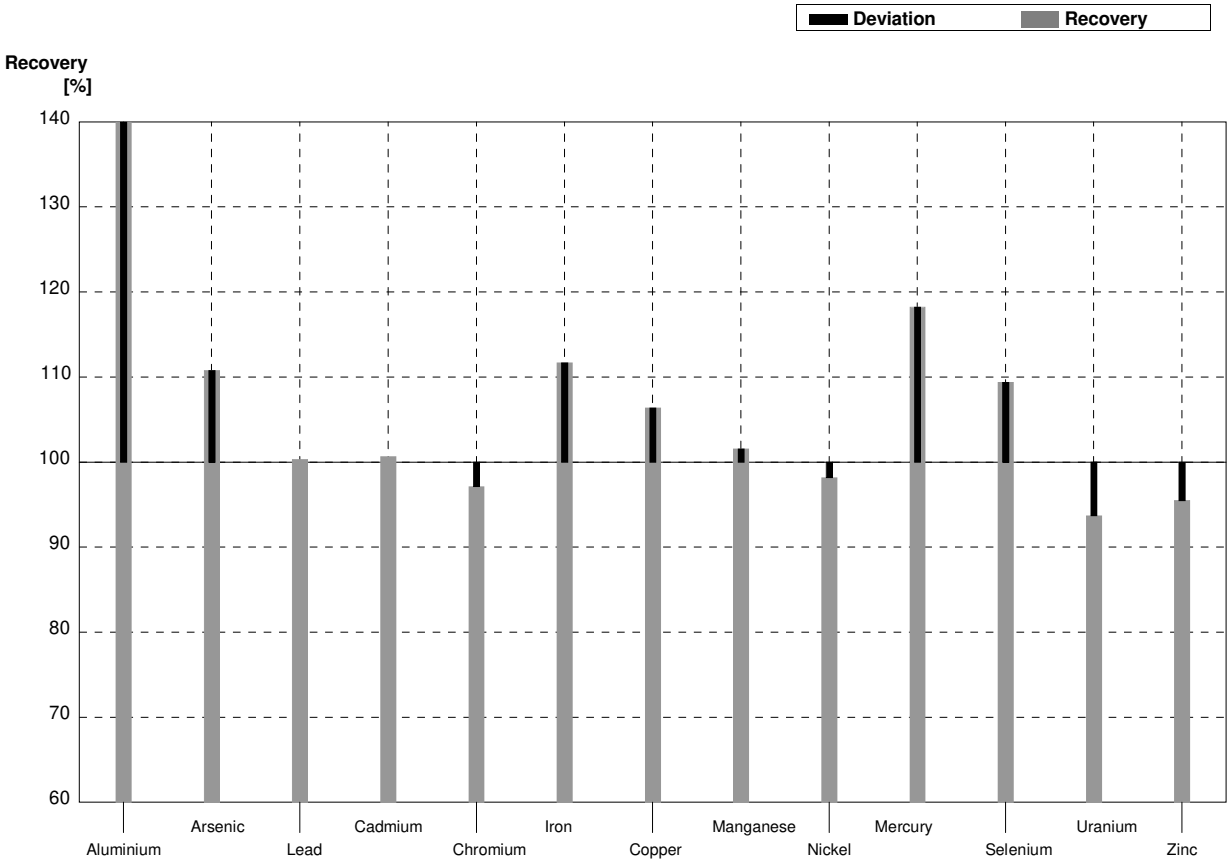
Sample **M163B**
Laboratory **L**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	8,91	1,78	µg/l	122%
Arsenic	1,537	0,013	1,74	0,50	µg/l	113%
Lead	1,741	0,017	1,56	0,50	µg/l	90%
Cadmium	0,695	0,007	0,698	0,140	µg/l	100%
Chromium	2,36	0,02	2,94	0,59	µg/l	125%
Iron	56,0	0,3	54,6	10,9	µg/l	98%
Copper	2,72	0,07	2,84	0,57	µg/l	104%
Manganese	9,58	0,11	12,1	2,4	µg/l	126%
Nickel	2,17	0,09	2,45	0,50	µg/l	113%
Mercury	1,766	0,018	1,39	0,21	µg/l	79%
Selenium	0,754	0,017	<1		µg/l	•
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3	27,5	5,5	µg/l	126%



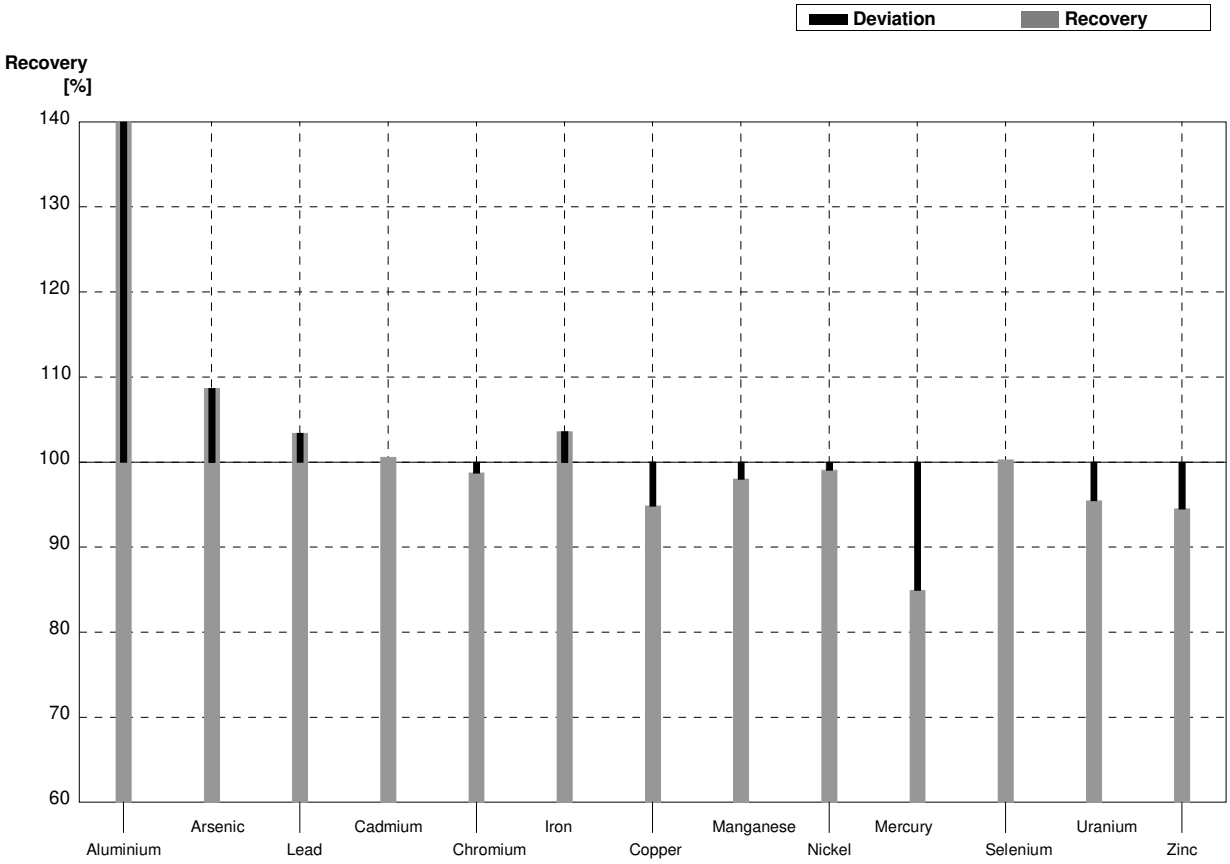
Sample **M163A**
Laboratory **M**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	30,0	1,1	µg/l	148%
Arsenic	1,056	0,010	1,17	0,061	µg/l	111%
Lead	3,14	0,03	3,15	0,095	µg/l	100%
Cadmium	2,017	0,016	2,03	0,051	µg/l	101%
Chromium	4,54	0,04	4,41	0,12	µg/l	97%
Iron	29,1	0,2	32,5	0,61	µg/l	112%
Copper	1,10	0,07	1,17	0,035	µg/l	106%
Manganese	38,5	0,2	39,1	0,64	µg/l	102%
Nickel	1,10	0,09	1,08	0,029	µg/l	98%
Mercury	0,417	0,012	0,493	0,042	µg/l	118%
Selenium	1,92	0,02	2,10	0,044	µg/l	109%
Uranium	4,61	0,04	4,32	0,081	µg/l	94%
Zinc	17,8	1,3	17,0	0,25	µg/l	96%



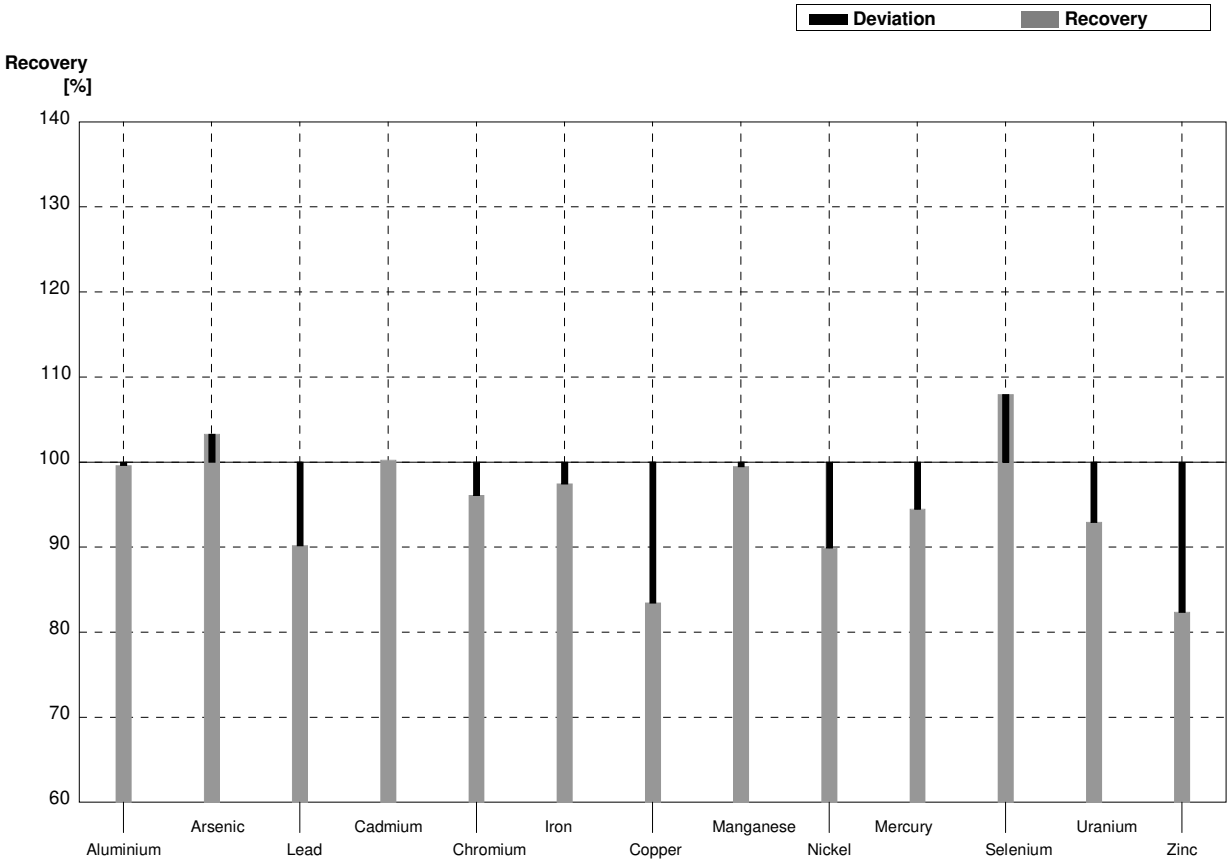
Sample **M163B**
Laboratory **M**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	16,8	0,51	µg/l	230%
Arsenic	1,537	0,013	1,67	0,066	µg/l	109%
Lead	1,741	0,017	1,80	0,050	µg/l	103%
Cadmium	0,695	0,007	0,699	0,025	µg/l	101%
Chromium	2,36	0,02	2,33	0,061	µg/l	99%
Iron	56,0	0,3	58,0	1,2	µg/l	104%
Copper	2,72	0,07	2,58	0,044	µg/l	95%
Manganese	9,58	0,11	9,39	0,22	µg/l	98%
Nickel	2,17	0,09	2,15	0,10	µg/l	99%
Mercury	1,766	0,018	1,50	0,12	µg/l	85%
Selenium	0,754	0,017	0,756	0,032	µg/l	100%
Uranium	1,634	0,015	1,56	0,036	µg/l	95%
Zinc	21,9	1,3	20,7	0,29	µg/l	95%



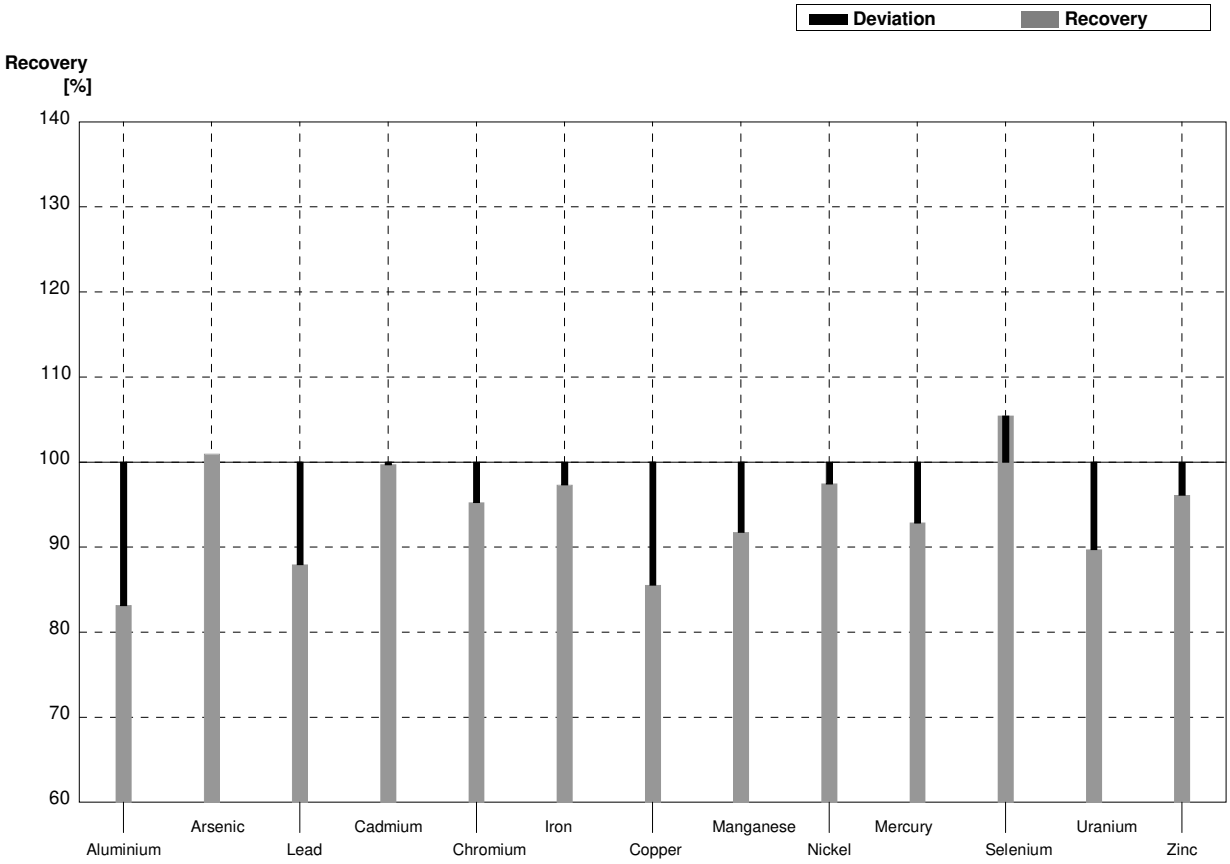
Sample **M163A**
Laboratory **N**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	20,22	4,65	µg/l	100%
Arsenic	1,056	0,010	1,091	0,295	µg/l	103%
Lead	3,14	0,03	2,832	0,283	µg/l	90%
Cadmium	2,017	0,016	2,022	0,445	µg/l	100%
Chromium	4,54	0,04	4,363	0,393	µg/l	96%
Iron	29,1	0,2	28,36	3,69	µg/l	97%
Copper	1,10	0,07	0,918	0,165	µg/l	83%
Manganese	38,5	0,2	38,30	5,36	µg/l	99%
Nickel	1,10	0,09	0,989	0,099	µg/l	90%
Mercury	0,417	0,012	0,394	0,099	µg/l	94%
Selenium	1,92	0,02	2,073	0,332	µg/l	108%
Uranium	4,61	0,04	4,285	0,471	µg/l	93%
Zinc	17,8	1,3	14,66	2,64	µg/l	82%



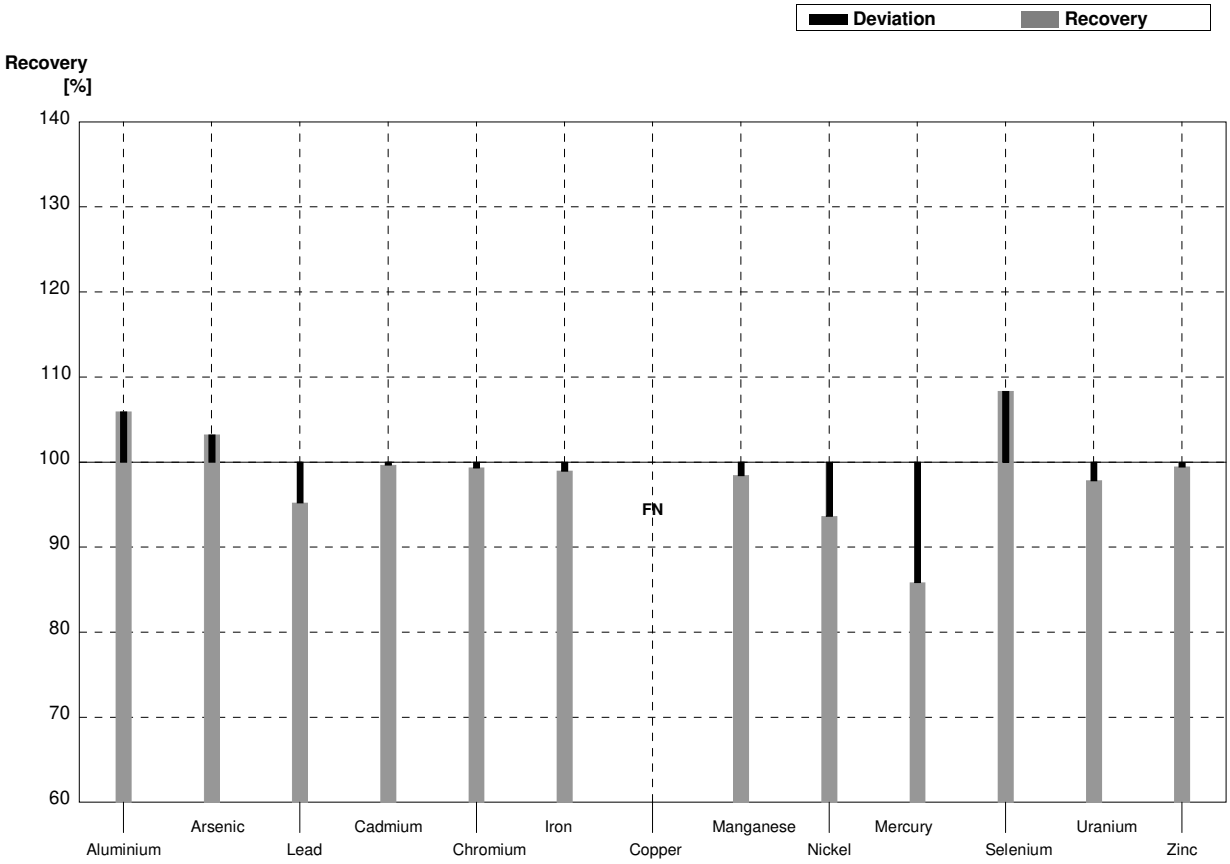
Sample **M163B**
Laboratory **N**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	6,07	1,40	µg/l	83%
Arsenic	1,537	0,013	1,552	0,419	µg/l	101%
Lead	1,741	0,017	1,531	0,153	µg/l	88%
Cadmium	0,695	0,007	0,693	0,152	µg/l	100%
Chromium	2,36	0,02	2,248	0,202	µg/l	95%
Iron	56,0	0,3	54,50	7,09	µg/l	97%
Copper	2,72	0,07	2,327	0,419	µg/l	86%
Manganese	9,58	0,11	8,79	1,23	µg/l	92%
Nickel	2,17	0,09	2,115	0,211	µg/l	97%
Mercury	1,766	0,018	1,640	0,410	µg/l	93%
Selenium	0,754	0,017	0,795	0,127	µg/l	105%
Uranium	1,634	0,015	1,466	0,161	µg/l	90%
Zinc	21,9	1,3	21,05	3,79	µg/l	96%



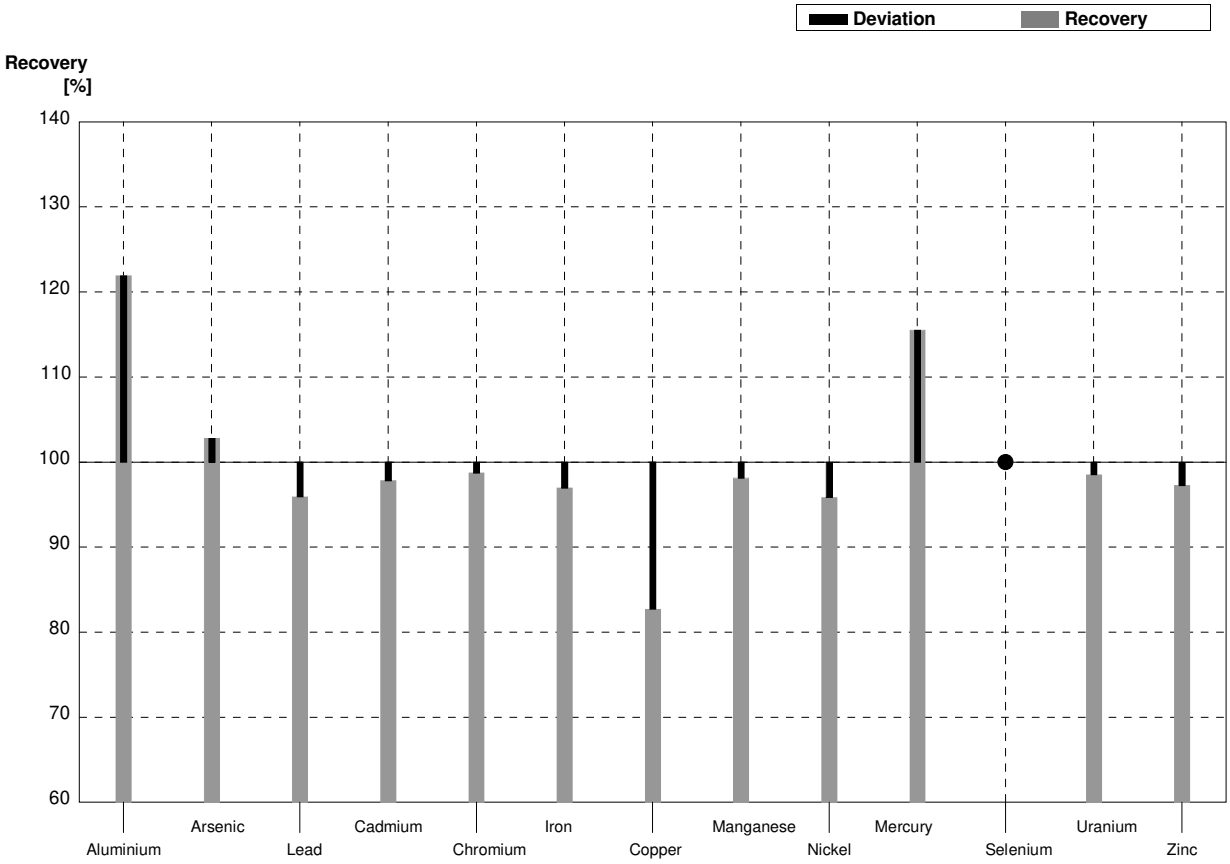
Sample **M163A**
Laboratory **O**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	21,5	3,2	µg/l	106%
Arsenic	1,056	0,010	1,09	0,22	µg/l	103%
Lead	3,14	0,03	2,99	0,36	µg/l	95%
Cadmium	2,017	0,016	2,01	0,26	µg/l	100%
Chromium	4,54	0,04	4,51	0,71	µg/l	99%
Iron	29,1	0,2	28,8	3,2	µg/l	99%
Copper	1,10	0,07	<1		µg/l	FN
Manganese	38,5	0,2	37,9	3,8	µg/l	98%
Nickel	1,10	0,09	1,03	0,31	µg/l	94%
Mercury	0,417	0,012	0,358	0,050	µg/l	86%
Selenium	1,92	0,02	2,08	0,31	µg/l	108%
Uranium	4,61	0,04	4,51	0,45	µg/l	98%
Zinc	17,8	1,3	17,7	2,4	µg/l	99%



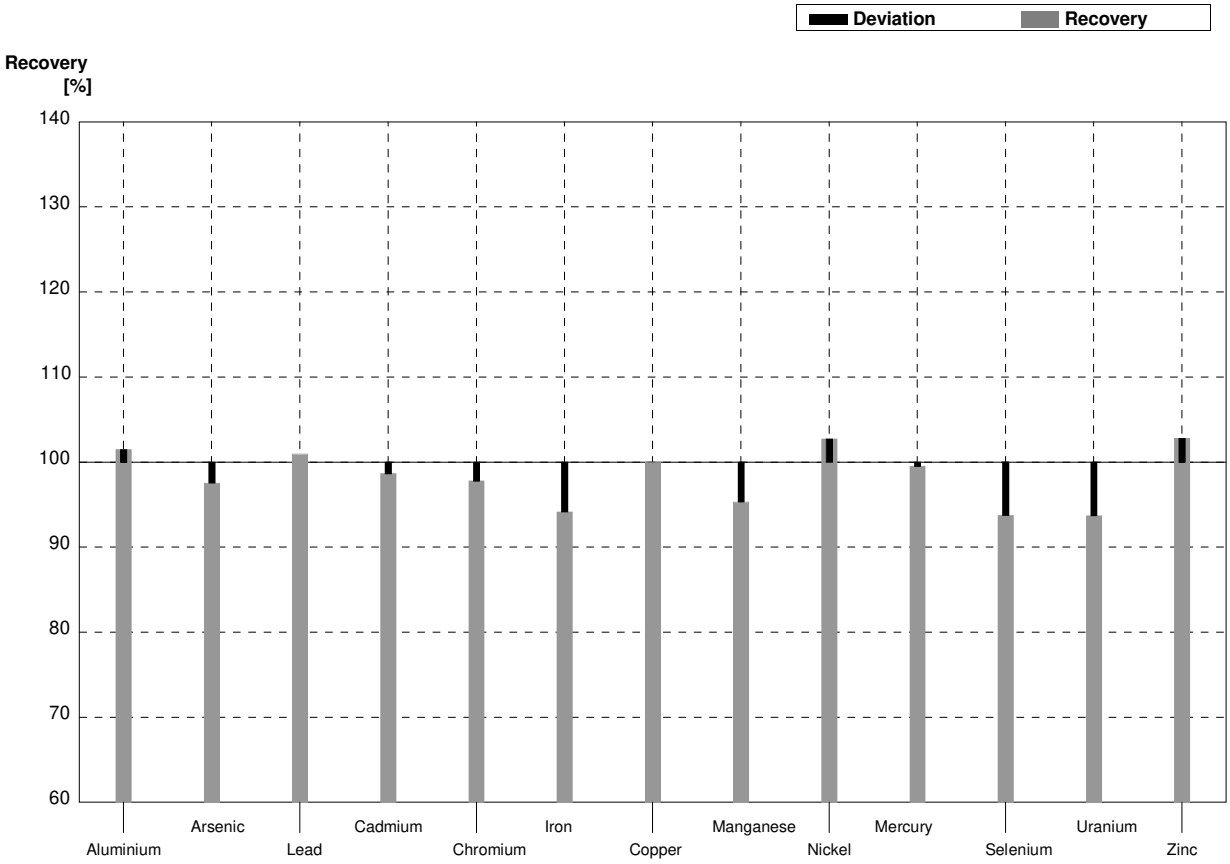
Sample **M163B**
Laboratory **O**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	8,9	1,7	µg/l	122%
Arsenic	1,537	0,013	1,58	0,28	µg/l	103%
Lead	1,741	0,017	1,67	0,20	µg/l	96%
Cadmium	0,695	0,007	0,68	0,09	µg/l	98%
Chromium	2,36	0,02	2,33	0,41	µg/l	99%
Iron	56,0	0,3	54,3	5,6	µg/l	97%
Copper	2,72	0,07	2,25	0,34	µg/l	83%
Manganese	9,58	0,11	9,4	1,2	µg/l	98%
Nickel	2,17	0,09	2,08	0,44	µg/l	96%
Mercury	1,766	0,018	2,04	0,29	µg/l	116%
Selenium	0,754	0,017	<2		µg/l	•
Uranium	1,634	0,015	1,61	0,16	µg/l	99%
Zinc	21,9	1,3	21,3	2,8	µg/l	97%



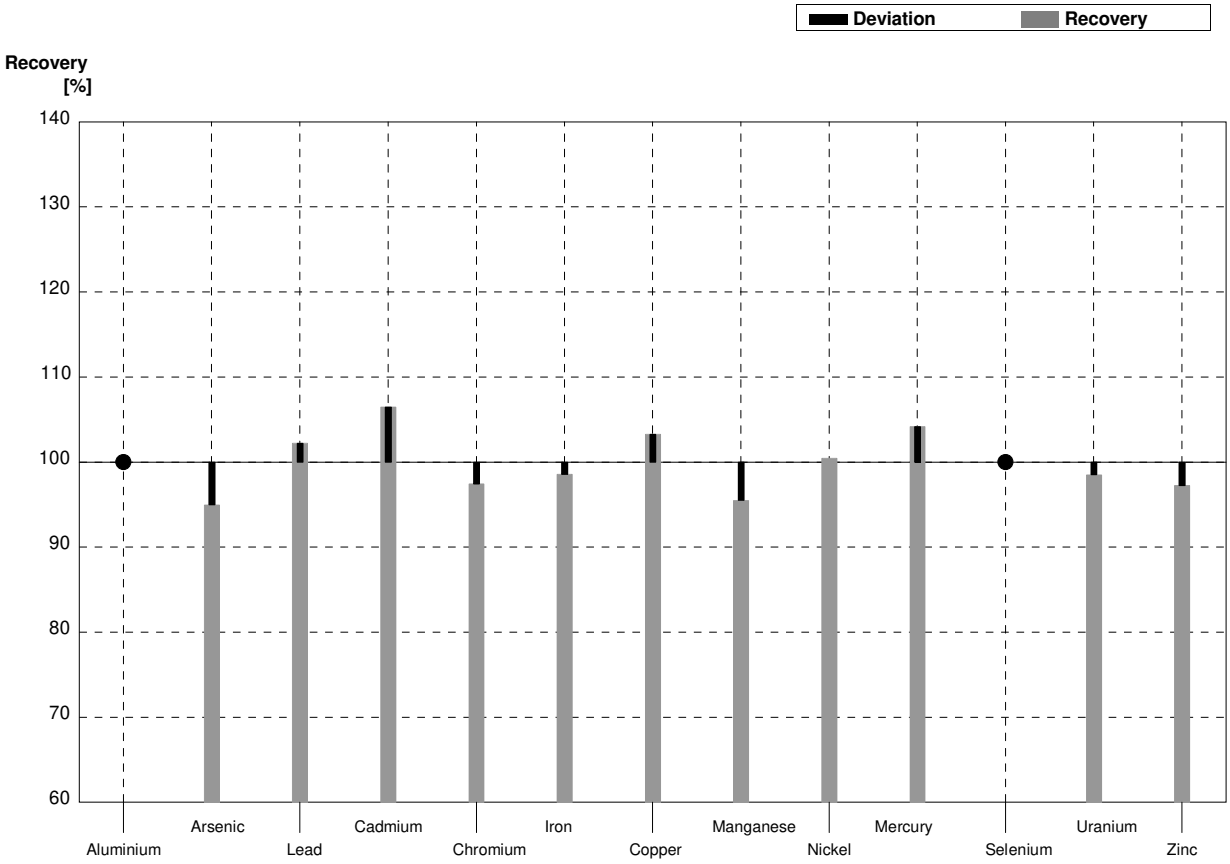
Sample **M163A**
Laboratory **P**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	20,6	3,09	µg/l	101%
Arsenic	1,056	0,010	1,03	0,206	µg/l	98%
Lead	3,14	0,03	3,17	0,634	µg/l	101%
Cadmium	2,017	0,016	1,99	0,398	µg/l	99%
Chromium	4,54	0,04	4,44	0,666	µg/l	98%
Iron	29,1	0,2	27,4	2,93	µg/l	94%
Copper	1,10	0,07	1,10	0,22	µg/l	100%
Manganese	38,5	0,2	36,7	2,39	µg/l	95%
Nickel	1,10	0,09	1,13	0,226	µg/l	103%
Mercury	0,417	0,012	0,415	0,104	µg/l	100%
Selenium	1,92	0,02	1,80	0,245	µg/l	94%
Uranium	4,61	0,04	4,32	0,648	µg/l	94%
Zinc	17,8	1,3	18,3	2,75	µg/l	103%



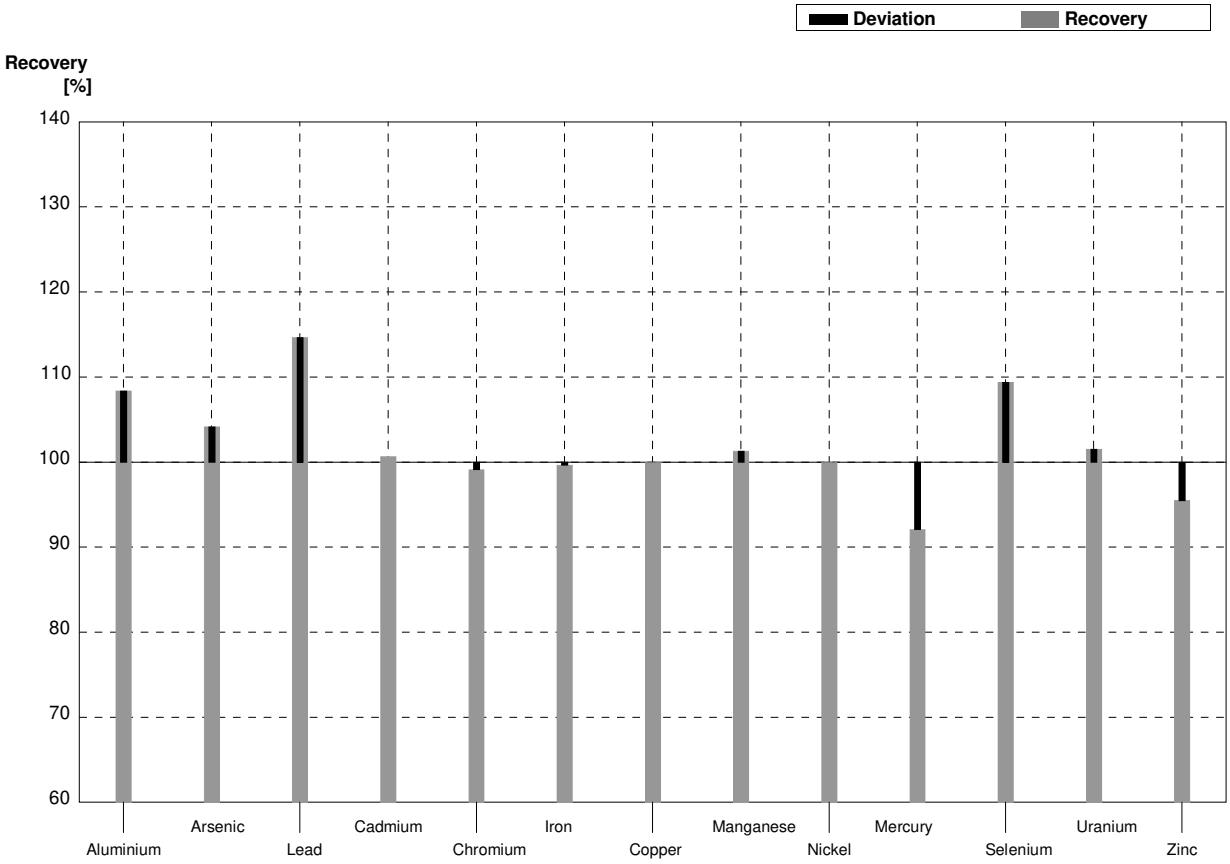
Sample **M163B**
Laboratory **P**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	<10		µg/l	•
Arsenic	1,537	0,013	1,46	0,292	µg/l	95%
Lead	1,741	0,017	1,78	0,356	µg/l	102%
Cadmium	0,695	0,007	0,74	0,188	µg/l	106%
Chromium	2,36	0,02	2,30	0,345	µg/l	97%
Iron	56,0	0,3	55,2	5,91	µg/l	99%
Copper	2,72	0,07	2,81	0,562	µg/l	103%
Manganese	9,58	0,11	9,15	0,595	µg/l	96%
Nickel	2,17	0,09	2,18	0,436	µg/l	100%
Mercury	1,766	0,018	1,84	0,368	µg/l	104%
Selenium	0,754	0,017	<1,0		µg/l	•
Uranium	1,634	0,015	1,61	0,242	µg/l	99%
Zinc	21,9	1,3	21,3	3,20	µg/l	97%



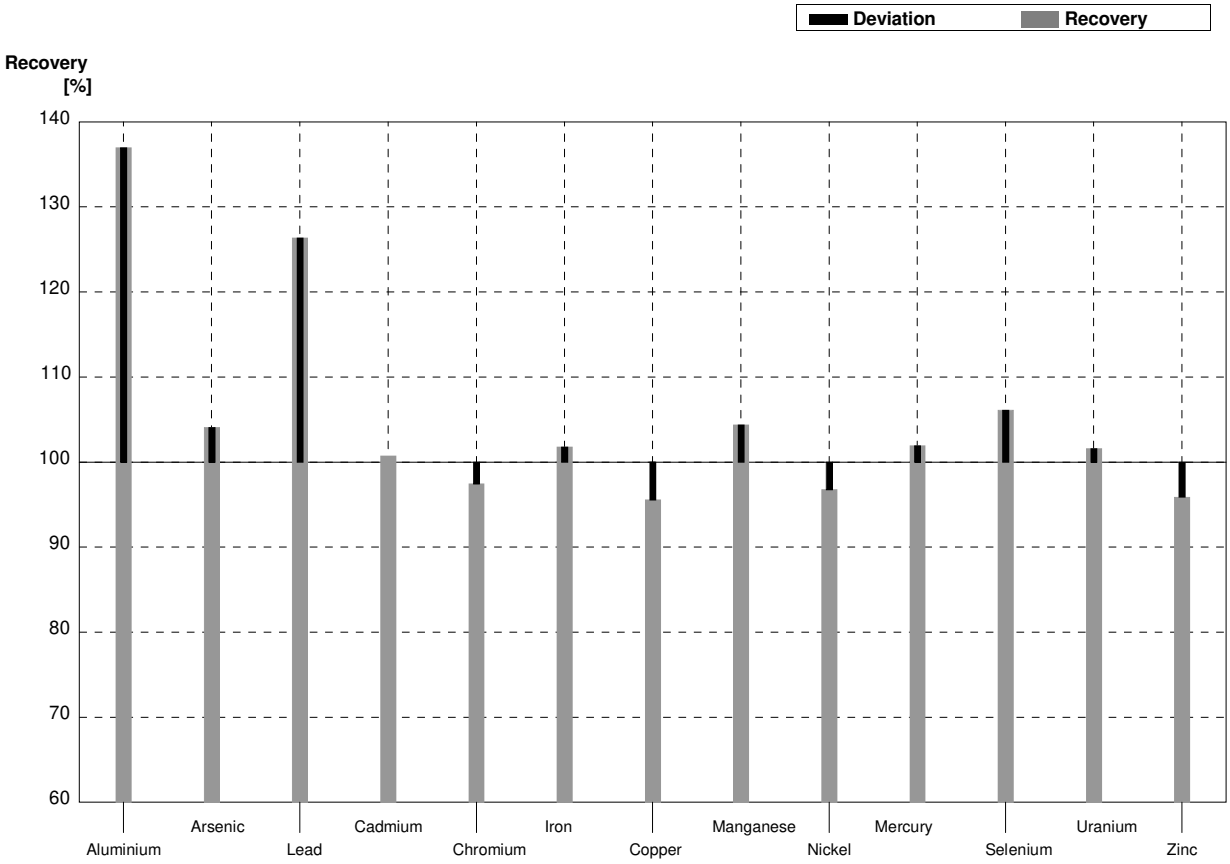
Sample **M163A**
Laboratory **Q**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	22,0	2,20	µg/l	108%
Arsenic	1,056	0,010	1,10	0,132	µg/l	104%
Lead	3,14	0,03	3,60	0,288	µg/l	115%
Cadmium	2,017	0,016	2,03	0,162	µg/l	101%
Chromium	4,54	0,04	4,50	0,540	µg/l	99%
Iron	29,1	0,2	29,0	7,54	µg/l	100%
Copper	1,10	0,07	1,10	0,088	µg/l	100%
Manganese	38,5	0,2	39,0	3,90	µg/l	101%
Nickel	1,10	0,09	1,10	0,110	µg/l	100%
Mercury	0,417	0,012	0,384	0,058	µg/l	92%
Selenium	1,92	0,02	2,10	0,315	µg/l	109%
Uranium	4,61	0,04	4,68	0,234	µg/l	102%
Zinc	17,8	1,3	17,0	1,70	µg/l	96%



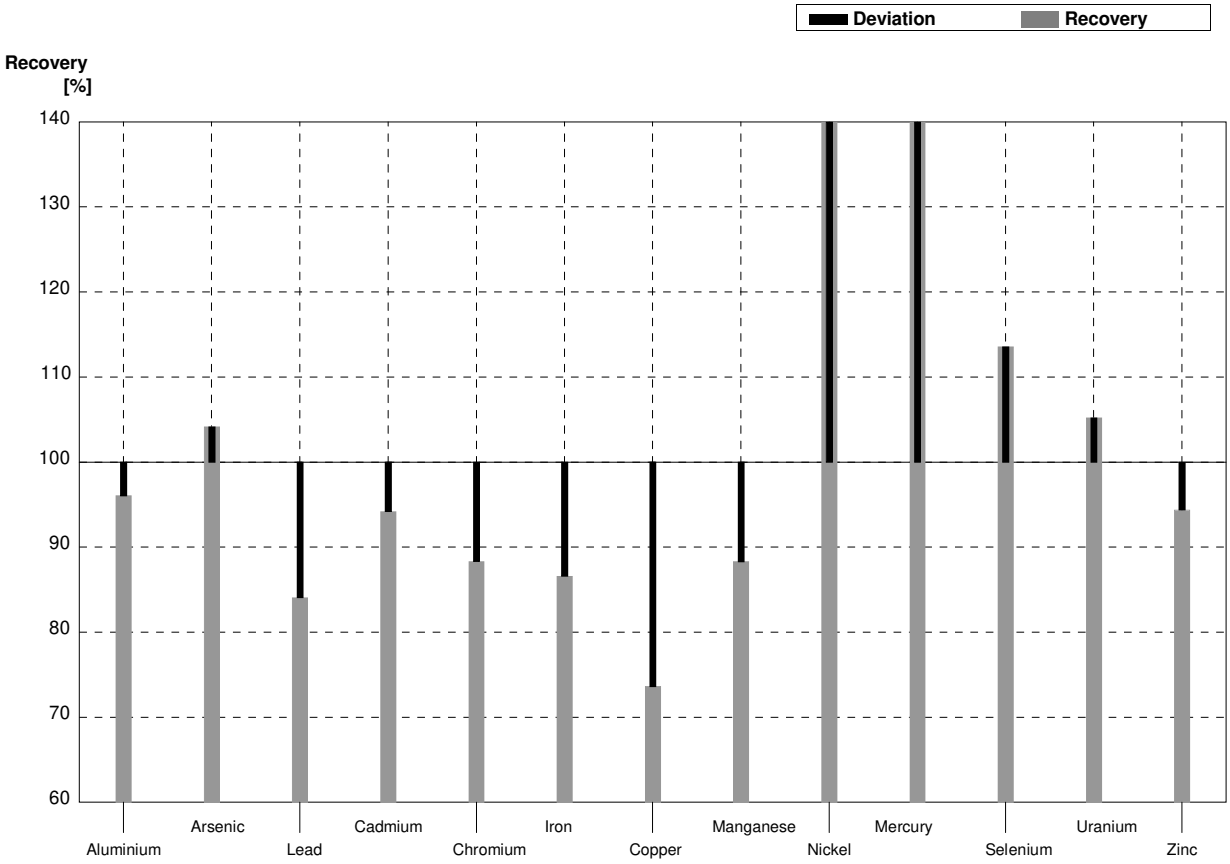
Sample **M163B**
Laboratory **Q**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	10,0	1,00	µg/l	137%
Arsenic	1,537	0,013	1,60	0,192	µg/l	104%
Lead	1,741	0,017	2,20	0,176	µg/l	126%
Cadmium	0,695	0,007	0,700	0,056	µg/l	101%
Chromium	2,36	0,02	2,30	0,276	µg/l	97%
Iron	56,0	0,3	57,0	14,8	µg/l	102%
Copper	2,72	0,07	2,60	0,208	µg/l	96%
Manganese	9,58	0,11	10,0	1,00	µg/l	104%
Nickel	2,17	0,09	2,10	0,210	µg/l	97%
Mercury	1,766	0,018	1,80	0,271	µg/l	102%
Selenium	0,754	0,017	0,800	0,120	µg/l	106%
Uranium	1,634	0,015	1,66	0,083	µg/l	102%
Zinc	21,9	1,3	21,0	2,10	µg/l	96%



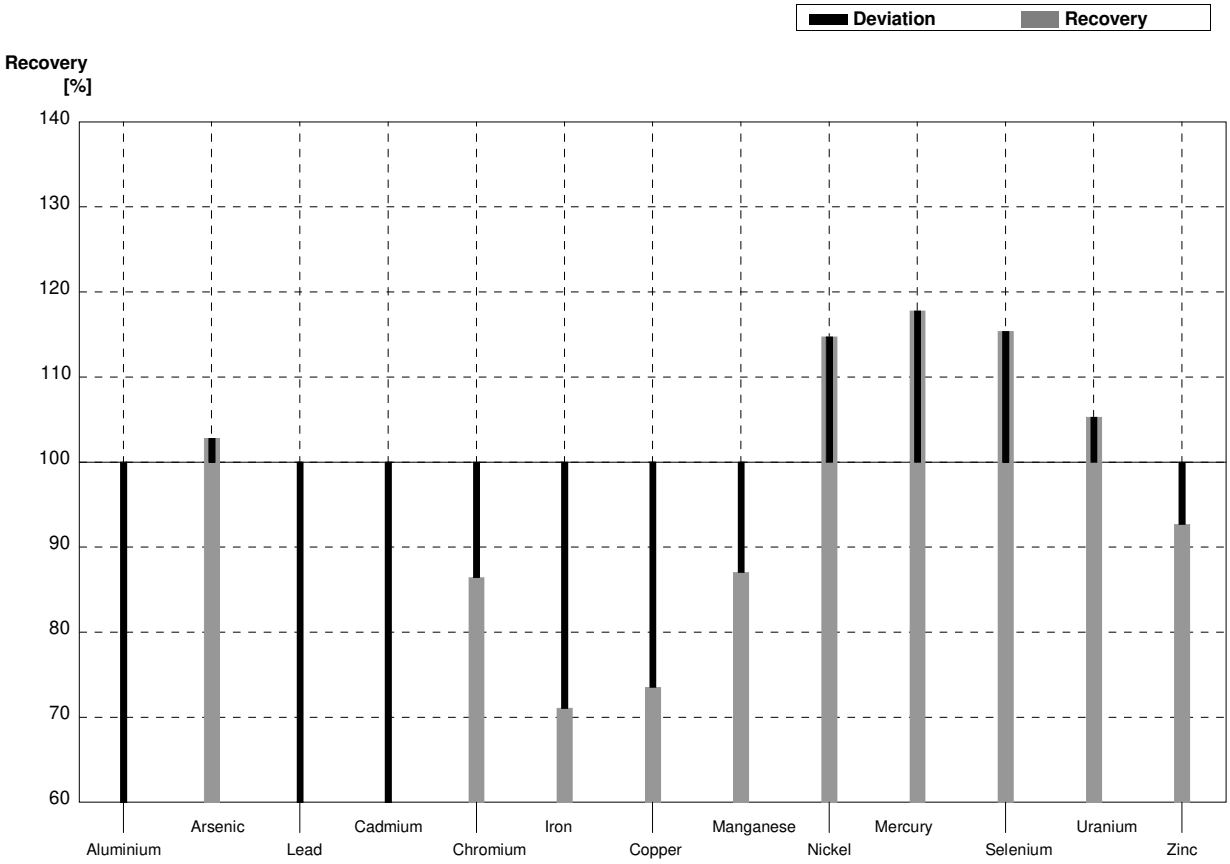
Sample **M163A**
Laboratory **R**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	19,5	2	µg/l	96%
Arsenic	1,056	0,010	1,10	0,5	µg/l	104%
Lead	3,14	0,03	2,64	0,5	µg/l	84%
Cadmium	2,017	0,016	1,90	0,5	µg/l	94%
Chromium	4,54	0,04	4,01	0,5	µg/l	88%
Iron	29,1	0,2	25,2	3	µg/l	87%
Copper	1,10	0,07	0,81	0,3	µg/l	74%
Manganese	38,5	0,2	34,0	3	µg/l	88%
Nickel	1,10	0,09	1,58	0,5	µg/l	144%
Mercury	0,417	0,012	0,69	0,2	µg/l	165%
Selenium	1,92	0,02	2,18	0,2	µg/l	114%
Uranium	4,61	0,04	4,85	0,2	µg/l	105%
Zinc	17,8	1,3	16,8	0,55	µg/l	94%



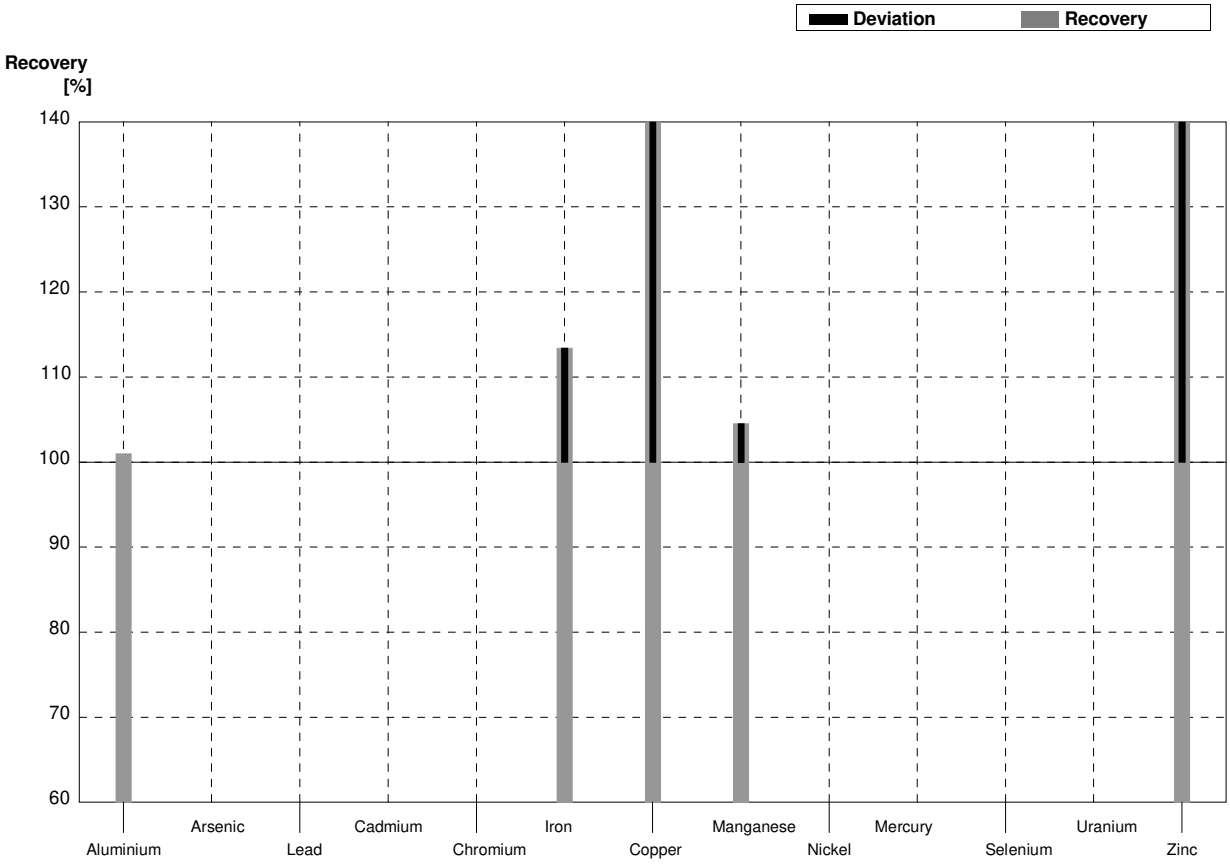
Sample **M163B**
Laboratory **R**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	3,61	0,5	µg/l	49%
Arsenic	1,537	0,013	1,58	0,6	µg/l	103%
Lead	1,741	0,017	0,93	0,3	µg/l	53%
Cadmium	0,695	0,007	0,390	0,3	µg/l	56%
Chromium	2,36	0,02	2,04	0,3	µg/l	86%
Iron	56,0	0,3	39,8	5	µg/l	71%
Copper	2,72	0,07	2,00	0,8	µg/l	74%
Manganese	9,58	0,11	8,34	1	µg/l	87%
Nickel	2,17	0,09	2,49	1	µg/l	115%
Mercury	1,766	0,018	2,08	0,6	µg/l	118%
Selenium	0,754	0,017	0,87	0,1	µg/l	115%
Uranium	1,634	0,015	1,72	0,12	µg/l	105%
Zinc	21,9	1,3	20,3	0,65	µg/l	93%



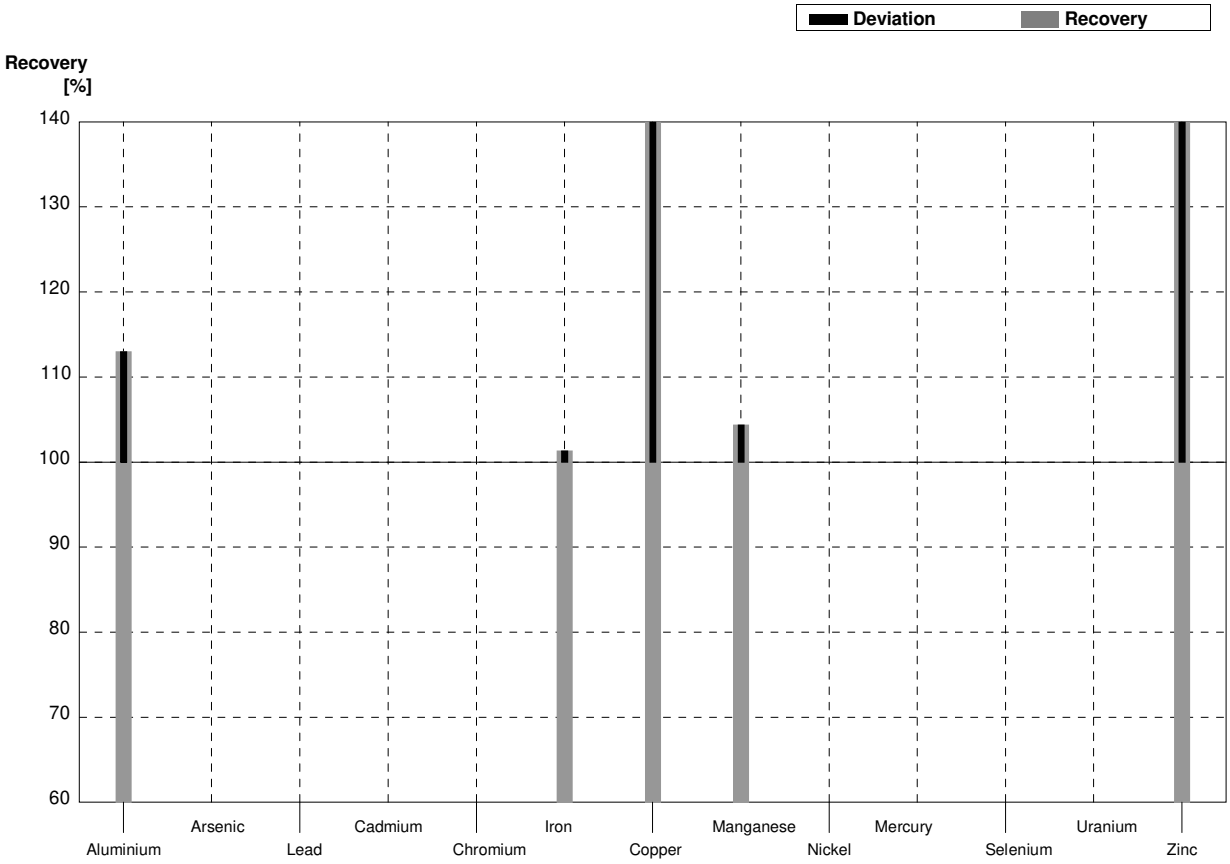
Sample **M163A**
Laboratory **S**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	20,5	4	µg/l	101%
Arsenic	1,056	0,010			µg/l	
Lead	3,14	0,03			µg/l	
Cadmium	2,017	0,016			µg/l	
Chromium	4,54	0,04			µg/l	
Iron	29,1	0,2	33,0	4	µg/l	113%
Copper	1,10	0,07	5,5	5	µg/l	500%
Manganese	38,5	0,2	40,25	2	µg/l	105%
Nickel	1,10	0,09			µg/l	
Mercury	0,417	0,012			µg/l	
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3	28,5	10	µg/l	160%



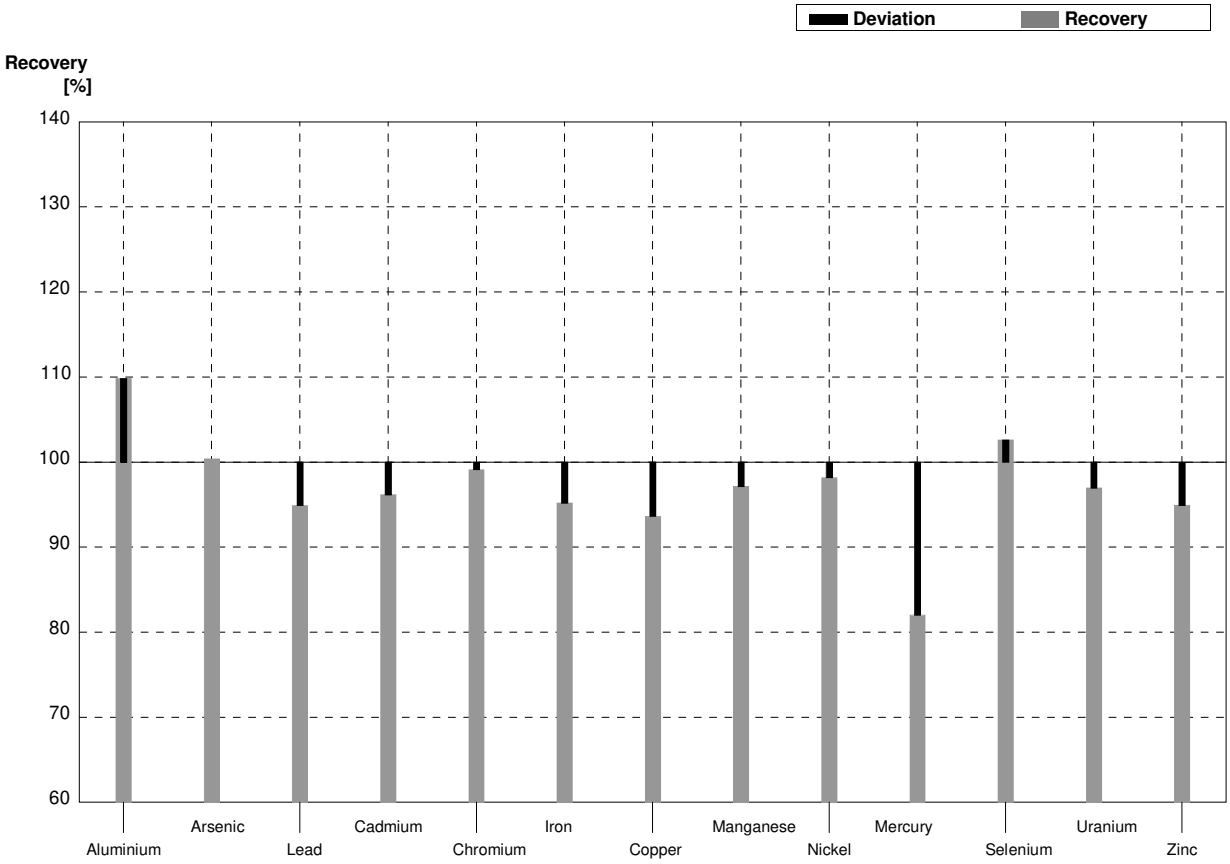
Sample **M163B**
Laboratory **S**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	8,25	4	µg/l	113%
Arsenic	1,537	0,013			µg/l	
Lead	1,741	0,017			µg/l	
Cadmium	0,695	0,007			µg/l	
Chromium	2,36	0,02			µg/l	
Iron	56,0	0,3	56,75	4	µg/l	101%
Copper	2,72	0,07	6,0	5	µg/l	221%
Manganese	9,58	0,11	10,0	2	µg/l	104%
Nickel	2,17	0,09			µg/l	
Mercury	1,766	0,018			µg/l	
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3	34,5	10	µg/l	158%



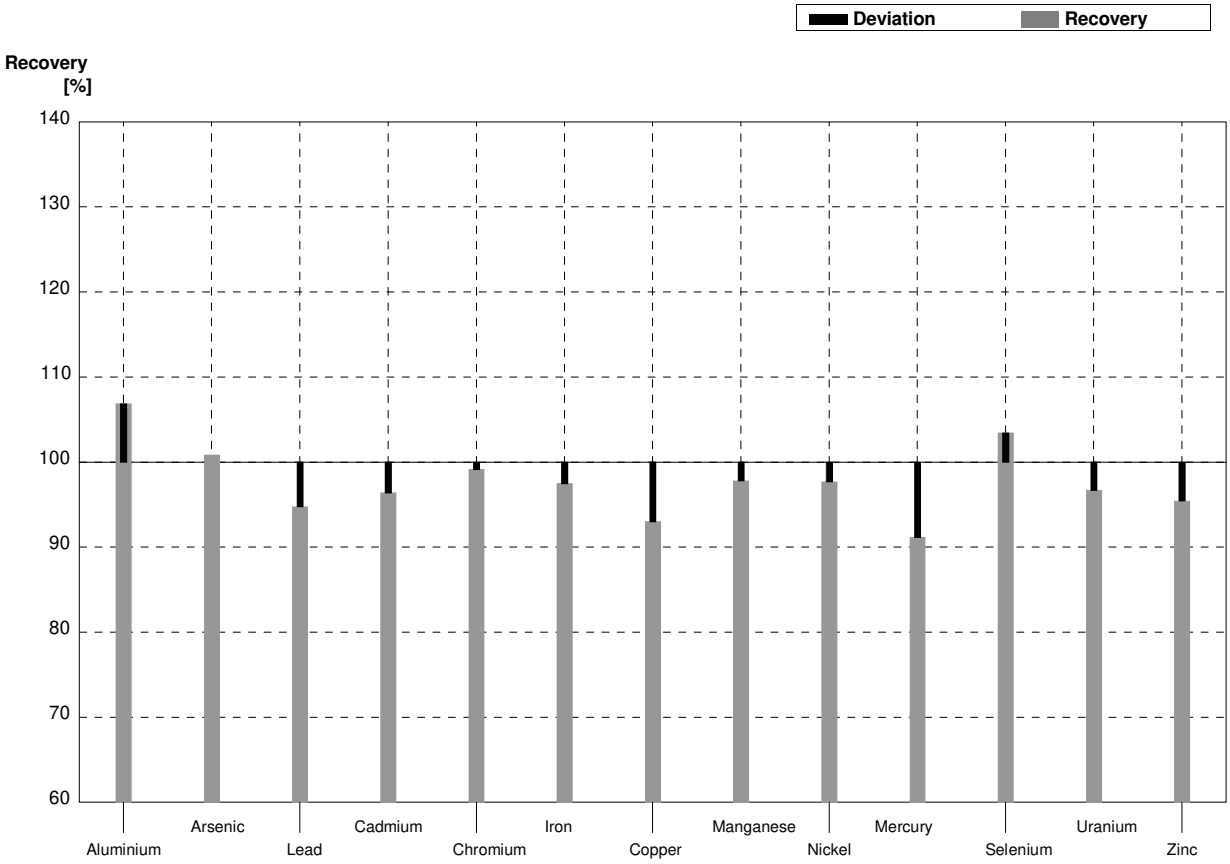
Sample **M163A**
Laboratory **T**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	22,3	2,2	µg/l	110%
Arsenic	1,056	0,010	1,06	0,11	µg/l	100%
Lead	3,14	0,03	2,98	0,30	µg/l	95%
Cadmium	2,017	0,016	1,94	0,19	µg/l	96%
Chromium	4,54	0,04	4,50	0,44	µg/l	99%
Iron	29,1	0,2	27,7	3,9	µg/l	95%
Copper	1,10	0,07	1,03	0,09	µg/l	94%
Manganese	38,5	0,2	37,4	3,7	µg/l	97%
Nickel	1,10	0,09	1,08	0,10	µg/l	98%
Mercury	0,417	0,012	0,342	0,101	µg/l	82%
Selenium	1,92	0,02	1,97	0,14	µg/l	103%
Uranium	4,61	0,04	4,47	0,36	µg/l	97%
Zinc	17,8	1,3	16,9	1,4	µg/l	95%



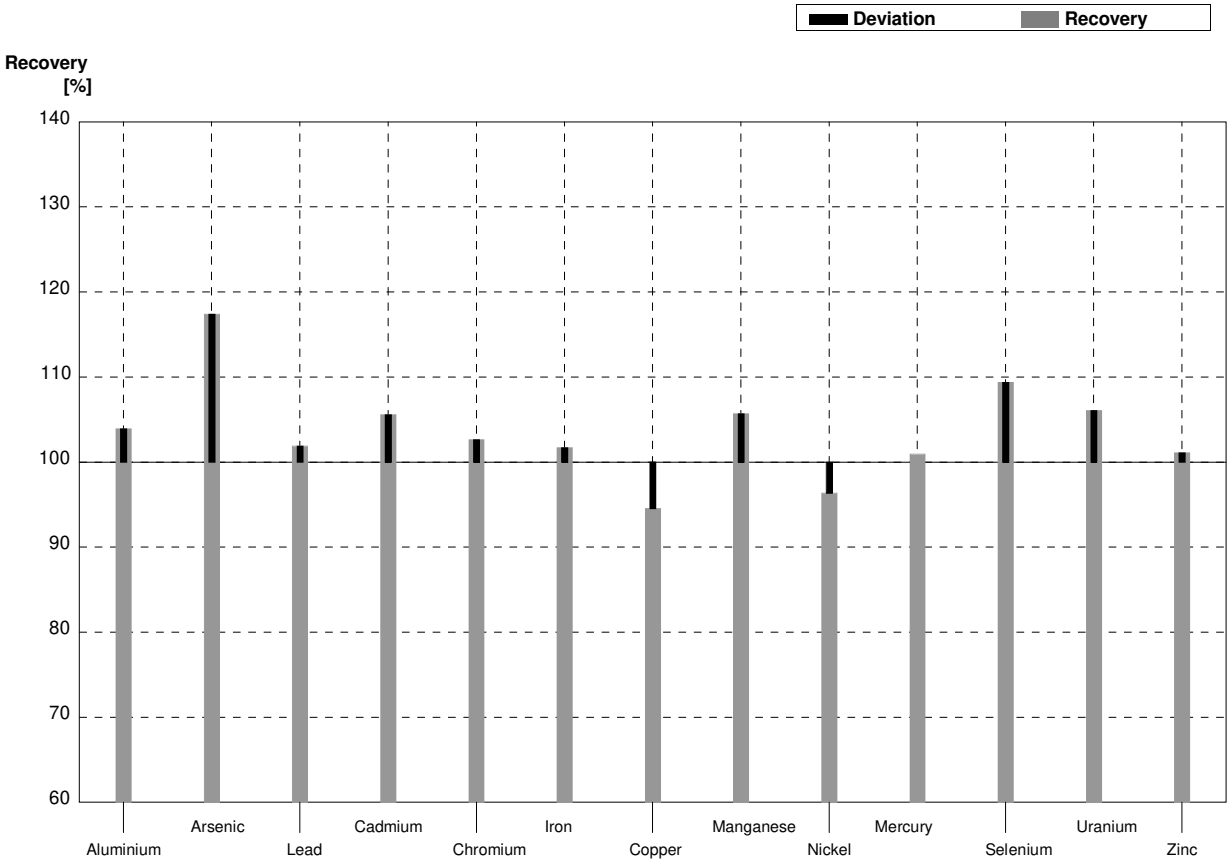
Sample M163B
Laboratory T

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	7,8	0,8	µg/l	107%
Arsenic	1,537	0,013	1,55	0,16	µg/l	101%
Lead	1,741	0,017	1,65	0,17	µg/l	95%
Cadmium	0,695	0,007	0,67	0,07	µg/l	96%
Chromium	2,36	0,02	2,34	0,23	µg/l	99%
Iron	56,0	0,3	54,6	7,6	µg/l	98%
Copper	2,72	0,07	2,53	0,25	µg/l	93%
Manganese	9,58	0,11	9,37	0,93	µg/l	98%
Nickel	2,17	0,09	2,12	0,21	µg/l	98%
Mercury	1,766	0,018	1,61	0,47	µg/l	91%
Selenium	0,754	0,017	0,78	0,06	µg/l	103%
Uranium	1,634	0,015	1,58	0,13	µg/l	97%
Zinc	21,9	1,3	20,9	1,7	µg/l	95%



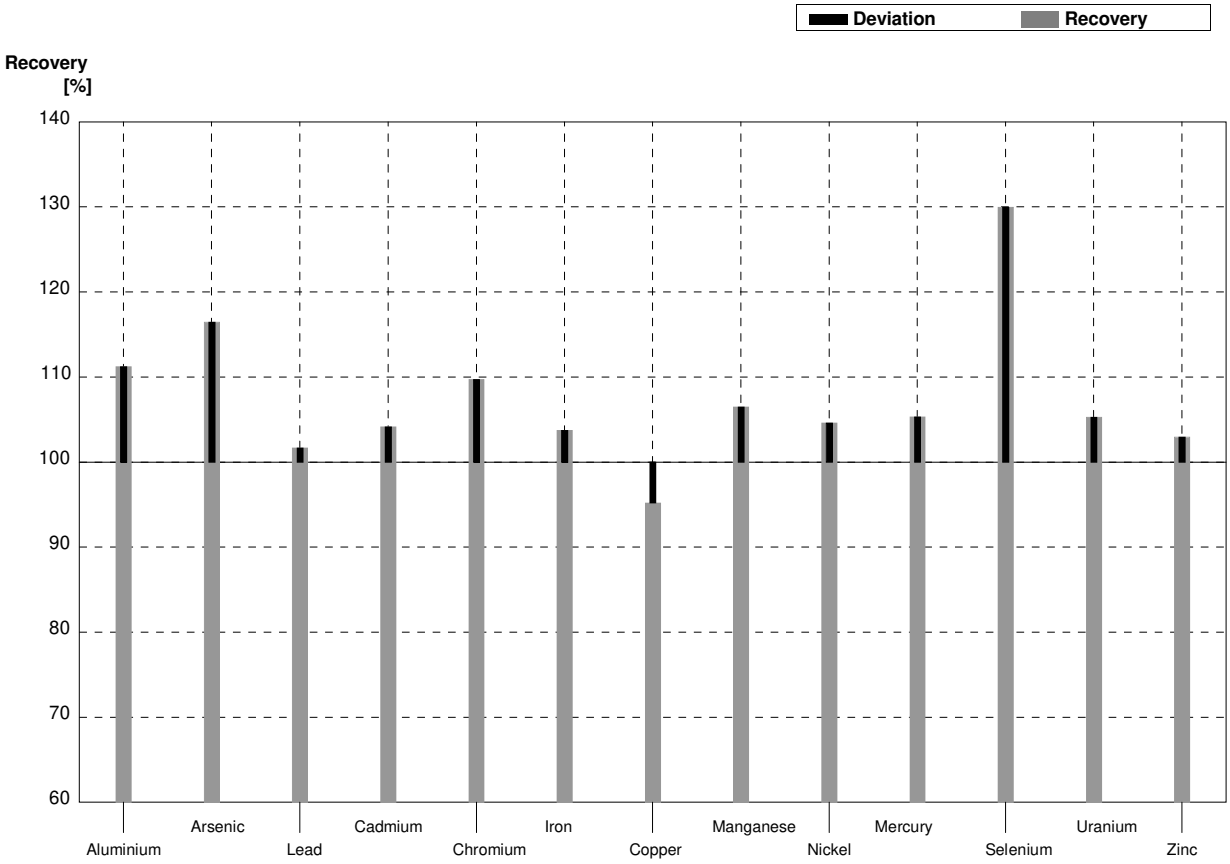
Sample **M163A**
Laboratory **U**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	21,1	2,2	µg/l	104%
Arsenic	1,056	0,010	1,24	0,19	µg/l	117%
Lead	3,14	0,03	3,20	0,48	µg/l	102%
Cadmium	2,017	0,016	2,13	0,32	µg/l	106%
Chromium	4,54	0,04	4,66	0,70	µg/l	103%
Iron	29,1	0,2	29,6	4,4	µg/l	102%
Copper	1,10	0,07	1,04	0,16	µg/l	95%
Manganese	38,5	0,2	40,7	6,1	µg/l	106%
Nickel	1,10	0,09	1,06	0,16	µg/l	96%
Mercury	0,417	0,012	0,421	0,063	µg/l	101%
Selenium	1,92	0,02	2,10	0,31	µg/l	109%
Uranium	4,61	0,04	4,89	0,73	µg/l	106%
Zinc	17,8	1,3	18,0	2,7	µg/l	101%



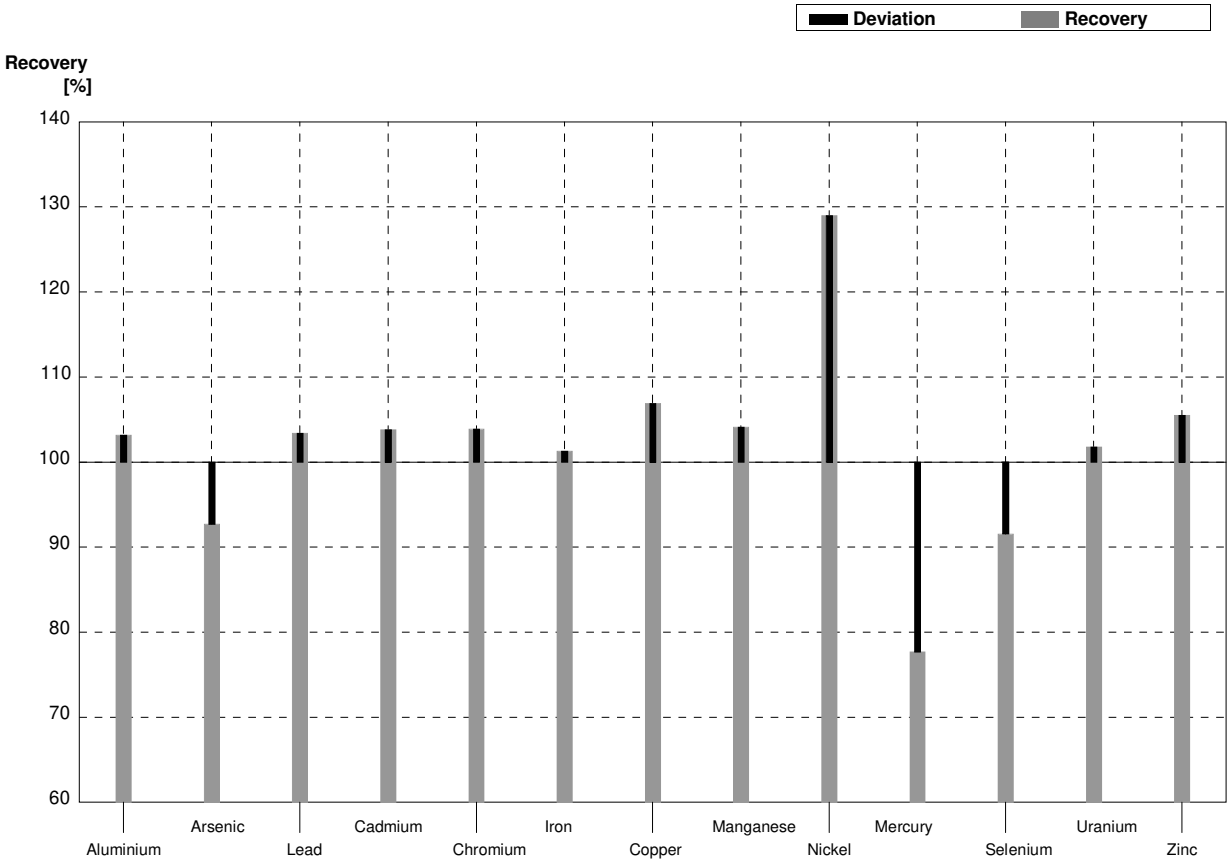
Sample **M163B**
Laboratory **U**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	8,12	1,22	µg/l	111%
Arsenic	1,537	0,013	1,79	0,27	µg/l	116%
Lead	1,741	0,017	1,77	0,27	µg/l	102%
Cadmium	0,695	0,007	0,724	0,11	µg/l	104%
Chromium	2,36	0,02	2,59	0,39	µg/l	110%
Iron	56,0	0,3	58,1	8,7	µg/l	104%
Copper	2,72	0,07	2,59	0,39	µg/l	95%
Manganese	9,58	0,11	10,2	1,54	µg/l	106%
Nickel	2,17	0,09	2,27	0,34	µg/l	105%
Mercury	1,766	0,018	1,86	0,28	µg/l	105%
Selenium	0,754	0,017	0,98	0,15	µg/l	130%
Uranium	1,634	0,015	1,72	0,26	µg/l	105%
Zinc	21,9	1,3	22,55	3,4	µg/l	103%



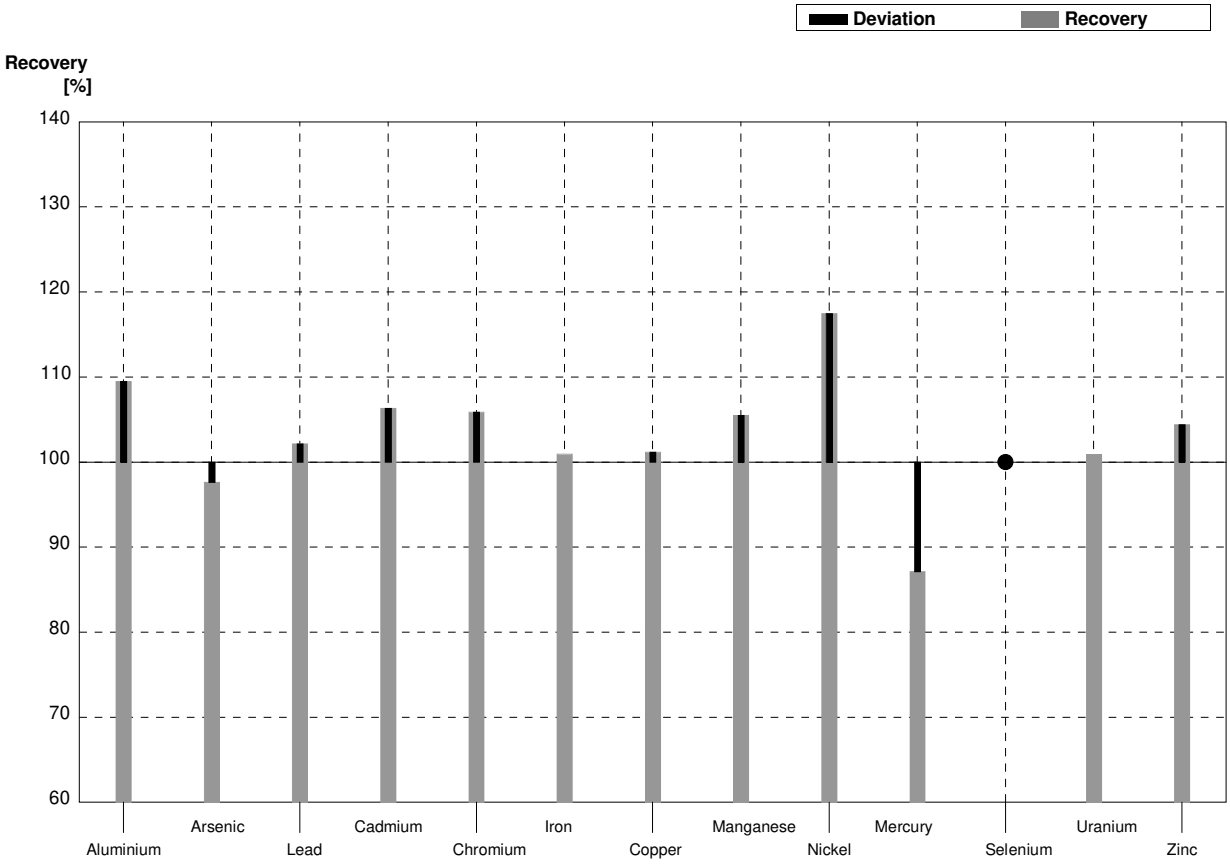
Sample M163A
Laboratory V

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	20,948	4,190	µg/l	103%
Arsenic	1,056	0,010	0,979	0,196	µg/l	93%
Lead	3,14	0,03	3,247	0,649	µg/l	103%
Cadmium	2,017	0,016	2,094	0,419	µg/l	104%
Chromium	4,54	0,04	4,717	0,943	µg/l	104%
Iron	29,1	0,2	29,477	5,895	µg/l	101%
Copper	1,10	0,07	1,176	0,235	µg/l	107%
Manganese	38,5	0,2	40,083	8,017	µg/l	104%
Nickel	1,10	0,09	1,419	0,284	µg/l	129%
Mercury	0,417	0,012	0,324	0,065	µg/l	78%
Selenium	1,92	0,02	1,758	0,352	µg/l	92%
Uranium	4,61	0,04	4,693	0,939	µg/l	102%
Zinc	17,8	1,3	18,780	3,756	µg/l	106%



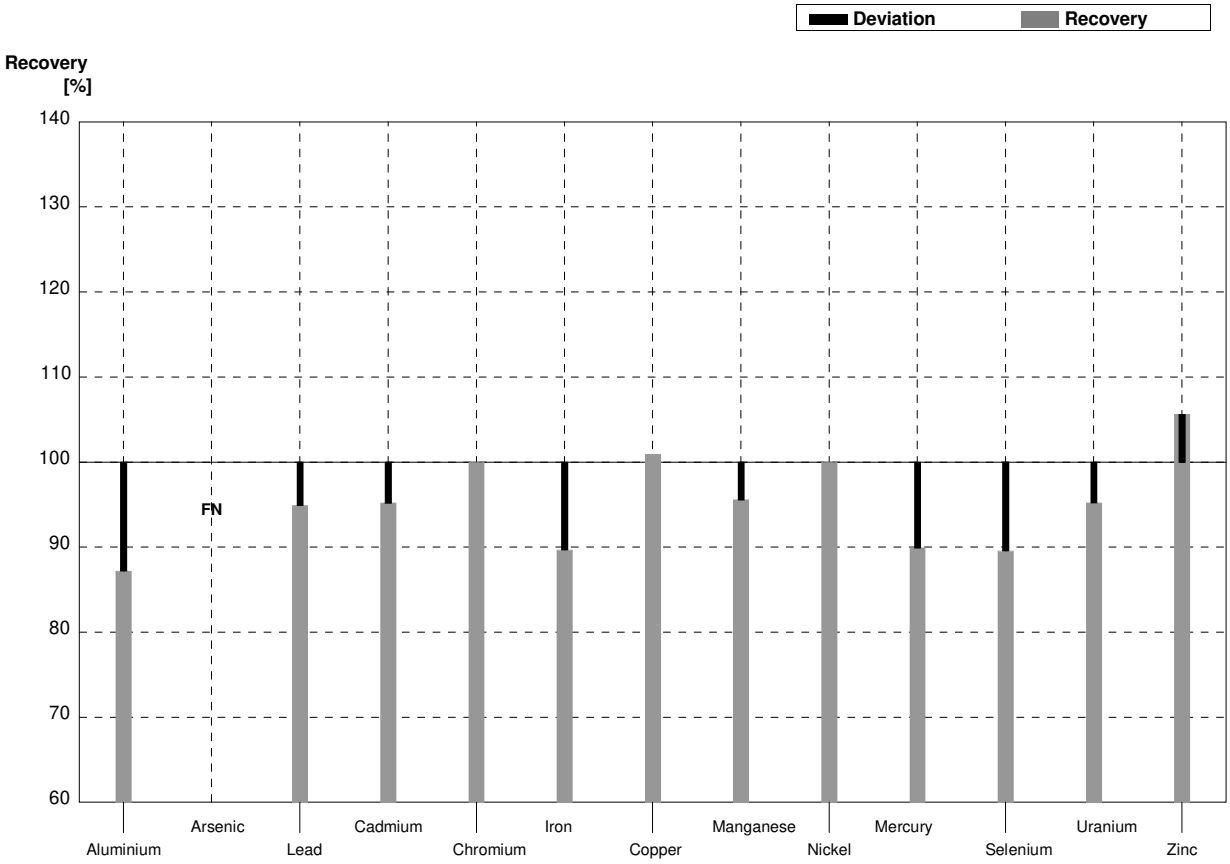
Sample M163B
Laboratory V

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	7,993	1,599	µg/l	109%
Arsenic	1,537	0,013	1,501	0,300	µg/l	98%
Lead	1,741	0,017	1,779	0,356	µg/l	102%
Cadmium	0,695	0,007	0,739	0,148	µg/l	106%
Chromium	2,36	0,02	2,499	0,500	µg/l	106%
Iron	56,0	0,3	56,547	11,309	µg/l	101%
Copper	2,72	0,07	2,752	0,550	µg/l	101%
Manganese	9,58	0,11	10,109	2,022	µg/l	106%
Nickel	2,17	0,09	2,549	0,510	µg/l	117%
Mercury	1,766	0,018	1,539	0,308	µg/l	87%
Selenium	0,754	0,017	<1,250		µg/l	•
Uranium	1,634	0,015	1,649	0,330	µg/l	101%
Zinc	21,9	1,3	22,865	4,573	µg/l	104%



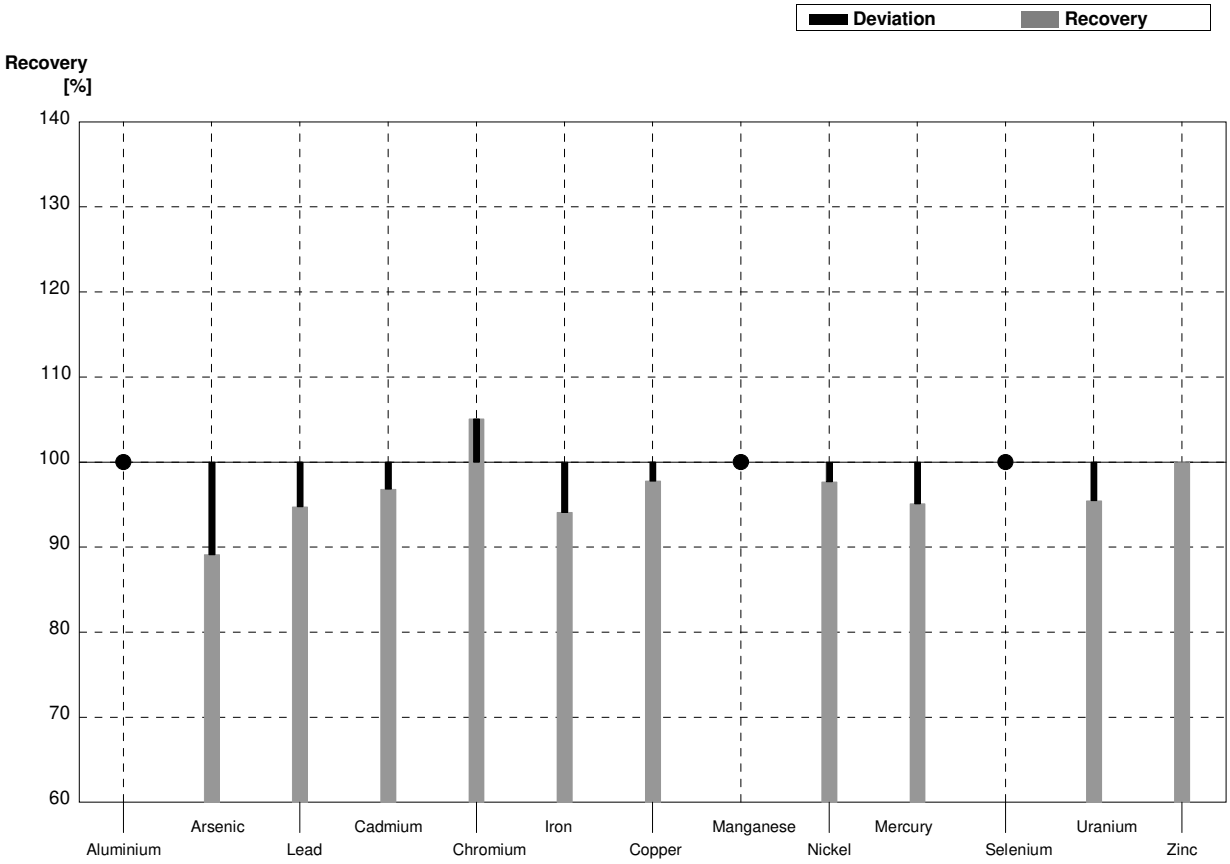
Sample **M163A**
Laboratory **W**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	17,7	0,902	µg/l	87%
Arsenic	1,056	0,010	<1		µg/l	FN
Lead	3,14	0,03	2,98	0,0665	µg/l	95%
Cadmium	2,017	0,016	1,92	0,109	µg/l	95%
Chromium	4,54	0,04	4,54	0,163	µg/l	100%
Iron	29,1	0,2	26,1	1,12	µg/l	90%
Copper	1,10	0,07	1,11	0,122	µg/l	101%
Manganese	38,5	0,2	36,8	0,745	µg/l	96%
Nickel	1,10	0,09	1,10	0,184	µg/l	100%
Mercury	0,417	0,012	0,375	0,0132	µg/l	90%
Selenium	1,92	0,02	1,72	0,109	µg/l	90%
Uranium	4,61	0,04	4,39	0,0751	µg/l	95%
Zinc	17,8	1,3	18,8	0,381	µg/l	106%



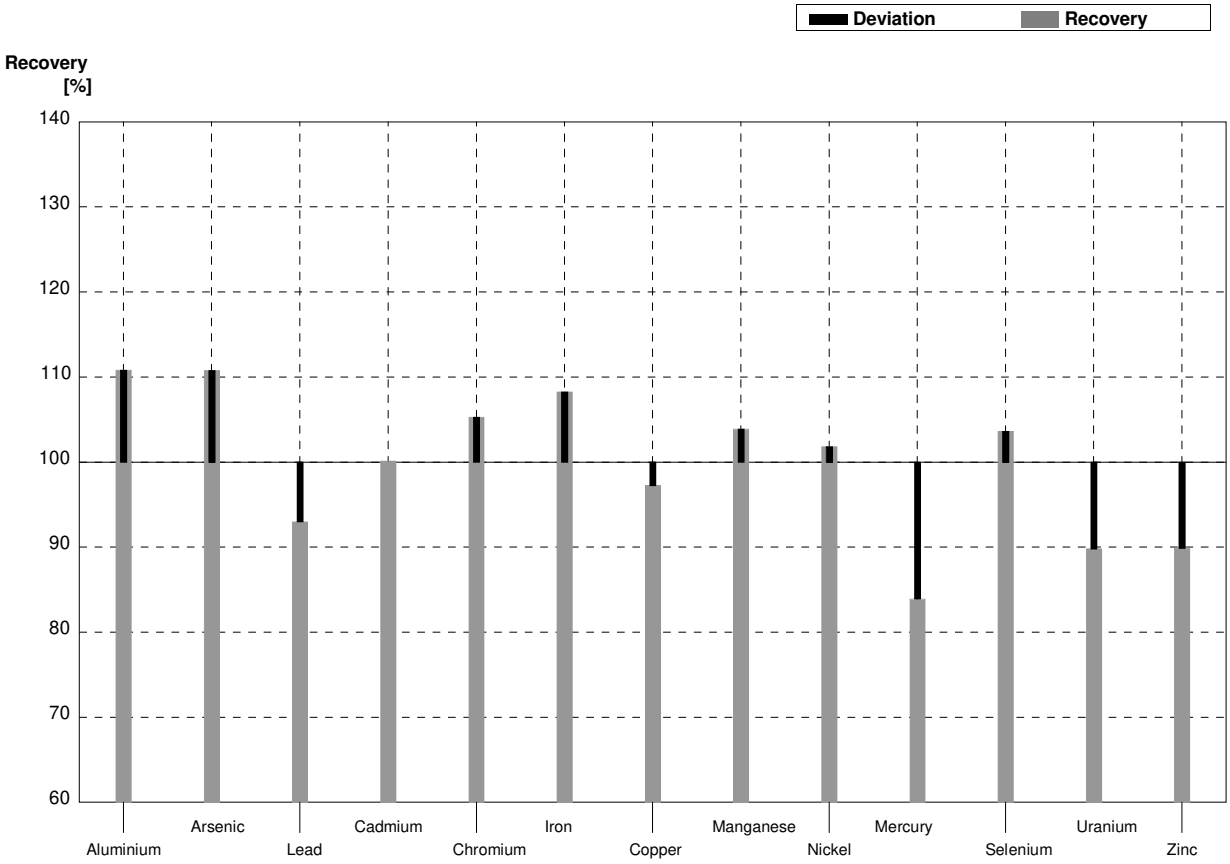
Sample **M163B**
Laboratory **W**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	<10		µg/l	•
Arsenic	1,537	0,013	1,37	0,106	µg/l	89%
Lead	1,741	0,017	1,65	0,0713	µg/l	95%
Cadmium	0,695	0,007	0,673	0,0160	µg/l	97%
Chromium	2,36	0,02	2,48	0,175	µg/l	105%
Iron	56,0	0,3	52,7	1,03	µg/l	94%
Copper	2,72	0,07	2,66	0,0320	µg/l	98%
Manganese	9,58	0,11	<10		µg/l	•
Nickel	2,17	0,09	2,12	0,172	µg/l	98%
Mercury	1,766	0,018	1,68	0,0127	µg/l	95%
Selenium	0,754	0,017	<1		µg/l	•
Uranium	1,634	0,015	1,56	0,0850	µg/l	95%
Zinc	21,9	1,3	21,9	0,376	µg/l	100%



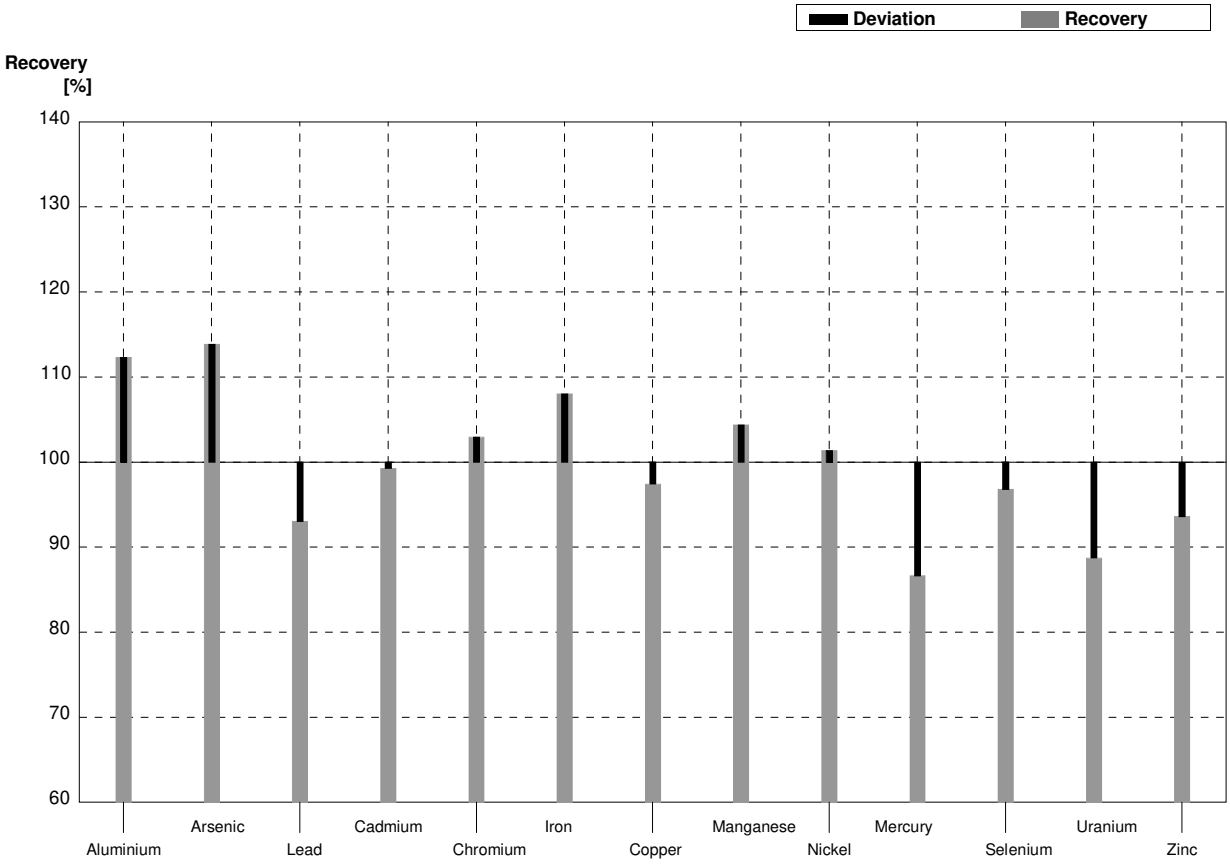
Sample **M163A**
Laboratory **X**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	22,5	2	µg/l	111%
Arsenic	1,056	0,010	1,17	0,1	µg/l	111%
Lead	3,14	0,03	2,92	0,1	µg/l	93%
Cadmium	2,017	0,016	2,02	0,1	µg/l	100%
Chromium	4,54	0,04	4,78	0,1	µg/l	105%
Iron	29,1	0,2	31,5	2	µg/l	108%
Copper	1,10	0,07	1,07	0,1	µg/l	97%
Manganese	38,5	0,2	40,0	2	µg/l	104%
Nickel	1,10	0,09	1,12	0,2	µg/l	102%
Mercury	0,417	0,012	0,350	0,01	µg/l	84%
Selenium	1,92	0,02	1,99	0,2	µg/l	104%
Uranium	4,61	0,04	4,14	0,05	µg/l	90%
Zinc	17,8	1,3	16,0	0,5	µg/l	90%



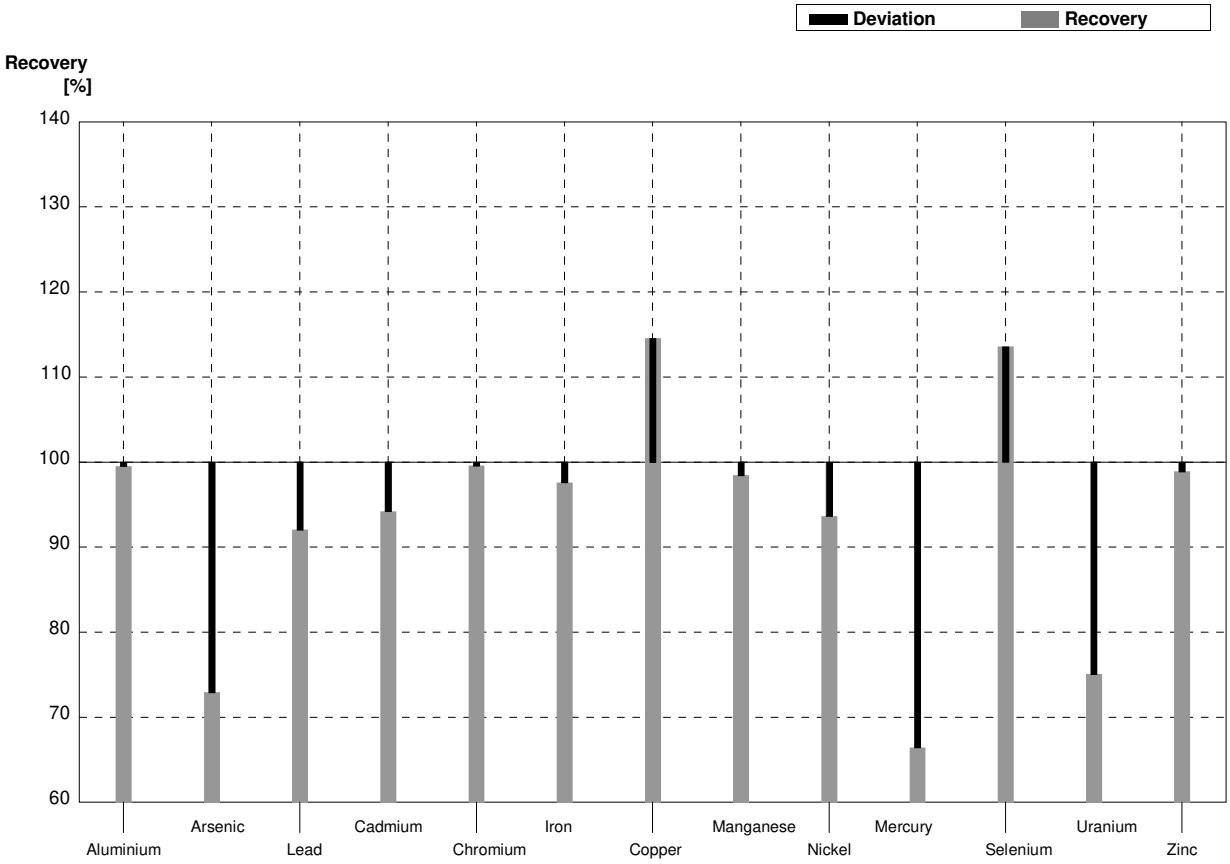
Sample M163B
Laboratory X

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	8,2	1	µg/l	112%
Arsenic	1,537	0,013	1,75	0,1	µg/l	114%
Lead	1,741	0,017	1,62	0,1	µg/l	93%
Cadmium	0,695	0,007	0,69	0,02	µg/l	99%
Chromium	2,36	0,02	2,43	0,1	µg/l	103%
Iron	56,0	0,3	60,5	2	µg/l	108%
Copper	2,72	0,07	2,65	0,1	µg/l	97%
Manganese	9,58	0,11	10,0	1	µg/l	104%
Nickel	2,17	0,09	2,20	0,20	µg/l	101%
Mercury	1,766	0,018	1,53	0,01	µg/l	87%
Selenium	0,754	0,017	0,73	0,2	µg/l	97%
Uranium	1,634	0,015	1,45	0,05	µg/l	89%
Zinc	21,9	1,3	20,5	0,5	µg/l	94%



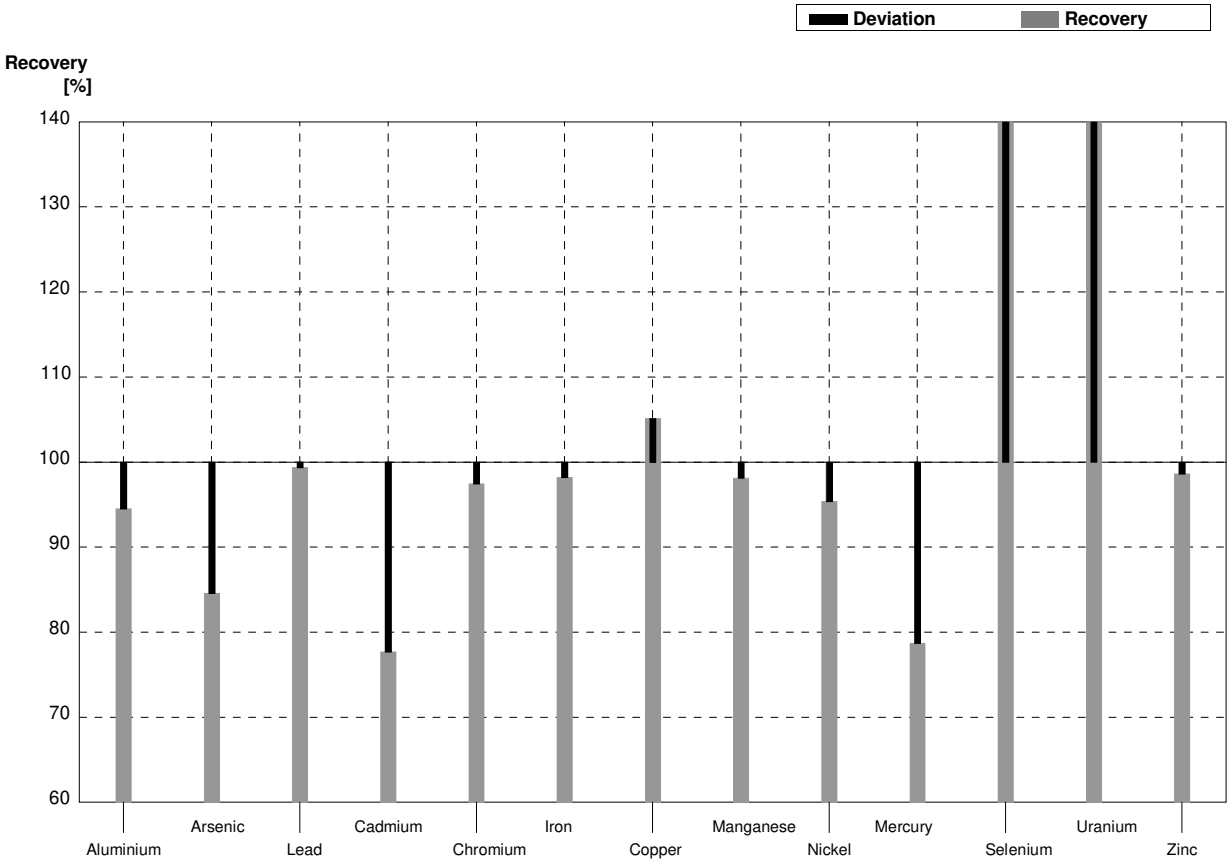
Sample M163A
Laboratory Y

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	20,2	15,0	µg/l	100%
Arsenic	1,056	0,010	0,77	1,44	µg/l	73%
Lead	3,14	0,03	2,89	1,35	µg/l	92%
Cadmium	2,017	0,016	1,90	0,410	µg/l	94%
Chromium	4,54	0,04	4,52	7,3	µg/l	100%
Iron	29,1	0,2	28,4	25,7	µg/l	98%
Copper	1,10	0,07	1,26	6,9	µg/l	115%
Manganese	38,5	0,2	37,9	6,8	µg/l	98%
Nickel	1,10	0,09	1,03	3,51	µg/l	94%
Mercury	0,417	0,012	0,277	0,188	µg/l	66%
Selenium	1,92	0,02	2,18	1,32	µg/l	114%
Uranium	4,61	0,04	3,46	1,51	µg/l	75%
Zinc	17,8	1,3	17,6	6,9	µg/l	99%



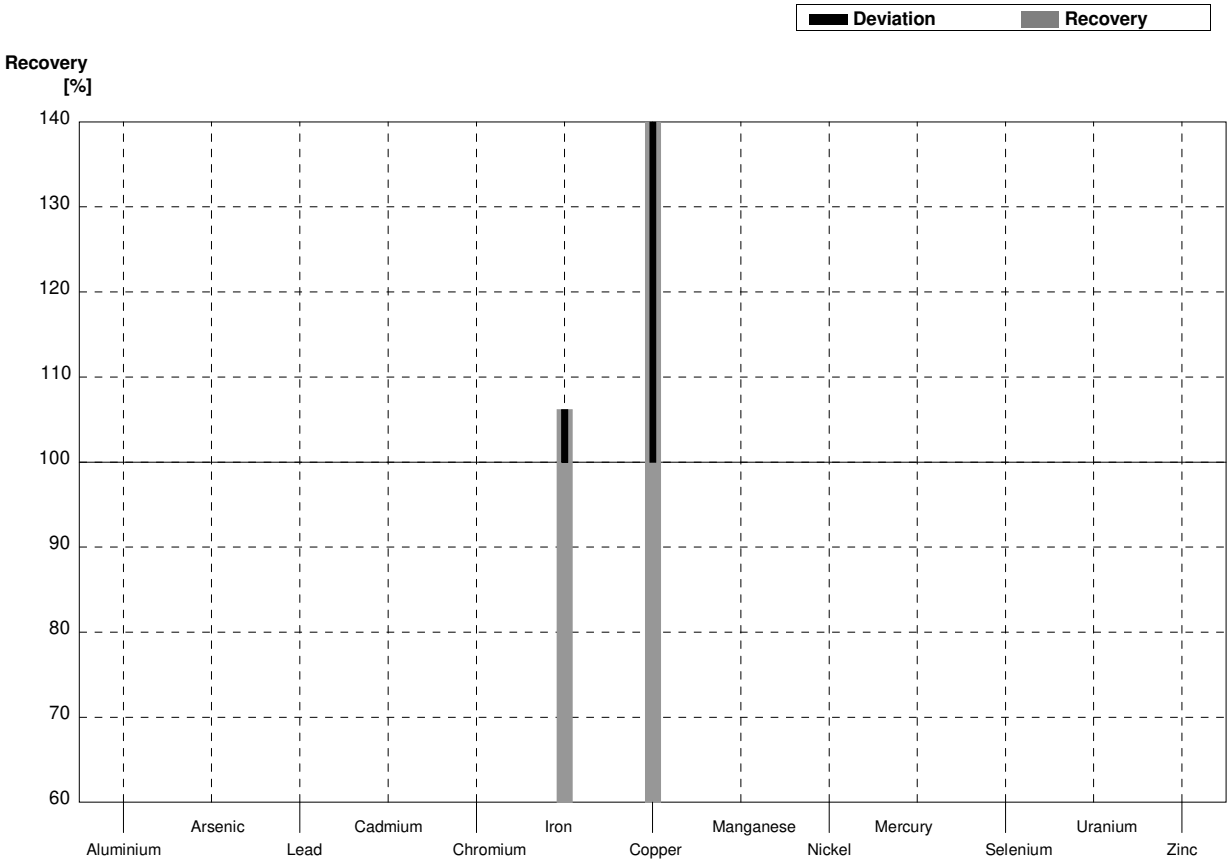
Sample M163B
Laboratory Y

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	6,9	15,0	µg/l	95%
Arsenic	1,537	0,013	1,30	1,44	µg/l	85%
Lead	1,741	0,017	1,73	1,35	µg/l	99%
Cadmium	0,695	0,007	0,54	0,410	µg/l	78%
Chromium	2,36	0,02	2,30	7,3	µg/l	97%
Iron	56,0	0,3	55	25,7	µg/l	98%
Copper	2,72	0,07	2,86	6,9	µg/l	105%
Manganese	9,58	0,11	9,4	6,8	µg/l	98%
Nickel	2,17	0,09	2,07	3,51	µg/l	95%
Mercury	1,766	0,018	1,39	0,188	µg/l	79%
Selenium	0,754	0,017	1,29	1,32	µg/l	171%
Uranium	1,634	0,015	2,30	1,51	µg/l	141%
Zinc	21,9	1,3	21,6	6,9	µg/l	99%



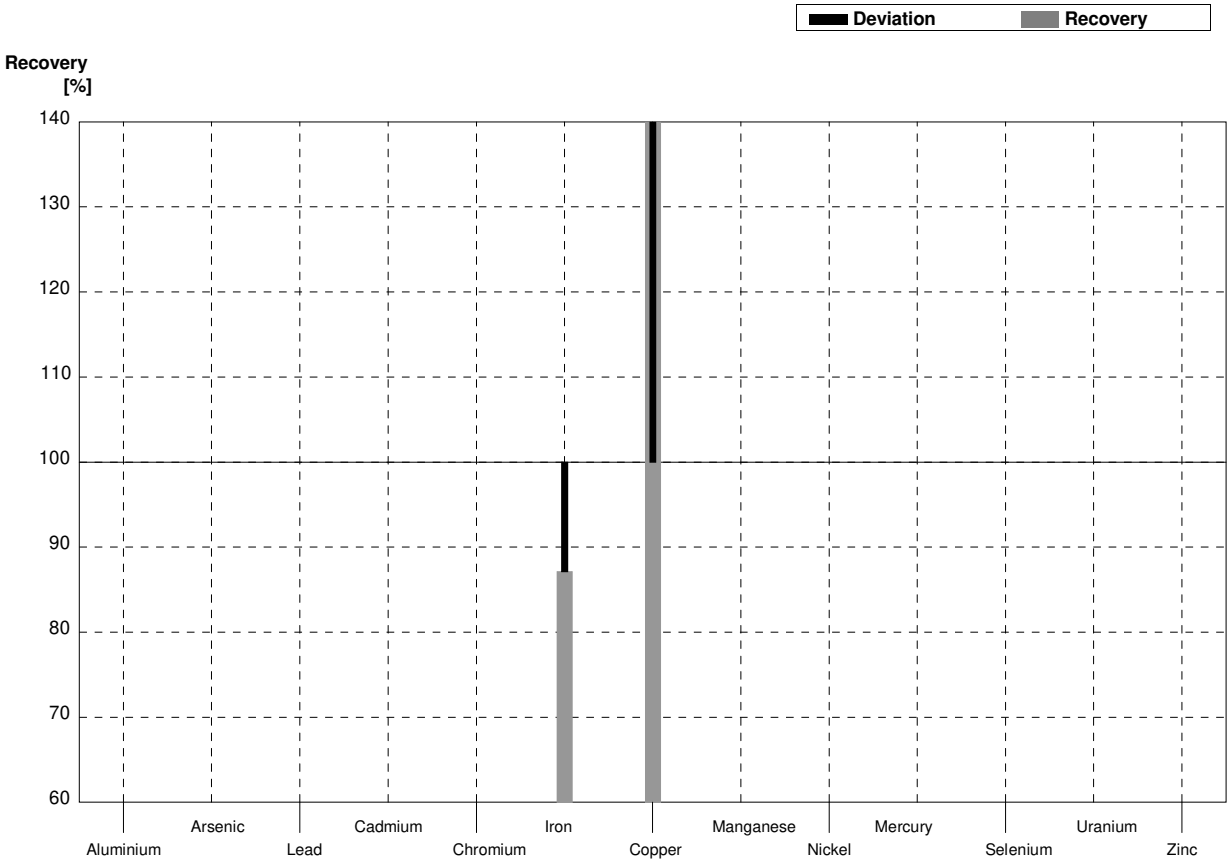
Sample **M163A**
Laboratory **Z**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3			µg/l	
Arsenic	1,056	0,010			µg/l	
Lead	3,14	0,03			µg/l	
Cadmium	2,017	0,016			µg/l	
Chromium	4,54	0,04			µg/l	
Iron	29,1	0,2	30,9	0,2	µg/l	106%
Copper	1,10	0,07	3,25	0,02	µg/l	295%
Manganese	38,5	0,2			µg/l	
Nickel	1,10	0,09			µg/l	
Mercury	0,417	0,012			µg/l	
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3			µg/l	



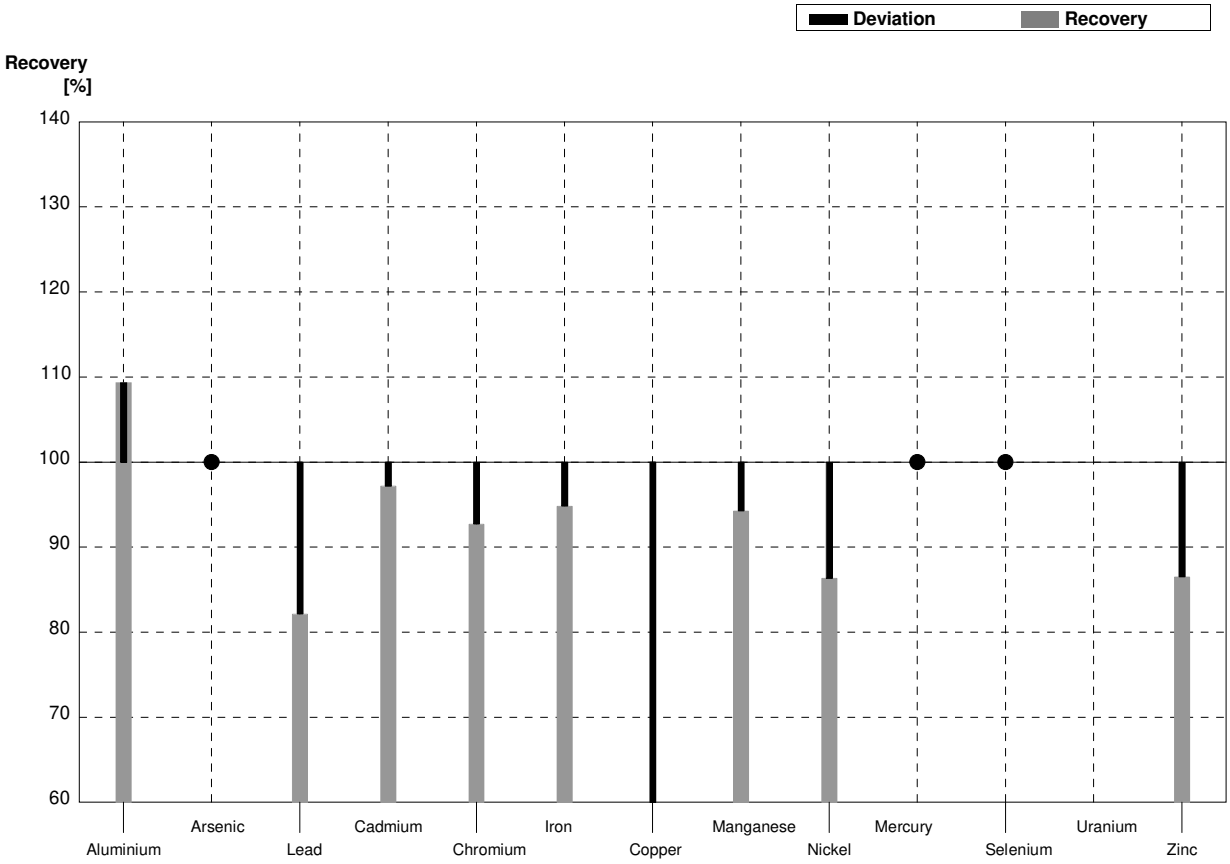
Sample **M163B**
Laboratory **Z**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3			µg/l	
Arsenic	1,537	0,013			µg/l	
Lead	1,741	0,017			µg/l	
Cadmium	0,695	0,007			µg/l	
Chromium	2,36	0,02			µg/l	
Iron	56,0	0,3	48,8	0,2	µg/l	87%
Copper	2,72	0,07	41,2	0,02	µg/l	1515%
Manganese	9,58	0,11			µg/l	
Nickel	2,17	0,09			µg/l	
Mercury	1,766	0,018			µg/l	
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3			µg/l	



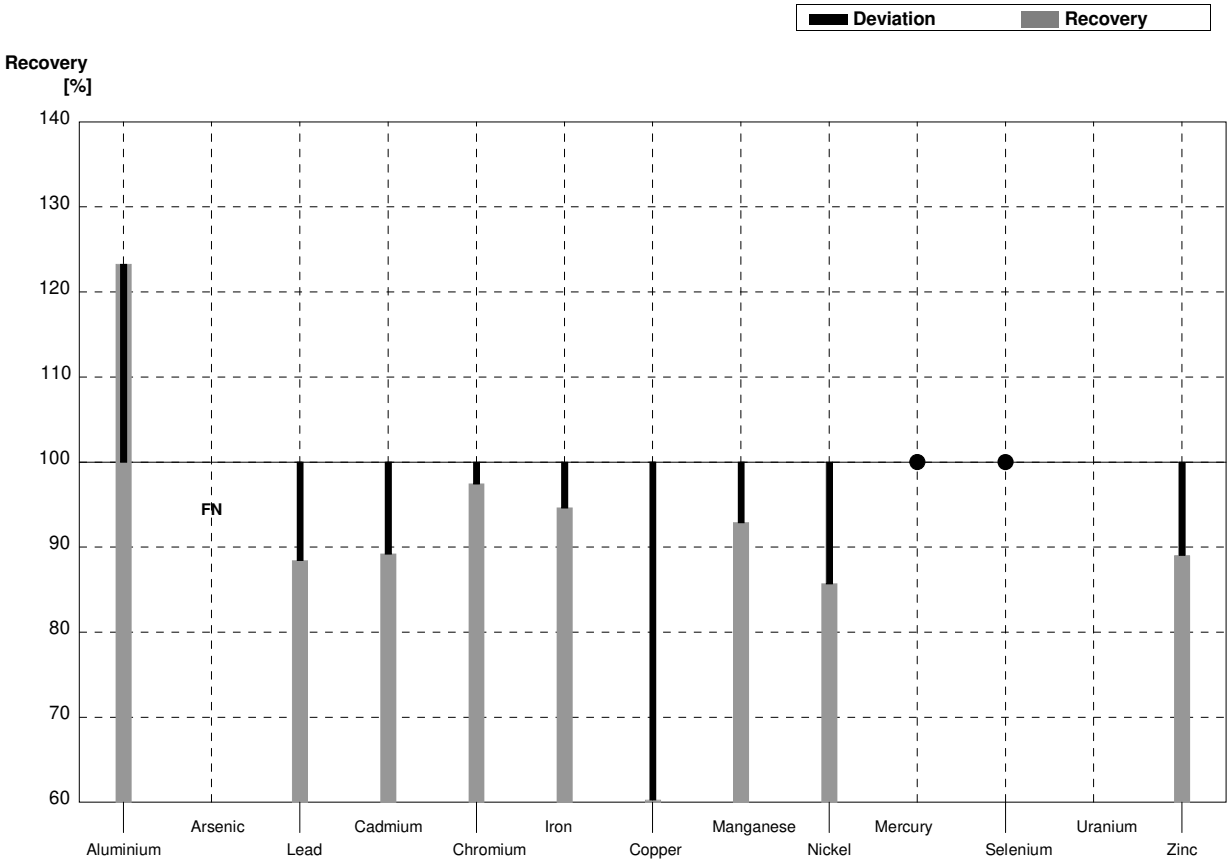
Sample **M163A**
Laboratory **AA**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	22,2	0,3	µg/l	109%
Arsenic	1,056	0,010	<2,13	1,69	µg/l	•
Lead	3,14	0,03	2,58	0,42	µg/l	82%
Cadmium	2,017	0,016	1,96	0,09	µg/l	97%
Chromium	4,54	0,04	4,21	0,34	µg/l	93%
Iron	29,1	0,2	27,6	0,2	µg/l	95%
Copper	1,10	0,07	0,54	0,14	µg/l	49%
Manganese	38,5	0,2	36,3	0,7	µg/l	94%
Nickel	1,10	0,09	0,95	0,11	µg/l	86%
Mercury	0,417	0,012	<0,468	0,249	µg/l	•
Selenium	1,92	0,02	<2,47	1,32	µg/l	•
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3	15,4	0,3	µg/l	87%



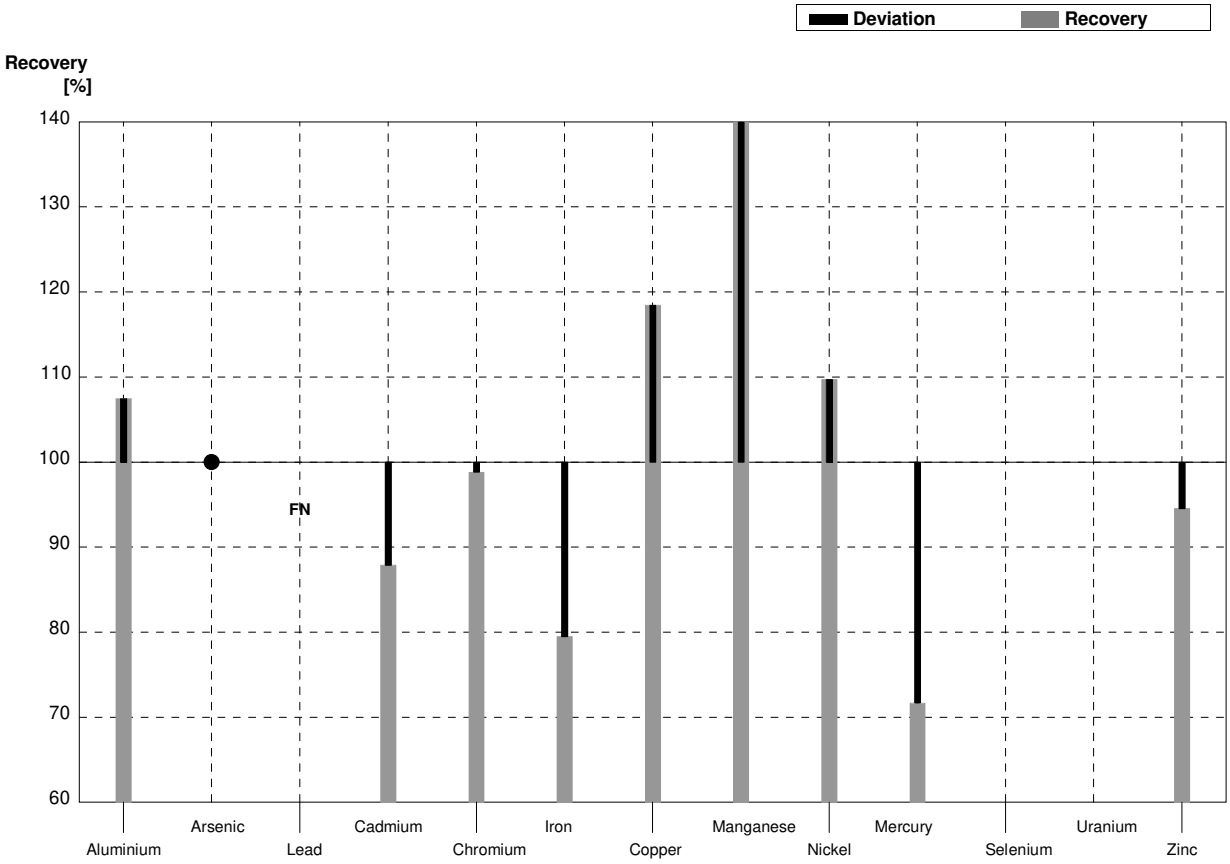
Sample **M163B**
Laboratory **AA**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	9,0	0,1	µg/l	123%
Arsenic	1,537	0,013	<0,62	0,15	µg/l	FN
Lead	1,741	0,017	1,54	0,18	µg/l	88%
Cadmium	0,695	0,007	0,62	0,13	µg/l	89%
Chromium	2,36	0,02	2,30	0,03	µg/l	97%
Iron	56,0	0,3	53	1,2	µg/l	95%
Copper	2,72	0,07	1,64	0,26	µg/l	60%
Manganese	9,58	0,11	8,9	0,1	µg/l	93%
Nickel	2,17	0,09	1,86	0,04	µg/l	86%
Mercury	1,766	0,018	<1,79	0,18	µg/l	•
Selenium	0,754	0,017	<0,73	0,36	µg/l	•
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3	19,5	0,2	µg/l	89%



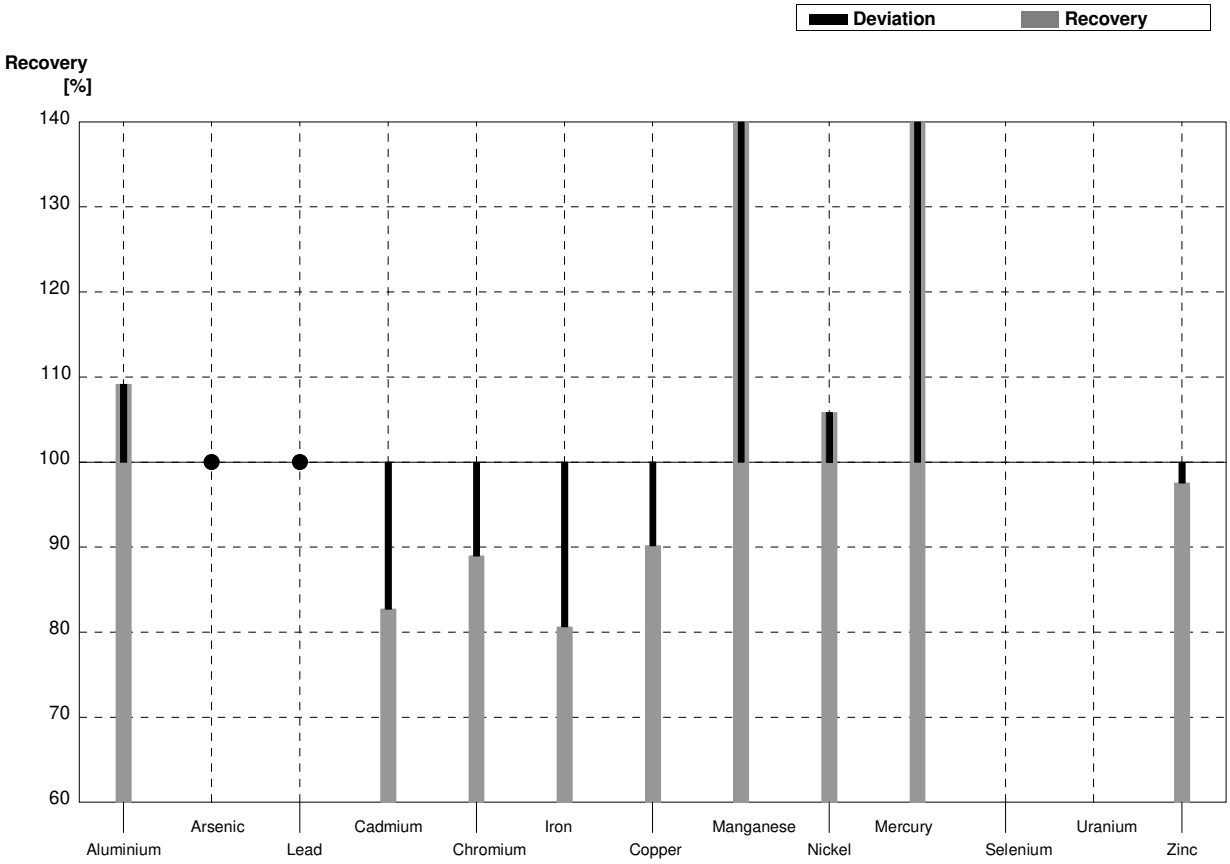
Sample **M163A**
Laboratory **AB**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	21,817	3,508	µg/l	107%
Arsenic	1,056	0,010	<5		µg/l	•
Lead	3,14	0,03	<2		µg/l	FN
Cadmium	2,017	0,016	1,773	0,0702	µg/l	88%
Chromium	4,54	0,04	4,487	0,3002	µg/l	99%
Iron	29,1	0,2	23,133	1,026	µg/l	79%
Copper	1,10	0,07	1,303	0,0462	µg/l	118%
Manganese	38,5	0,2	350,3	5,033	µg/l	910%
Nickel	1,10	0,09	1,207	0,182	µg/l	110%
Mercury	0,417	0,012	0,299	0,0408	µg/l	72%
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3	16,83	0,643	µg/l	95%



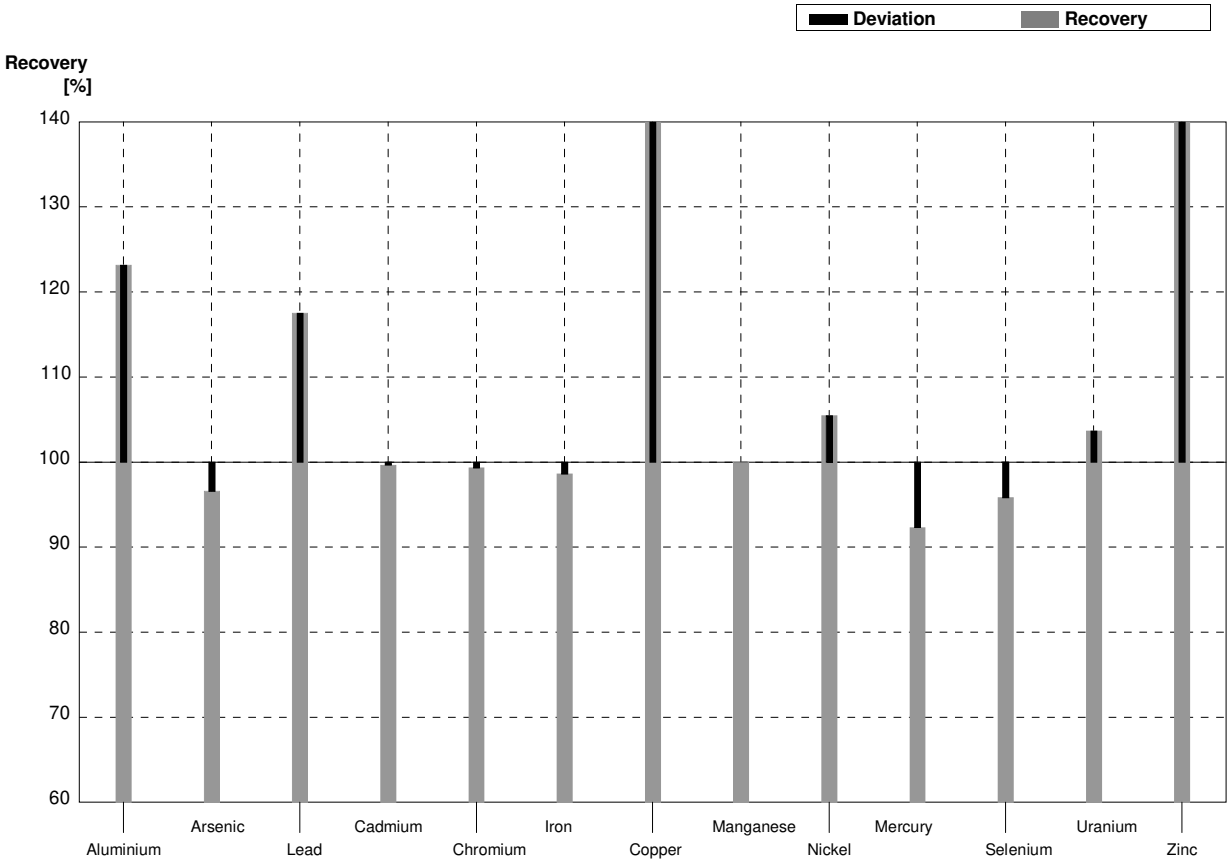
Sample **M163B**
Laboratory **AB**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	7,970	1,047	µg/l	109%
Arsenic	1,537	0,013	<5		µg/l	•
Lead	1,741	0,017	<2		µg/l	•
Cadmium	0,695	0,007	0,575	0,0546	µg/l	83%
Chromium	2,36	0,02	2,100	0,216	µg/l	89%
Iron	56,0	0,3	45,167	4,365	µg/l	81%
Copper	2,72	0,07	2,453	0,401	µg/l	90%
Manganese	9,58	0,11	86,00	1,039	µg/l	898%
Nickel	2,17	0,09	2,297	0,405	µg/l	106%
Mercury	1,766	0,018	4,045	0,322	µg/l	229%
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3	21,367	0,306	µg/l	98%



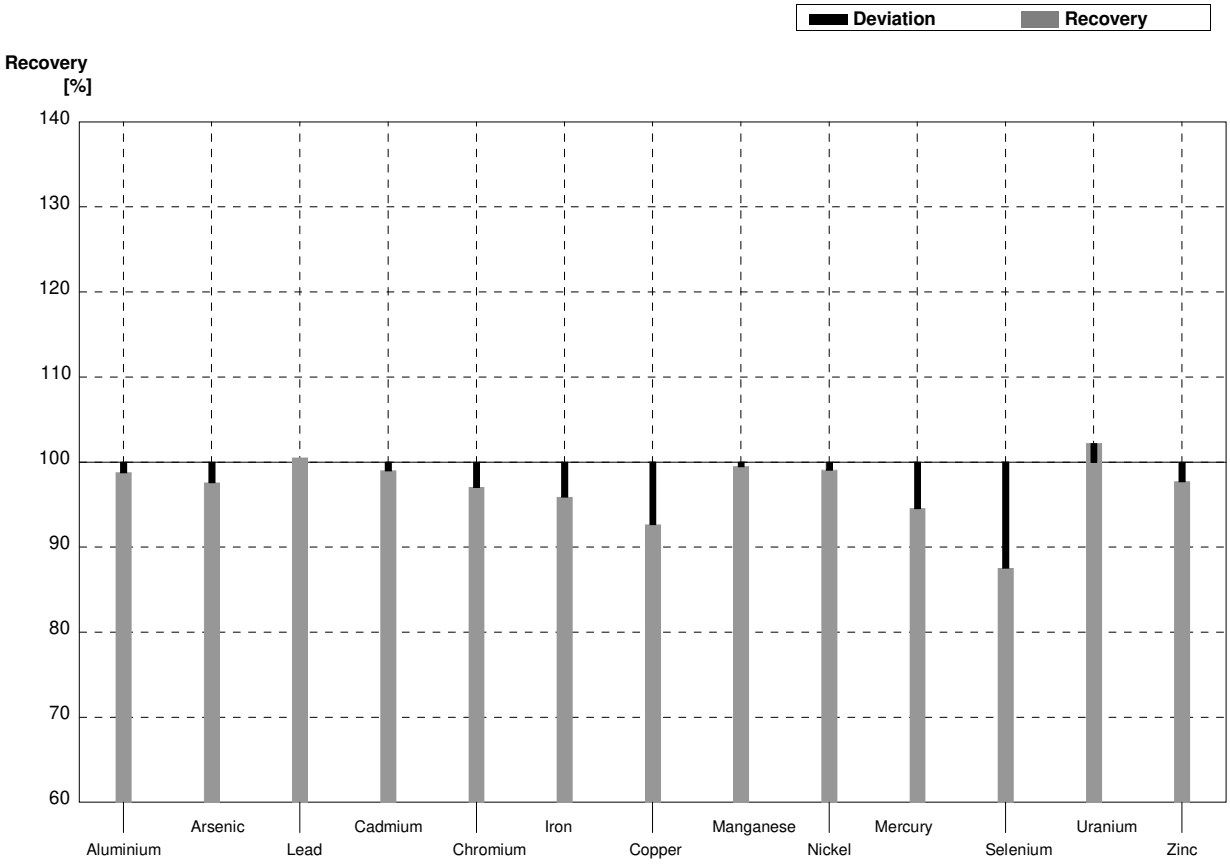
Sample **M163A**
Laboratory **AC**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	25,0	2,10	µg/l	123%
Arsenic	1,056	0,010	1,02	0,054	µg/l	97%
Lead	3,14	0,03	3,69	0,533	µg/l	118%
Cadmium	2,017	0,016	2,01	0,086	µg/l	100%
Chromium	4,54	0,04	4,51	0,169	µg/l	99%
Iron	29,1	0,2	28,7	1,12	µg/l	99%
Copper	1,10	0,07	2,24	0,150	µg/l	204%
Manganese	38,5	0,2	38,5	1,04	µg/l	100%
Nickel	1,10	0,09	1,16	0,032	µg/l	105%
Mercury	0,417	0,012	0,385	0,0095	µg/l	92%
Selenium	1,92	0,02	1,84	0,160	µg/l	96%
Uranium	4,61	0,04	4,78	0,208	µg/l	104%
Zinc	17,8	1,3	49,1	2,81	µg/l	276%



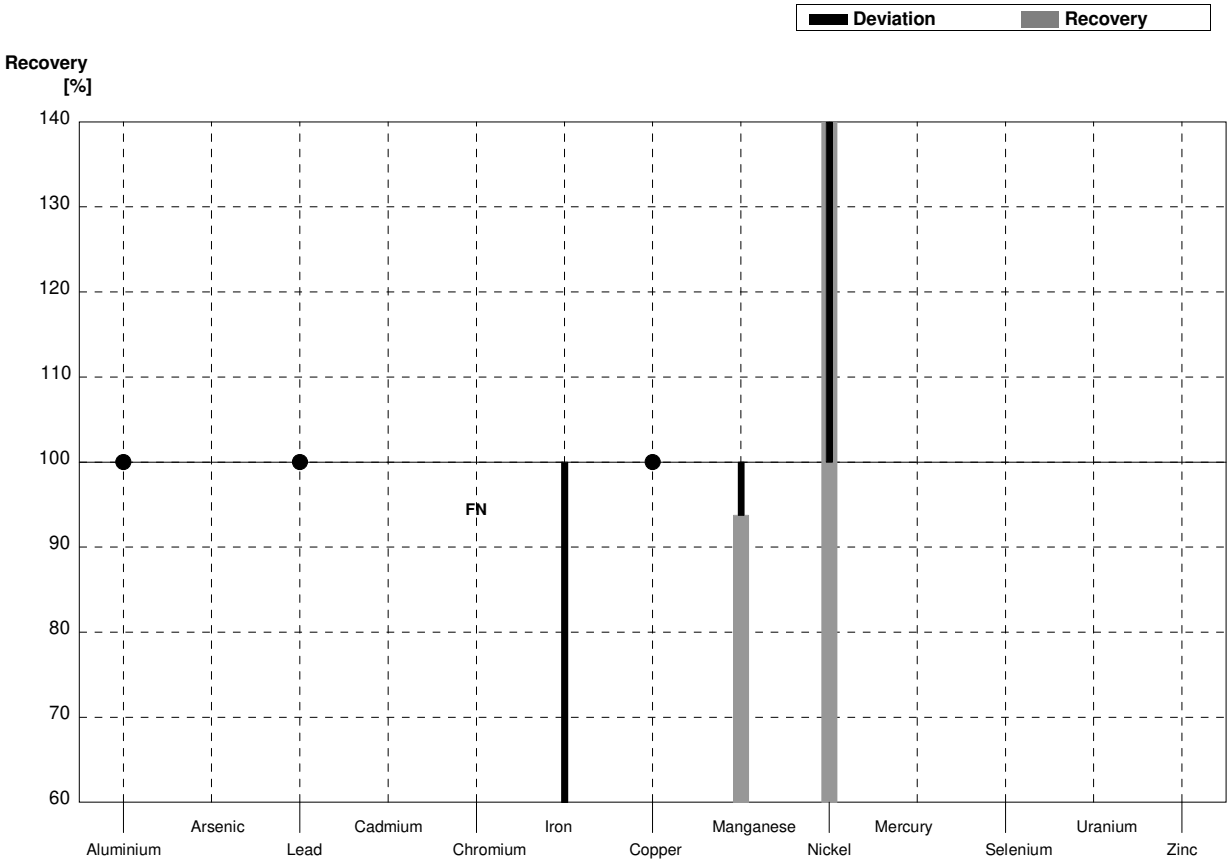
Sample **M163B**
Laboratory **AC**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	7,21	1,237	µg/l	99%
Arsenic	1,537	0,013	1,50	0,090	µg/l	98%
Lead	1,741	0,017	1,75	0,062	µg/l	101%
Cadmium	0,695	0,007	0,688	0,0402	µg/l	99%
Chromium	2,36	0,02	2,29	0,083	µg/l	97%
Iron	56,0	0,3	53,7	2,39	µg/l	96%
Copper	2,72	0,07	2,52	0,121	µg/l	93%
Manganese	9,58	0,11	9,53	0,272	µg/l	99%
Nickel	2,17	0,09	2,15	0,073	µg/l	99%
Mercury	1,766	0,018	1,67	0,145	µg/l	95%
Selenium	0,754	0,017	0,660	0,0803	µg/l	88%
Uranium	1,634	0,015	1,67	0,045	µg/l	102%
Zinc	21,9	1,3	21,4	1,51	µg/l	98%



Sample **M163A**
Laboratory **AD**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,3	0,3	<200		µg/l	•
Arsenic	1,056	0,010			µg/l	
Lead	3,14	0,03	<5		µg/l	•
Cadmium	2,017	0,016			µg/l	
Chromium	4,54	0,04	<4		µg/l	FN
Iron	29,1	0,2	13,5	1,34	µg/l	46%
Copper	1,10	0,07	<250		µg/l	•
Manganese	38,5	0,2	36,1	3,79	µg/l	94%
Nickel	1,10	0,09	8,57	0,866	µg/l	779%
Mercury	0,417	0,012			µg/l	
Selenium	1,92	0,02			µg/l	
Uranium	4,61	0,04			µg/l	
Zinc	17,8	1,3			µg/l	



Sample **M163B**
Laboratory **AD**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	7,3	0,3	<200		µg/l	•
Arsenic	1,537	0,013			µg/l	
Lead	1,741	0,017	<5		µg/l	•
Cadmium	0,695	0,007			µg/l	
Chromium	2,36	0,02	<4		µg/l	•
Iron	56,0	0,3	39,1	3,871	µg/l	70%
Copper	2,72	0,07	<250		µg/l	•
Manganese	9,58	0,11	8,18	0,859	µg/l	85%
Nickel	2,17	0,09	9,51	0,961	µg/l	438%
Mercury	1,766	0,018			µg/l	
Selenium	0,754	0,017			µg/l	
Uranium	1,634	0,015			µg/l	
Zinc	21,9	1,3			µg/l