IFA-Proficiency Testing Scheme for Water Analysis

Round M164
Metals

Sample Dispatch: 14 November 2022

In accordance with the procedure: AVKPS.02

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Round: M164	Date / Signature:	16.12.2022

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121 pages

This report summarises the results of round M164 (trace metals) within the IFA-Proficiency Testing Scheme for Water Analysis. The samples M164A and M164B were distributed to 36 participants on Monday, 14 November 2022. Each participant received two samples of 250 mL filled into LDPE bottles.

Closing date for reporting results to the IFA-Tulln was Friday, 9 December 2022. 35 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, 19.5 mg/L Mg, 9.0 mg/L Na, 1.19 mg/L K, 19.3 mg/L SO_4^{2-} and 15.3 mg/L Cl^- in M164A and 46.1 mg/L Ca, 19.5 mg/L Mg, 9.1 mg/L Na, 1.19 mg/L K, 19.2 mg/L SO_4^{2-} and 15.4 mg/L Cl^- in M164B. 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 M164A and M164B 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").

To check the stability of the proficiency test samples all parameters were determined in M164A and M164B four weeks after the shipment.

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 %).

Arsenic was not added to the sample M164A in order to check the analytical blank values. The target concentration was set to <0.5 µg/L As which meets the minimum quantifiable values defined by the Austrian ground and river water monitoring program and is well above the quantification limits of the analytical methods applied in the IFA-Tulln.

The recoveries of the target concentrations, calculated from outlier-corrected data mean values ranged between 90.7 % (Hg in sample M164A) and 103 % (Al and Se in sample M164B). The between laboratory CVs covered the ranged between 4.4 % (U in sample M164B) and 16.9 % (Hg in sample M164A).

All confidence intervals of the outlier-corrected laboratory mean values except that for Cu (94.7 % ± 2.6 %) and Zn (95.6 % ± 2.5 %) in sample M164B 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.

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, 16 December 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

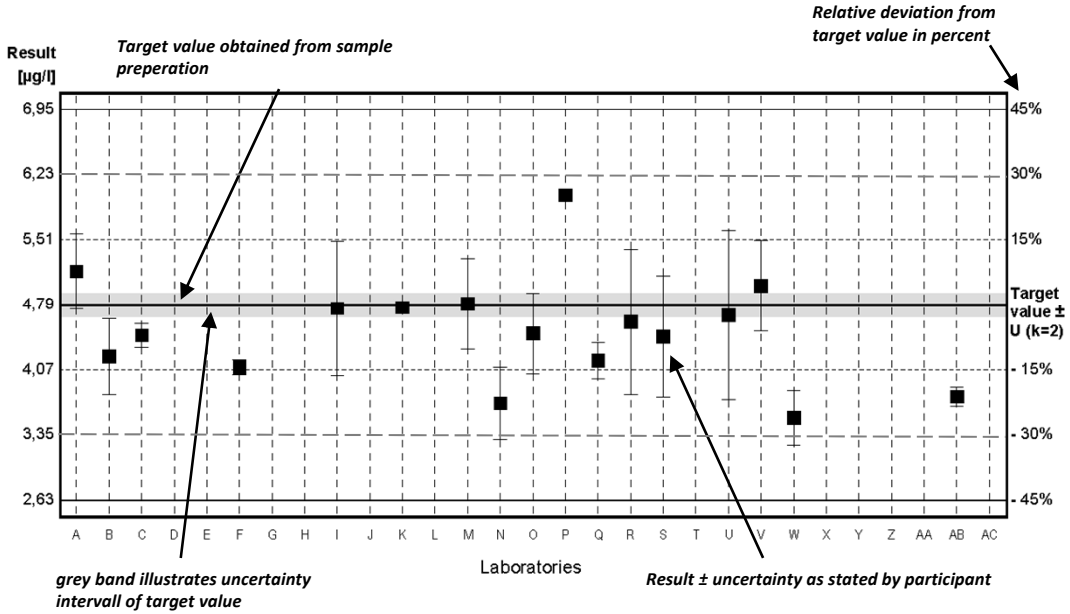


Diagram 1: Measurement results and their uncertainties

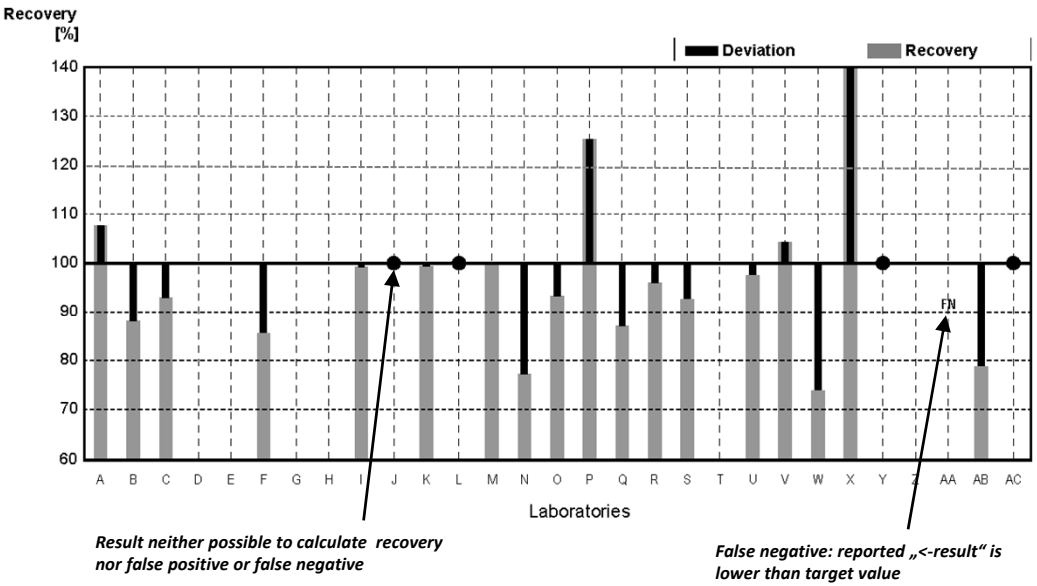


Diagram 2: Recoveries and deviations from target values

Illustration of Results
Tables and Parameter Oriented Part

Round M164
Metals

Sample Dispatch: 14 November 2022

Results Sample M164A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
Target value	45.8	<0.5	1.154	0.501	1.158	34.00	1.70
IFA result	46.2	<0.5	1.09	0.504	1.18	34.5	1.82
Stability test	45.4	<0.5	1.09	0.481	1.17	33.9	1.75
A			<3.0			28.8	
B							
C	48.3	<0.1	1.248	0.489	1.140	34.65	1.612
D	47.8		0.701	0.393	1.09	26.9	1.01
E	49.2	<0.22	1.14	0.452	1.22	33.7	1.63
F	41.8	<1	1.14	0.503	1.08	33.5	1.57
G	47.6	0.659	1.70	0.445	3.08	25.7	4.71
H	46.91			0.3927		32.73	0.7645
I	<150	<70	<10	<40	<30	33.0	<20
J	51.7	<1	1.18	0.52	1.22	35.4	1.66
K	44.5	<0.2	1.11	0.495	1.13	33.5	1.62
L	43.6	<0.1	1.12	0.489	1.34	32.5	1.57
M	46.3	<1	1.12	0.499	1.16	33.1	1.82
N	48.0					31.6	<10
O	39.7	<1.0	1.04	0.513	1.07	31.0	1.54
P						32.2	
Q	48.0	<1.00	1.00	<1.00	1.00	35.7	3.00
R	50.0	<0.50	1.20	0.490	1.10	35.0	1.60
S	44.3	[0.14]	1.18	0.485	1.25	31.4	1.68
T	47.8	<1	1.09	0.499	1.09	32.4	1.25
U	48.9	<2	<2	0.531	<5	35.7	<10
V	49.8	<0.01	1.15	0.519	1.25	35.5	1.69
W	43.0	<1.0	1.11	0.517	1.16	32.8	1.64
X	43.0	<0.4	1.04	0.487	1.13	32.9	1.60
Y	42.9	<1	1.32	0.608	1.53	30.6	1.98
Z	47.6	<1	1.40	0.597	1.14	36.3	1.76
AA	44.89	<0.5	1.10	0.485	1.08	33.81	1.60
AB	41.3	0.100	0.84	0.270	1.14	34.3	1.82
AC	39.9	<1.00	1.12	0.493	1.15	33.6	1.54
AD	43.9		<5		1.24	33.0	<100
AE	40.5		0.94	0.499	0.95	35.9	1.30
AF	47.8	<0.1	1.08	0.474	1.21	33.2	1.51
AG	44.9		1.01	0.475	1.00	30.2	1.47
AH	46.5	<1	1.24	0.53	1.27	<50	<2
AI	48.0	<1	1.10	0.425	1.13	32.3	1.50
AJ	49.1	<0.50	1.10	0.57	1.27	34.4	1.67

All data in µg/L

Measurement Uncertainties Sample M164A

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
Target value	0.4		0.013	0.004	0.012	0.18	0.05
IFA result	2.5		0.03	0.030	0.06	2.7	0.13
Stability test	2.4		0.03	0.028	0.06	2.6	0.13
A			1			31	
B							
C	4.83	0.01	0.125	0.049	0.114	3.5	0.16
D	4.2		0.24	0.15	0.21	10.5	0.16
E	0.721		0.025	0.034	0.012	0.416	0.020
F	4.6		0.12	0.023	0.15	3.7	0.086
G	9.5	0.13	0.34	0.09	0.62	5.1	0.94
H							
I						3.96	
J	7.75		0.18	0.078	0.18	5.3	0.25
K	8.9		0.2	0.1	0.2	6.7	0.3
L	13.1		0.17	0.073	0.40	4.9	0.47
M	5.6		0.13	0.060	0.22	6.0	0.20
N	8.2					5.7	
O	9.5		0.25	0.123	0.26	7.4	0.37
P						9.7	
Q	7.0	1.00	1.00	1.00	1.00	4.96	1.00
R	5.00		0.096	0.0392	0.132	9.10	0.128
S	0.545		0.0842	0.0123	0.088	0.572	0.0578
T	5.5		0.14	0.1	0.22	2.2	0.24
U	7.53			0.037		2.9	
V	4.25		0.13	0.25	0.21	4.43	0.23
W	5.7		0.13	0.07	0.24	3.6	0.27
X	4.30		0.104	0.0487	0.113	3.29	0.16
Y	8.6		0.50	0.122	0.50	6.1	0.50
Z	7.1		0.21	0.09	0.17	5.4	0.26
AA	10.32		0.11	0.107	0.10	4.40	0.29
AB	0.53	0.05	0.05	0.05	0.05	1.7	0.06
AC							
AD	4.25				0.129	1.25	
AE	5.3		0.25	0.059	0.11	7.2	0.23
AF	0.9		0.05	0.011	0.06	1.0	0.11
AG	6.7		0.151	0.062	0.100	4.54	0.220
AH	10		1	0.1	0.1		
AI	9.6		0.22	0.085	0.23	6.5	0.30
AJ	3.9	0.085	0.22	0.09	0.19	5.2	0.25

All data in µg/L

Results Sample M164A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
Target value	40.7	1.93	0.956	2.11	2.82	12.9
IFA result	42.6	1.98	0.97	2.34	2.63	14.5
Stability test	41.8	1.88	0.90	1.98	2.76	16.8
A	32.0					
B						
C	40.42	1.819	0.884	1.911	2.961	12.21
D	42.7	0.68				10.7
E	39.9	1.92	0.868	2.19	2.61	12.5
F	42.1	1.93	0.959	2.05	2.84	12.3
G	38.6	1.76				8.22
H	34.38					
I	38.0	<30				<50
J	43.7	1.91	1.02	2.75	3.04	13.4
K	39.4	1.86	1.01	2.11	2.79	12.1
L	39.9	2.04		2.02	2.82	12.5
M	40.2	1.82	0.938	2.24	2.75	12.2
N	37.8					
O	37.9	1.72	0.744	2.25	2.79	11.7
P	37.9					
Q	42.0	2.00	<1.00	3.00	3.00	13.3
R	41.0	1.80	0.957	2.20	2.83	13.0
S	42.3	1.80	0.888	1.99	2.82	13.4
T	38.3	1.77	0.85	2.18	2.81	12.5
U	42.9	<2		<5		13.5
V	42.8	1.95	0.84	2.11	2.60	12.5
W	40.4	1.93	0.95	2.08	2.77	12.8
X	39.4	1.78	1.22	1.77	2.75	12.1
Y	36.4	2.67	0.636	2.50		15.8
Z	40.3	1.96	0.808	3.73	2.66	19.0
AA	40.71	1.79	0.794	2.23	2.56	12.90
AB	37.9	1.77	0.89	2.06	2.82	12.5
AC	40.1	1.82	0.513	2.16	2.68	12.6
AD	39.6	<5				
AE	39.0	1.53	1.06	2.27		11.6
AF	39.1	1.68	0.840	1.96	2.87	12.5
AG	38.4	1.72	0.67	2.01	2.45	11.6
AH	43.0	<2	0.87			<20
AI	39.8	1.65	0.740	1.93	2.55	<10
AJ	42.0	1.90	0.86	2.20	2.67	13.4

All data in µg/L

Measurement Uncertainties Sample M164A

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
Target value	0.2	0.05	0.013	0.02	0.02	1.6
IFA result	2.9	0.12	0.18	0.28	0.30	1.9
Stability test	2.8	0.12	0.17	0.23	0.31	2.2
A	11					
B						
C	4	0.18	0.09	0.19	0.3	1.22
D	0.71	0.28				1.3
E	0.416	0.076	0.019	0.061	0.042	0.30
F	2.3	0.15	0.149	0.25	0.30	0.77
G	7.72	0.35				1.64
H						
I	5.2					
J	6.5	0.29	0.15	0.41	0.46	2.02
K	7.3	0.4	0.2	0.4	0.6	2.4
L	6.0	1.02		0.61	0.42	1.9
M	4.4	0.42	0.169	0.76	0.28	2.0
N	6.8					
O	9.1	0.41	0.179	0.58	0.67	2.8
P	3.8					
Q	6.0	1.00	1.00	1.00	1.00	2.34
R	4.10	0.180	0.144	0.330	0.142	1.30
S	1.06	0.201	0.0474	0.153	0.0368	0.362
T	2.4	0.2	0.01	0.35	0.18	1.87
U	3.1					1.89
V	5.62	0.18	0.14	0.35	0.29	0.83
W	4.0	0.42	0.13	0.31	0.28	1.8
X	3.94	0.178	0.122	0.266	0.275	1.21
Y	7.3	0.53	0.095	0.50		3.16
Z	6.04	0.29	0.12	0.56	0.4	2.85
AA	5.70	0.18	0.199	0.36	0.28	2.32
AB	1.893	0.14	0.05	0.07	0.05	0.88
AC						
AD	1.77					
AE	5.1	0.13	0.20	0.32		2.1
AF	1.4	0.09	0.037	0.08	0.05	0.7
AG	3.84	0.172	0.133	0.302	0.245	1.04
AH	20		0.1			
AI	8.0	0.33	0.15	0.39	0.51	
AJ	6.3	0.29	0.22	0.55	0.40	2.7

All data in µg/L

Results Sample M164B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
Target value	17.2	2.268	2.84	0.208	2.83	92.0	4.02
IFA result	17.1	1.98	2.62	0.211	2.78	83	3.80
Stability test	17.4	2.40	2.67	0.204	2.91	94	4.14
A			<3.0			86.0	
B							
C	18.48	2.095	3.064	0.198	2.816	95.05	3.924
D	19.2		2.17	0.191	2.63	91.8	2.53
E	20.0	2.21	2.89	0.203	2.85	87.3	3.80
F	15.2	2.28	2.77	0.202	2.79	92.3	3.78
G	25.8	1.89	2.59	0.177	3.58	79.6	2.95
H	16.31			0.1333		90.90	2.388
I	<150	<70	<10	<40	<30	75	<20
J	20.1	2.49	2.80	0.209	2.91	94.0	3.87
K	17.5	2.31	2.70	0.211	2.78	90.1	3.87
L	17.1	2.29	2.73	0.201	3.06	87.6	3.73
M	17.8	2.30	2.74	0.204	2.83	89.7	4.00
N	16.8					84	<10
O	15.2	2.30	2.54	0.217	2.62	83.3	3.61
P						85.1	
Q	18.3	2.00	3.00	<1.00	3.00	93.8	5.5
R	21.0	2.20	2.80	0.210	2.90	100	3.90
S	15.5	2.01	2.91	0.202	2.63	92.5	3.95
T	18.0	2.38	2.65	0.210	2.73	86.8	3.72
U	18.5	2.61	3.13	0.219	<5	97.1	<10
V	19.3	2.44	2.78	0.215	2.96	94.5	3.98
W	17.1	2.25	2.74	0.209	2.82	87.3	3.76
X	16.3	2.28	2.58	<0.2	2.79	85.9	3.60
Y	15.4	3.12	3.30	0.277	3.98	80.2	4.93
Z	18.9	3.06	3.15	0.246	2.77	92.4	4.23
AA	17.53	2.38	2.65	0.207	2.66	96.83	3.80
AB	16.7	2.19	2.36	0.160	2.73	88.1	4.01
AC	14.7	2.27	2.67	0.201	2.75	89.1	3.69
AD	16.62		<5		2.85	90.1	<100
AE	15.1	2.44	2.50	0.202	2.67	78	3.31
AF	20.9	2.17	2.66	0.198	2.75	91.5	3.78
AG	17.9	2.03	2.52	0.196	2.46	82	3.64
AH	21.5	2.20	2.76	0.230	3.01	111	3.77
AI	17.5	2.05	2.78	0.200	2.83	89.5	3.65
AJ	18.5	2.40	2.70	0.200	3.05	95	4.00

All data in µg/L

Measurement Uncertainties Sample M164B

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
Target value	0.3	0.014	0.02	0.003	0.02	0.4	0.05
IFA result	0.9	0.21	0.07	0.012	0.10	6	0.20
Stability test	0.9	0.25	0.07	0.012	0.11	7	0.22
A			1			31	
B							
C	1.85	0.21	0.31	0.02	0.28	9.5	0.39
D	2.6		0.4	0.04	0.41	8.5	0.38
E	0.153	0.151	0.040	0.008	0.295	2.88	0.158
F	1.7	0.13	0.29	0.016	0.39	10	0.21
G	5.2	0.38	0.52	0.04	0.72	15.9	0.60
H							
I						9.20	
J	3.02	0.38	0.42	0.031	0.44	14.1	0.58
K	3.5	0.5	0.5	0.04	0.6	17.9	0.8
L	5.1	0.69	0.41	0.030	0.92	13.1	1.12
M	3.0	0.39	0.33	0.024	0.54	16.1	0.44
N	2.90					15.2	
O	3.6	0.55	0.61	0.052	0.63	20.0	0.87
P						4.3	
Q	3.05	1.00	1.00	1.00	1.00	9.00	2.00
R	2.10	0.264	0.224	0.0168	0.384	26.0	0.312
S	0.593	0.128	0.0765	0.0137	0.081	0.703	0.0520
T	2.1	0.20	0.28	0.03	0.22	6.13	0.24
U	2.85	0.39	0.54	0.015		8.0	
V	2.4	0.31	0.22	0.18	0.39	7.1	0.51
W	2.7	0.36	0.33	0.027	0.47	8.8	0.50
X	1.63	0.342	0.258		0.279	8.59	0.36
Y	5.0	0.62	0.66	0.055	0.80	16.0	0.99
Z	2.8	0.46	0.47	0.04	0.42	13.9	0.63
AA	4.03	0.64	0.27	0.046	0.24	12.59	0.68
AB	0.25	0.05	0.05	0.05	0.05	1.34	0.06
AC							
AD	1.61				0.296	3.42	
AE	2.0	0.65	0.67	0.024	0.30	16	0.59
AF	0.5	0.12	0.14	0.008	0.14	2.2	0.12
AG	2.69	0.406	0.378	0.0254	0.246	12.3	0.55
AH	5	1	1	0.1	1	30	1
AI	3.5	0.41	0.56	0.040	0.57	18	0.73
AJ	2.8	0.48	0.54	0.03	0.46	14	0.60

All data in µg/L

Results Sample M164B

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
Target value	25.20	6.26	1.502	1.002	7.25	93.2
IFA result	22.6	6.1	1.34	0.92	6.8	81
Stability test	26.2	6.4	1.56	0.97	6.9	104
A	22.9					
B						
C	25.126	6.137	1.412	0.918	7.651	87.93
D	25.3	6.79				43.3
E	24.4	5.86	1.44	0.980	6.91	87.1
F	25.7	6.31	1.48	<1	7.01	89.5
G	23.2	6.69				84.2
H	22.21					
I	23.0	<30				88
J	26.5	6.24	1.58	1.76	7.39	97.3
K	24.2	5.97	1.56	1.07	7.16	85.3
L	24.4	5.97		0.953	7.20	90.8
M	24.8	5.99	1.48	1.04	7.02	87.3
N	23.3					
O	23.6	5.48	1.26	1.06	7.15	84.7
P	23.2					
Q	26.0	6.0	1.00	1.00	7.0	94.0
R	26.0	6.30	1.53	1.10	7.29	95.0
S	25.6	6.43	1.40	<1	7.24	95.6
T	23.9	6.02	1.28	1.03	6.98	89.0
U	26.9	6.42		<5		95.7
V	25.7	6.35	1.38	0.95	6.85	87
W	24.6	6.12	1.54	<2.0	7.2	88.8
X	24.0	5.90	1.90	<1.0	7.2	84.6
Y	22.4	8.05	1.13	1.34		91.3
Z	25.2	6.36	1.29	1.87	6.81	136
AA	25.38	6.00	1.14	1.05	6.63	89.30
AB	23.5	5.8	1.36	1.12	7.48	89.7
AC	24.5	5.97	0.815	0.988	6.72	89.1
AD	24.3	5.86				
AE	24.2	5.7	1.68	1.14		80
AF	24.2	5.79	1.35	0.901	7.34	87.9
AG	23.6	5.8	1.21	0.93	6.3	84
AH	32.0	5.6	1.34			93
AI	24.8	6.00	1.23	<1	6.73	82.0
AJ	25.9	6.4	1.34	1.00	6.7	97

All data in µg/L

Measurement Uncertainties Sample M164B

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
Target value	0.16	0.06	0.016	0.017	0.05	1.6
IFA result	1.5	0.2	0.25	0.12	0.8	9
Stability test	1.8	0.2	0.29	0.12	0.8	11
A	11					
B						
C	2.51	0.61	0.14	0.092	0.77	8.8
D	4.1	1.4				4.6
E	1.102	0.346	0.025	0.060	0.150	4.33
F	1.4	0.48	0.23		0.74	5.6
G	4.64	1.33				16.84
H						
I	3.13					5.6
J	3.98	0.94	0.24	0.26	1.11	14.6
K	4.8	1.2	0.3	0.2	1.4	17.1
L	3.7	1.79		0.286	1.08	13.6
M	3.7	1.38	0.27	0.35	0.70	11.3
N	4.20					
O	5.7	1.32	0.30	0.25	1.72	20.3
P	2.3					
Q	4.00	1.50	1.00	1.00	3.00	8.0
R	2.60	0.63	0.229	0.165	0.365	9.50
S	1.13	0.171	0.0475		0.0359	3.48
T	1.64	0.69	0.26	0.17	0.54	23.5
U	1.9	0.79				13.4
V	3.4	2.45	0.27	0.21	0.67	1.21
W	2.6	0.92	0.22		0.7	10.5
X	2.4	0.59	0.19		0.72	8.46
Y	4.5	1.61	0.17	0.50		18.3
Z	3.78	0.95	0.19	0.28	1.02	20.4
AA	3.55	0.60	0.29	0.17	0.73	16.07
AB	0.28	0.37	0.05	0.06	0.06	4.89
AC						
AD	1.09	0.44				
AE	3.2	0.5	0.32	0.16		15
AF	1.0	0.30	0.05	0.049	0.26	3.6
AG	2.36	0.58	0.242	0.139	0.63	7.6
AH	15	1	0.2			20
AI	5.0	1.2	0.25		1.3	16
AJ	3.9	1.0	0.34	0.25	1.0	19

All data in µg/L

z-Scores Sample M164A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A						-2.32	
B							
C	0.70		1.20	-0.43	-0.25	0.29	-0.66
D	0.56		-5.77	-3.85	-0.93	-3.16	-5.20
E	0.95		-0.18	-1.75	0.85	-0.13	-0.53
F	-1.12		-0.18	0.07	-1.07	-0.22	-0.98
G	0.50		6.96	-2.00	26.35	-3.70	22.70
H	0.31			-3.86		-0.57	-7.06
I						-0.45	
J	1.65		0.33	0.68	0.85	0.62	-0.30
K	-0.36		-0.56	-0.21	-0.38	-0.22	-0.60
L	-0.62		-0.43	-0.43	2.49	-0.67	-0.98
M	0.14		-0.43	-0.07	0.03	-0.40	0.90
N	0.62					-1.07	
O	-1.71		-1.45	0.43	-1.21	-1.34	-1.21
P						-0.80	
Q	0.62		-1.96		-2.17	0.76	9.80
R	1.18		0.59	-0.39	-0.80	0.45	-0.75
S	-0.42		0.33	-0.57	1.26	-1.16	-0.15
T	0.56		-0.82	-0.07	-0.93	-0.71	-3.39
U	0.87			1.07		0.76	
V	1.12		-0.05	0.64	1.26	0.67	-0.08
W	-0.78		-0.56	0.57	0.03	-0.53	-0.45
X	-0.78		-1.45	-0.50	-0.38	-0.49	-0.75
Y	-0.81		2.12	3.81	5.10	-1.52	2.11
Z	0.50		3.13	3.42	-0.25	1.02	0.45
AA	-0.25		-0.69	-0.57	-1.07	-0.08	-0.75
AB	-1.26		-4.00	-8.23	-0.25	0.13	0.90
AC	-1.65		-0.43	-0.29	-0.11	-0.18	-1.21
AD	-0.53				1.12	-0.45	
AE	-1.48		-2.73	-0.07	-2.85	0.85	-3.02
AF	0.56		-0.94	-0.96	0.71	-0.36	-1.43
AG	-0.25		-1.84	-0.93	-2.17	-1.69	-1.73
AH	0.20		1.10	1.03	1.54		
AI	0.62		-0.69	-2.71	-0.38	-0.76	-1.51
AJ	0.92		-0.69	2.46	1.54	0.18	-0.23

z-Scores Sample M164A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A	-3.96					
B						
C	-0.13	-0.77	-0.68	-0.94	0.89	-0.72
D	0.91	-8.64				-2.30
E	-0.36	-0.07	-0.84	0.38	-1.33	-0.42
F	0.64	0.00	0.03	-0.28	0.13	-0.63
G	-0.96	-1.17				-4.90
H	-2.88					
I	-1.23					
J	1.37	-0.14	0.61	3.03	1.39	0.52
K	-0.59	-0.48	0.51	0.00	-0.19	-0.84
L	-0.36	0.76		-0.43	0.00	-0.42
M	-0.23	-0.76	-0.17	0.62	-0.44	-0.73
N	-1.32					
O	-1.27	-1.45	-2.02	0.66	-0.19	-1.26
P	-1.27					
Q	0.59	0.48		4.22	1.14	0.42
R	0.14	-0.90	0.01	0.43	0.06	0.10
S	0.73	-0.90	-0.65	-0.57	0.00	0.52
T	-1.09	-1.11	-1.01	0.33	-0.06	-0.42
U	1.00					0.63
V	0.96	0.14	-1.10	0.00	-1.39	-0.42
W	-0.14	0.00	-0.06	-0.14	-0.32	-0.10
X	-0.59	-1.04	2.51	-1.61	-0.44	-0.84
Y	-1.96	5.11	-3.04	1.85		3.04
Z	-0.18	0.21	-1.41	7.68	-1.01	6.39
AA	0.00	-0.97	-1.54	0.57	-1.65	0.00
AB	-1.27	-1.11	-0.63	-0.24	0.00	-0.42
AC	-0.27	-0.76	-4.21	0.24	-0.89	-0.31
AD	-0.50					
AE	-0.77	-2.76	0.99	0.76		-1.36
AF	-0.73	-1.73	-1.10	-0.71	0.32	-0.42
AG	-1.05	-1.45	-2.72	-0.47	-2.34	-1.36
AH	1.05		-0.82			
AI	-0.41	-1.93	-2.05	-0.85	-1.71	
AJ	0.59	-0.21	-0.91	0.43	-0.95	0.52

z-Scores Sample M164B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A						-0.99	
B							
C	0.95	-1.03	1.16	-0.86	-0.08	0.50	-0.31
D	1.49		-3.47	-1.46	-1.12	-0.03	-4.75
E	2.09	-0.35	0.26	-0.43	0.11	-0.77	-0.70
F	-1.49	0.07	-0.36	-0.52	-0.22	0.05	-0.77
G	6.41	-2.25	-1.29	-2.66	4.21	-2.04	-3.41
H	-0.66			-6.41		-0.18	-5.20
I						-2.80	
J	2.16	1.32	-0.21	0.09	0.45	0.33	-0.48
K	0.22	0.25	-0.72	0.26	-0.28	-0.31	-0.48
L	-0.07	0.13	-0.57	-0.60	1.29	-0.72	-0.92
M	0.45	0.19	-0.52	-0.34	0	-0.38	-0.06
N	-0.30					-1.32	
O	-1.49	0.19	-1.55	0.77	-1.18	-1.43	-1.31
P						-1.14	
Q	0.82	-1.60	0.83		0.95	0.30	4.72
R	2.83	-0.41	-0.21	0.17	0.39	1.32	-0.38
S	-1.27	-1.54	0.36	-0.52	-1.12	0.08	-0.22
T	0.60	0.67	-0.98	0.17	-0.56	-0.86	-0.96
U	0.97	2.04	1.50	0.94		0.84	
V	1.57	1.02	-0.31	0.60	0.73	0.41	-0.13
W	-0.07	-0.11	-0.52	0.09	-0.06	-0.77	-0.83
X	-0.67	0.07	-1.35		-0.22	-1.00	-1.34
Y	-1.34	5.08	2.38	5.92	6.45	-1.94	2.90
Z	1.27	4.72	1.61	3.26	-0.34	0.07	0.67
AA	0.25	0.67	-0.98	-0.09	-0.95	0.80	-0.70
AB	-0.37	-0.46	-2.49	-4.12	-0.56	-0.64	-0.03
AC	-1.86	0.01	-0.88	-0.60	-0.45	-0.48	-1.05
AD	-0.43				0.11	-0.31	
AE	-1.57	1.02	-1.76	-0.52	-0.90	-2.31	-2.26
AF	2.76	-0.58	-0.93	-0.86	-0.45	-0.08	-0.77
AG	0.52	-1.42	-1.66	-1.03	-2.08	-1.65	-1.21
AH	3.21	-0.41	-0.41	1.89	1.01	3.13	-0.80
AI	0.22	-1.30	-0.31	-0.69	0.00	-0.41	-1.18
AJ	0.97	0.79	-0.72	-0.69	1.23	0.49	-0.06

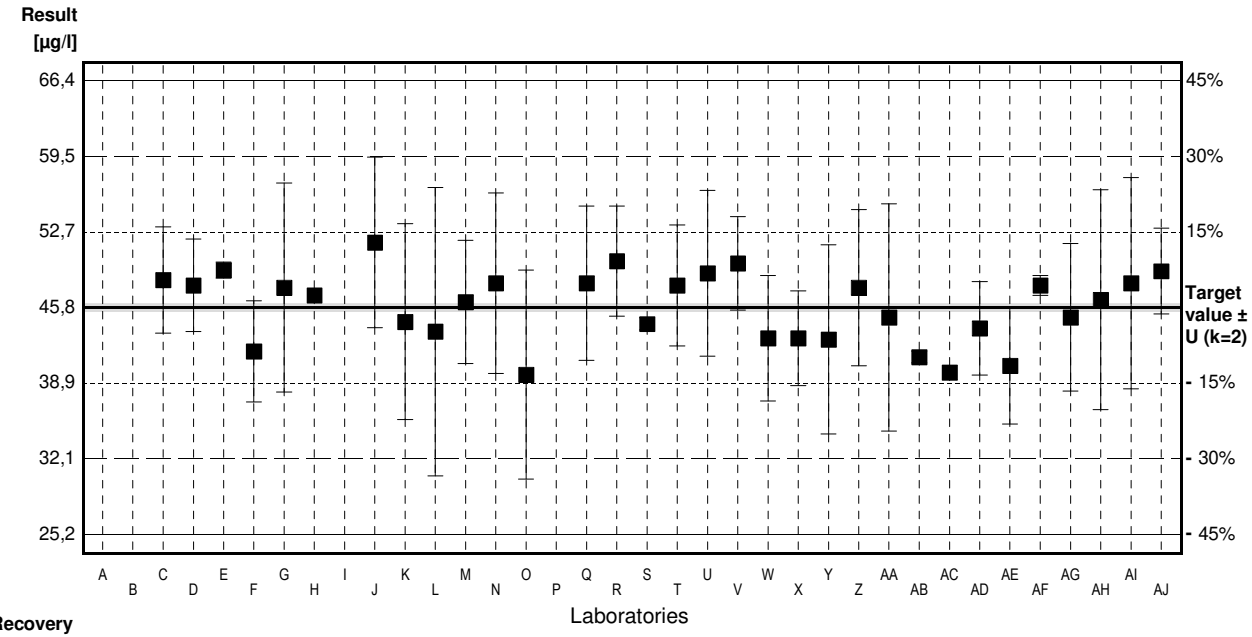
z-Scores Sample M164B

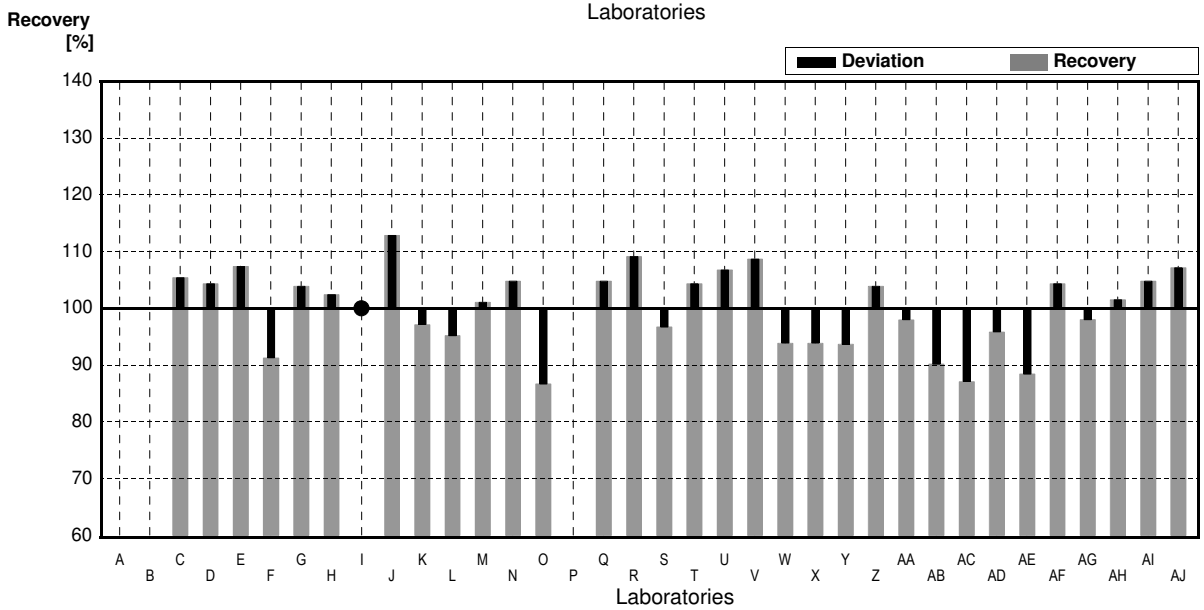
	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A	-1.69					
B						
C	-0.05	-0.26	-0.54	-0.84	0.99	-0.76
D	0.07	1.13				-7.24
E	-0.59	-0.85	-0.38	-0.22	-0.84	-0.88
F	0.37	0.11	-0.13		-0.59	-0.54
G	-1.47	0.92				-1.30
H	-2.20					
I	-1.62					-0.75
J	0.96	-0.04	0.47	7.56	0.34	0.59
K	-0.73	-0.62	0.35	0.68	-0.22	-1.15
L	-0.59	-0.62		-0.49	-0.12	-0.35
M	-0.29	-0.58	-0.13	0.38	-0.57	-0.86
N	-1.40					
O	-1.18	-1.66	-1.46	0.58	-0.25	-1.23
P	-1.47					
Q	0.59	-0.55	-3.04	-0.02	-0.62	0.12
R	0.59	0.09	0.17	0.98	0.10	0.26
S	0.29	0.36	-0.62		-0.02	0.35
T	-0.96	-0.51	-1.34	0.28	-0.67	-0.61
U	1.25	0.34				0.36
V	0.37	0.19	-0.74	-0.52	-0.99	-0.90
W	-0.44	-0.30	0.23		-0.12	-0.64
X	-0.88	-0.77	2.41		-0.12	-1.25
Y	-2.06	3.81	-2.25	3.37		-0.28
Z	0.00	0.21	-1.28	8.66	-1.08	6.21
AA	0.13	-0.55	-2.19	0.48	-1.53	-0.57
AB	-1.25	-0.98	-0.86	1.18	0.57	-0.51
AC	-0.51	-0.62	-4.16	-0.14	-1.31	-0.59
AD	-0.66	-0.85				
AE	-0.73	-1.19	1.08	1.38		-1.91
AF	-0.73	-1.00	-0.92	-1.01	0.22	-0.77
AG	-1.18	-0.98	-1.77	-0.72	-2.34	-1.33
AH	5.00	-1.41	-0.98			-0.03
AI	-0.29	-0.55	-1.65		-1.28	-1.62
AJ	0.51	0.30	-0.98	-0.02	-1.35	0.55

Sample M164A
Parameter Aluminium

Target value	± U (k=2)	45,8 µg/l	±	0,4 µg/l
IFA result	± U (k=2)	46,2 µg/l	±	2,5 µg/l
Stability test	± U (k=2)	45,4 µg/l	±	2,4 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	48.3	4.83	µg/l	105%	0.70
D	47.8	4.2	µg/l	104%	0.56
E	49.2	0.721	µg/l	107%	0.95
F	41.8	4.6	µg/l	91%	-1.12
G	47.6	9.5	µg/l	104%	0.50
H	46.91		µg/l	102%	0.31
I	<150		µg/l	•	
J	51.7	7.75	µg/l	113%	1.65
K	44.5	8.9	µg/l	97%	-0.36
L	43.6	13.1	µg/l	95%	-0.62
M	46.3	5.6	µg/l	101%	0.14
N	48.0	8.2	µg/l	105%	0.62
O	39.7	9.5	µg/l	87%	-1.71
P			µg/l		
Q	48.0	7.0	µg/l	105%	0.62
R	50.0	5.00	µg/l	109%	1.18
S	44.3	0.545	µg/l	97%	-0.42
T	47.8	5.5	µg/l	104%	0.56
U	48.9	7.53	µg/l	107%	0.87
V	49.8	4.25	µg/l	109%	1.12
W	43.0	5.7	µg/l	94%	-0.78
X	43.0	4.30	µg/l	94%	-0.78
Y	42.9	8.6	µg/l	94%	-0.81
Z	47.6	7.1	µg/l	104%	0.50
AA	44.89	10.32	µg/l	98%	-0.25
AB	41.3	0.53	µg/l	90%	-1.26
AC	39.9		µg/l	87%	-1.65
AD	43.9	4.25	µg/l	96%	-0.53
AE	40.5	5.3	µg/l	88%	-1.48
AF	47.8	0.9	µg/l	104%	0.56
AG	44.9	6.7	µg/l	98%	-0.25
AH	46.5	10	µg/l	102%	0.20
AI	48.0	9.6	µg/l	105%	0.62
AJ	49.1	3.9	µg/l	107%	0.92



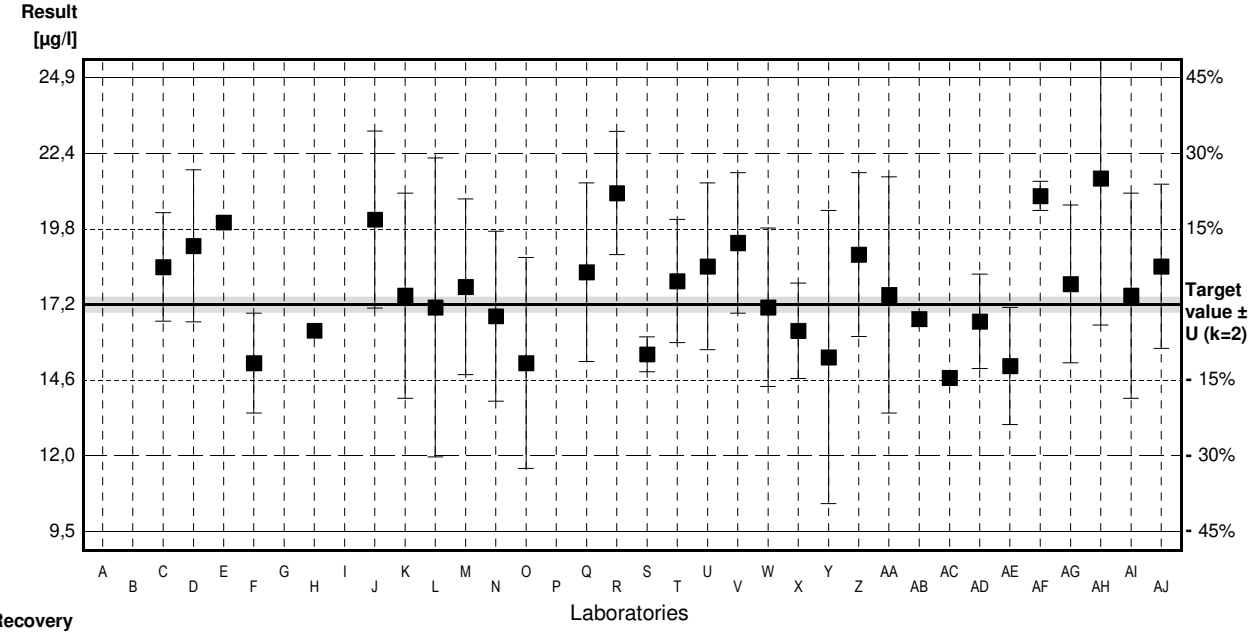


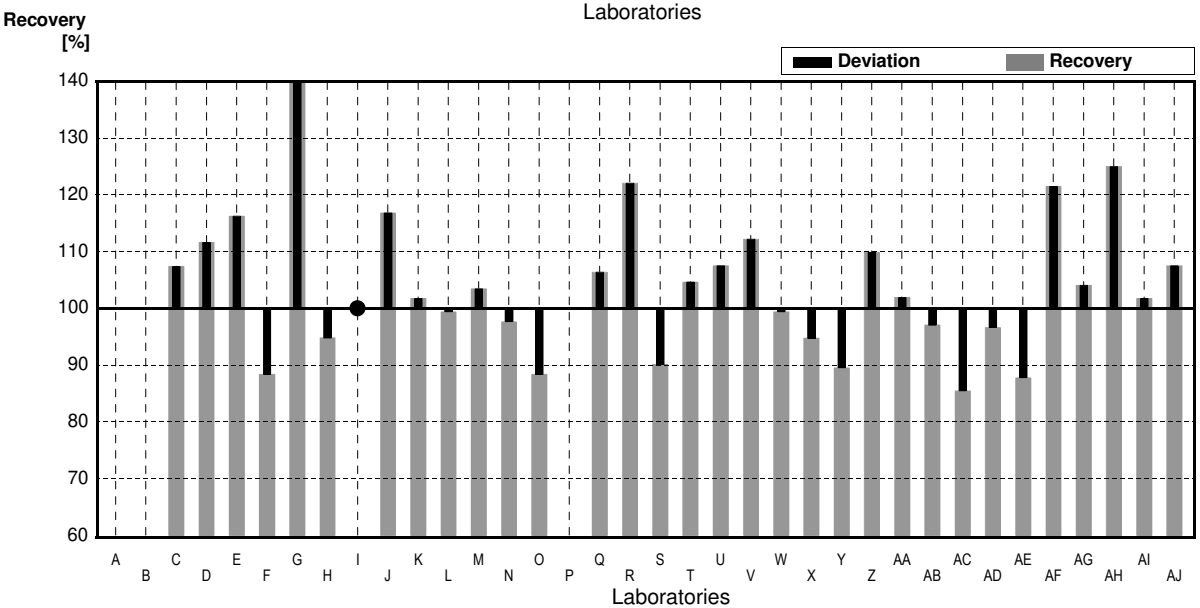
	All results	Outliers excl.	Unit
Mean ± CI(99%)	45,9 ± 1,6	45,9 ± 1,6	µg/l
Recov. ± CI(99%)	100,1 ± 3,4	100,1 ± 3,4	%
SD between labs	3,2	3,2	µg/l
RSD between labs	7,0	7,0	%
n for calculation	32	32	

Sample M164B
Parameter Aluminium

Target value	± U (k=2)	17,2 µg/l	±	0,3 µg/l
IFA result	± U (k=2)	17,1 µg/l	±	0,9 µg/l
Stability test	± U (k=2)	17,4 µg/l	±	0,9 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	18,48	1,85	µg/l	107%	0,95
D	19,2	2,6	µg/l	112%	1,49
E	20,0	0,153	µg/l	116%	2,09
F	15,2	1,7	µg/l	88%	-1,49
G	25,8 *	5,2	µg/l	150%	6,41
H	16,31		µg/l	95%	-0,66
I	<150		µg/l	•	
J	20,1	3,02	µg/l	117%	2,16
K	17,5	3,5	µg/l	102%	0,22
L	17,1	5,1	µg/l	99%	-0,07
M	17,8	3,0	µg/l	103%	0,45
N	16,8	2,90	µg/l	98%	-0,30
O	15,2	3,6	µg/l	88%	-1,49
P			µg/l		
Q	18,3	3,05	µg/l	106%	0,82
R	21,0	2,10	µg/l	122%	2,83
S	15,5	0,593	µg/l	90%	-1,27
T	18,0	2,1	µg/l	105%	0,60
U	18,5	2,85	µg/l	108%	0,97
V	19,3	2,4	µg/l	112%	1,57
W	17,1	2,7	µg/l	99%	-0,07
X	16,3	1,63	µg/l	95%	-0,67
Y	15,4	5,0	µg/l	90%	-1,34
Z	18,9	2,8	µg/l	110%	1,27
AA	17,53	4,03	µg/l	102%	0,25
AB	16,7	0,25	µg/l	97%	-0,37
AC	14,7		µg/l	85%	-1,86
AD	16,62	1,61	µg/l	97%	-0,43
AE	15,1	2,0	µg/l	88%	-1,57
AF	20,9	0,5	µg/l	122%	2,76
AG	17,9	2,69	µg/l	104%	0,52
AH	21,5	5	µg/l	125%	3,21
AI	17,5	3,5	µg/l	102%	0,22
AJ	18,5	2,8	µg/l	108%	0,97



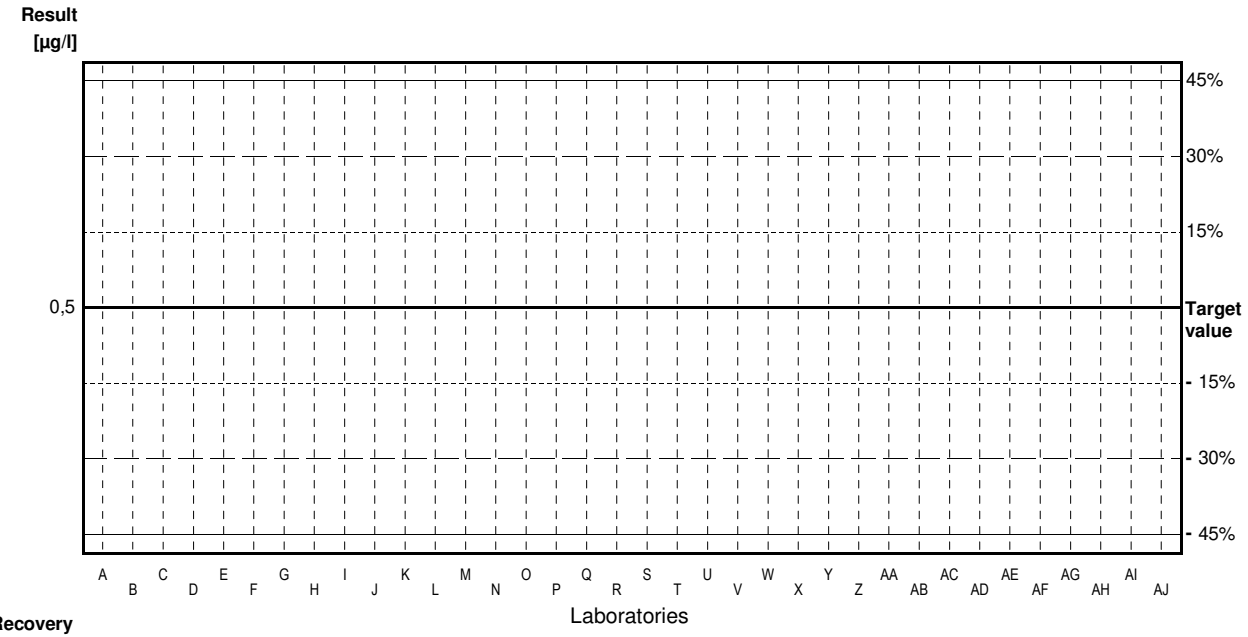


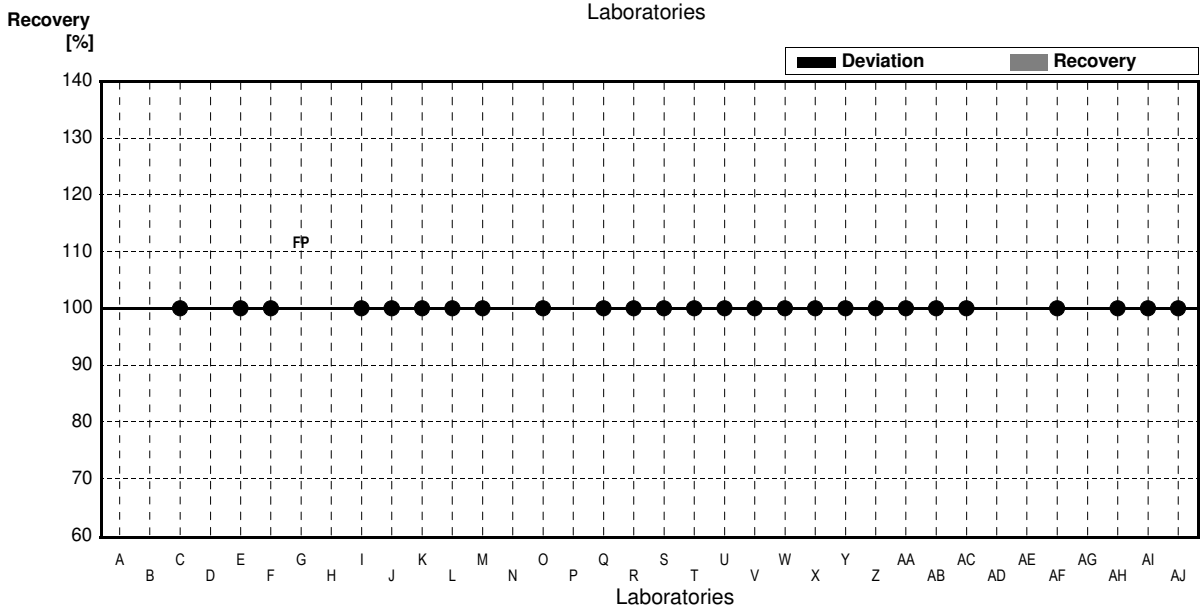
	All results	Outliers excl.	Unit
Mean ± CI(99%)	18,0 ± 1,1	17,7 ± 0,9	µg/l
Recov. ± CI(99%)	104,4 ± 6,5	103,0 ± 5,3	%
SD between labs	2,3	1,8	µg/l
RSD between labs	12,8	10,4	%
n for calculation	32	31	

Sample M164A
Parameter Arsenic

Target value	<0,5	µg/l
IFA result	<0,5	µg/l
Stability test	<0,5	µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	<0.1	0.01	µg/l	•	
D			µg/l		
E	<0.22		µg/l	•	
F	<1		µg/l	•	
G	0.659	0.13	µg/l	FP	
H			µg/l		
I	<70		µg/l	•	
J	<1		µg/l	•	
K	<0.2		µg/l	•	
L	<0.1		µg/l	•	
M	<1		µg/l	•	
N			µg/l		
O	<1.0		µg/l	•	
P			µg/l		
Q	<1.00	1.00	µg/l	•	
R	<0.50		µg/l	•	
S	[0.14]		µg/l	•	
T	<1		µg/l	•	
U	<2		µg/l	•	
V	<0.01		µg/l	•	
W	<1.0		µg/l	•	
X	<0.4		µg/l	•	
Y	<1		µg/l	•	
Z	<1		µg/l	•	
AA	<0.5		µg/l	•	
AB	0.100	0.05	µg/l	•	
AC	<1.00		µg/l	•	
AD			µg/l		
AE			µg/l		
AF	<0.1		µg/l	•	
AG			µg/l		
AH	<1		µg/l	•	
AI	<1		µg/l	•	
AJ	<0.50	0.085	µg/l	•	



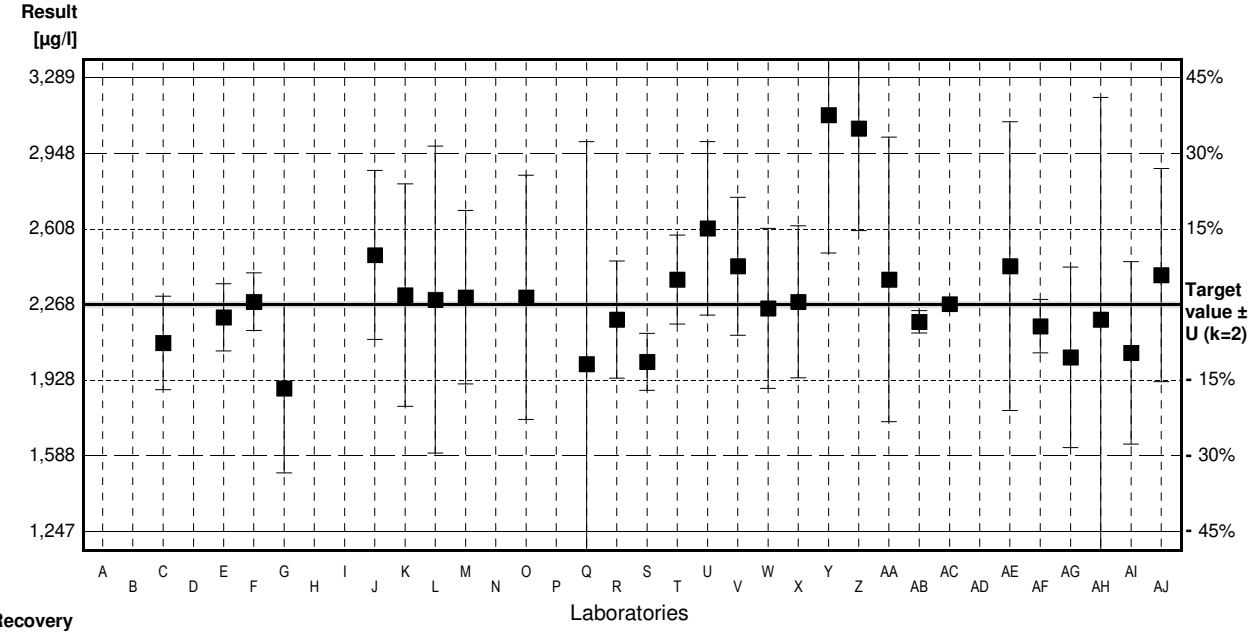


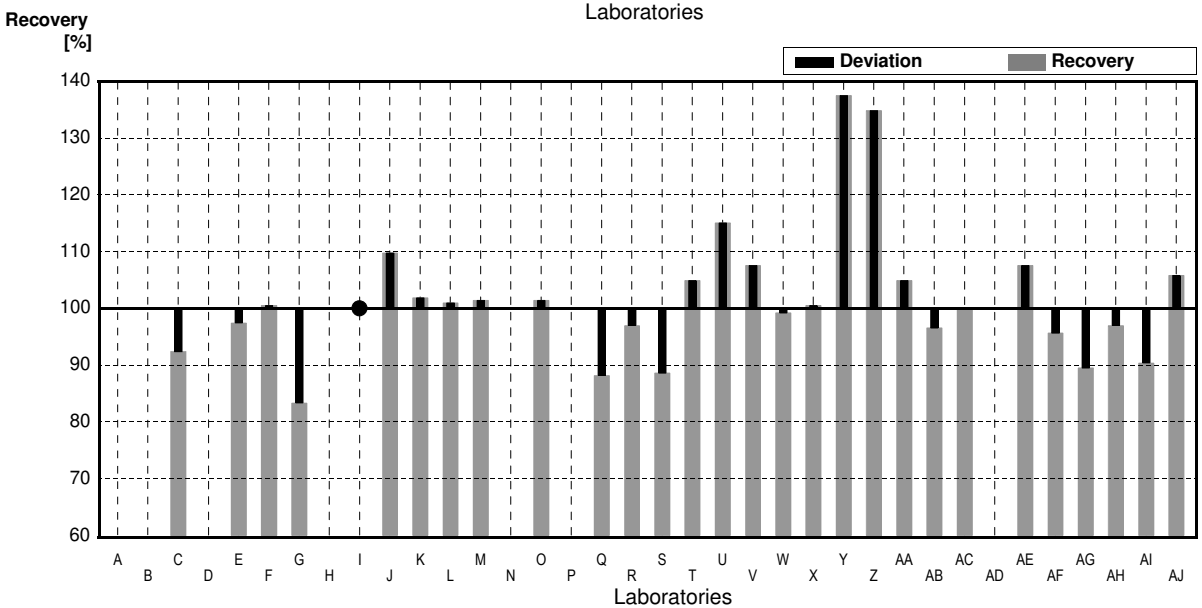
	All results	Outliers excl.	Unit
Mean ± CI(99%)			µg/l
Recov. ± CI(99%)			%
SD between labs			µg/l
RSD between labs			%
n for calculation			

Sample M164B
Parameter Arsenic

Target value	± U (k=2)	2,268 µg/l	±	0,014 µg/l
IFA result	± U (k=2)	1,98 µg/l	±	0,21 µg/l
Stability test	± U (k=2)	2,40 µg/l	±	0,25 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	2,095	0,21	µg/l	92%	-1,03
D			µg/l		
E	2,21	0,151	µg/l	97%	-0,35
F	2,28	0,13	µg/l	101%	0,07
G	1,89	0,38	µg/l	83%	-2,25
H			µg/l		
I	<70		µg/l	•	
J	2,49	0,38	µg/l	110%	1,32
K	2,31	0,5	µg/l	102%	0,25
L	2,29	0,69	µg/l	101%	0,13
M	2,30	0,39	µg/l	101%	0,19
N			µg/l		
O	2,30	0,55	µg/l	101%	0,19
P			µg/l		
Q	2,00	1,00	µg/l	88%	-1,60
R	2,20	0,264	µg/l	97%	-0,41
S	2,01	0,128	µg/l	89%	-1,54
T	2,38	0,20	µg/l	105%	0,67
U	2,61	0,39	µg/l	115%	2,04
V	2,44	0,31	µg/l	108%	1,02
W	2,25	0,36	µg/l	99%	-0,11
X	2,28	0,342	µg/l	101%	0,07
Y	3,12 *	0,62	µg/l	138%	5,08
Z	3,06 *	0,46	µg/l	135%	4,72
AA	2,38	0,64	µg/l	105%	0,67
AB	2,19	0,05	µg/l	97%	-0,46
AC	2,27		µg/l	100%	0,01
AD			µg/l		
AE	2,44	0,65	µg/l	108%	1,02
AF	2,17	0,12	µg/l	96%	-0,58
AG	2,03	0,406	µg/l	90%	-1,42
AH	2,20	1	µg/l	97%	-0,41
AI	2,05	0,41	µg/l	90%	-1,30
AJ	2,40	0,48	µg/l	106%	0,79





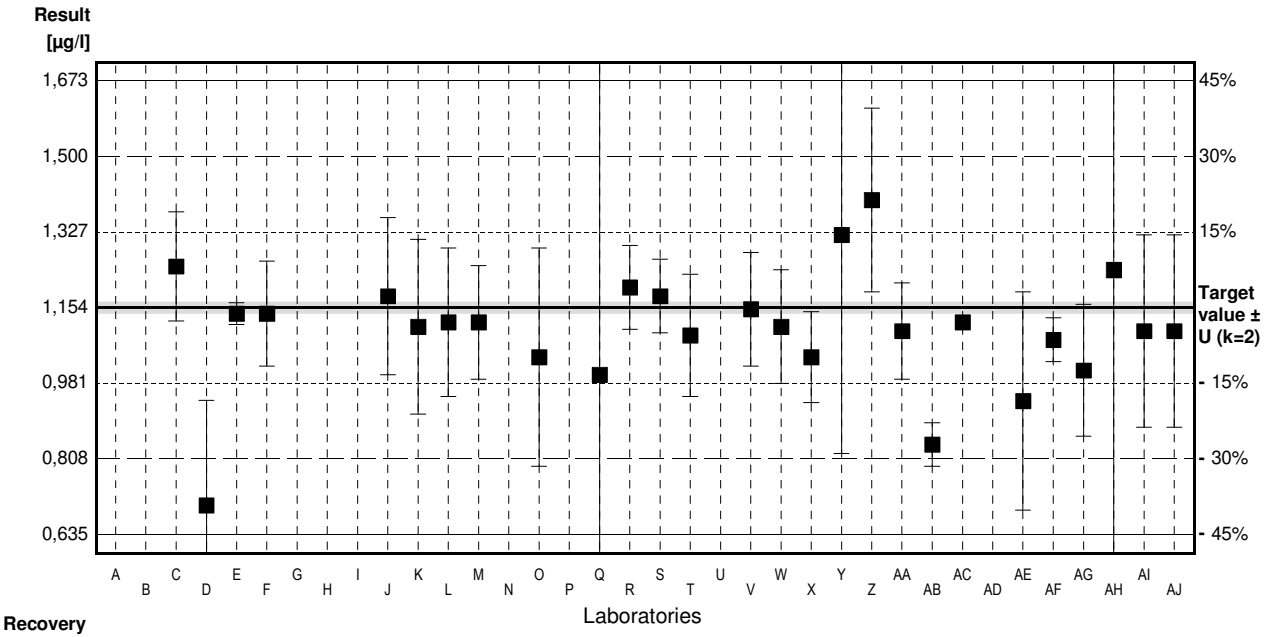
	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,309 ± 0,143	2,249 ± 0,092	µg/l
Recov. ± CI(99%)	101,8 ± 6,3	99,1 ± 4,1	%
SD between labs	0,274	0,168	µg/l
RSD between labs	11,9	7,5	%
n for calculation	28	26	

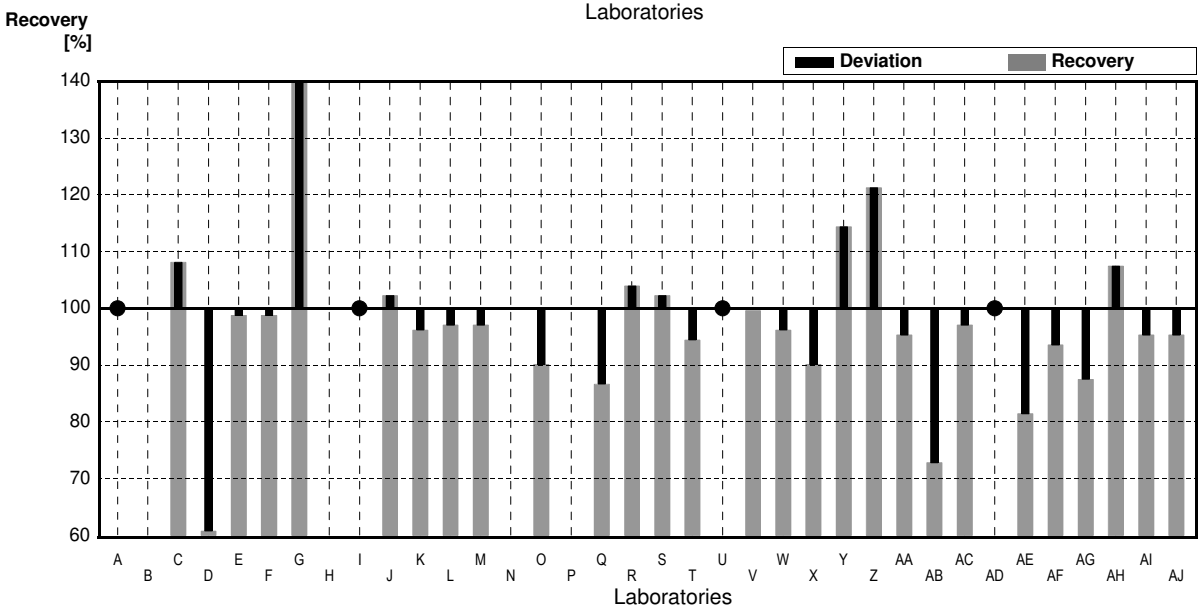
Sample M164A

Parameter Lead

Target value ± U (k=2)	1,154 µg/l	±	0,013 µg/l
IFA result ± U (k=2)	1,09 µg/l	±	0,03 µg/l
Stability test ± U (k=2)	1,09 µg/l	±	0,03 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	<3,0	1	µg/l	•	
B			µg/l		
C	1,248	0,125	µg/l	108%	1,20
D	0,701 *	0,24	µg/l	61%	-5,77
E	1,14	0,025	µg/l	99%	-0,18
F	1,14	0,12	µg/l	99%	-0,18
G	1,70 *	0,34	µg/l	147%	6,96
H			µg/l		
I	<10		µg/l	•	
J	1,18	0,18	µg/l	102%	0,33
K	1,11	0,2	µg/l	96%	-0,56
L	1,12	0,17	µg/l	97%	-0,43
M	1,12	0,13	µg/l	97%	-0,43
N			µg/l		
O	1,04	0,25	µg/l	90%	-1,45
P			µg/l		
Q	1,00	1,00	µg/l	87%	-1,96
R	1,20	0,096	µg/l	104%	0,59
S	1,18	0,0842	µg/l	102%	0,33
T	1,09	0,14	µg/l	94%	-0,82
U	<2		µg/l	•	
V	1,15	0,13	µg/l	100%	-0,05
W	1,11	0,13	µg/l	96%	-0,56
X	1,04	0,104	µg/l	90%	-1,45
Y	1,32	0,50	µg/l	114%	2,12
Z	1,40	0,21	µg/l	121%	3,13
AA	1,10	0,11	µg/l	95%	-0,69
AB	0,84	0,05	µg/l	73%	-4,00
AC	1,12		µg/l	97%	-0,43
AD	<5		µg/l	•	
AE	0,94	0,25	µg/l	81%	-2,73
AF	1,08	0,05	µg/l	94%	-0,94
AG	1,01	0,151	µg/l	88%	-1,84
AH	1,24	1	µg/l	107%	1,10
AI	1,10	0,22	µg/l	95%	-0,69
AJ	1,10	0,22	µg/l	95%	-0,69



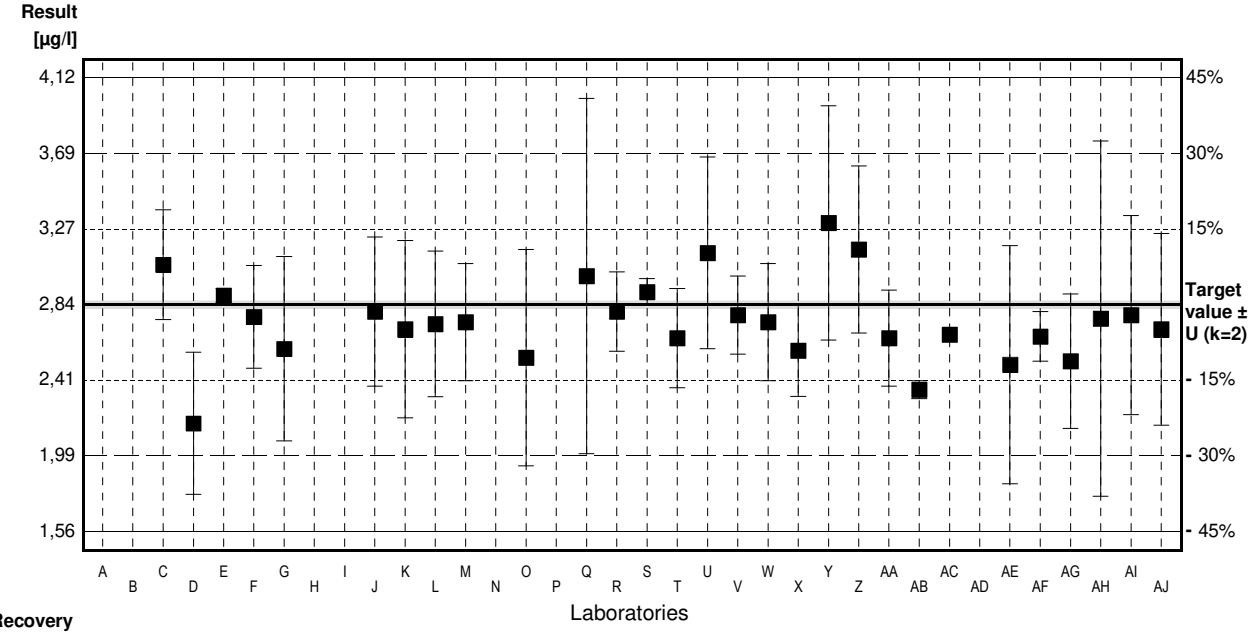


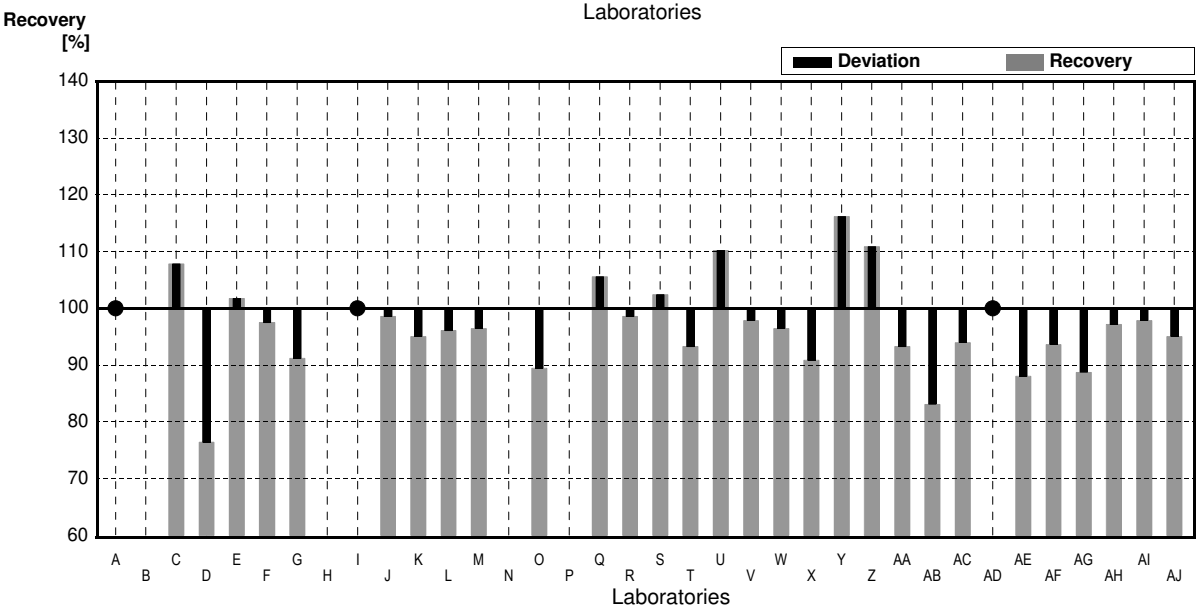
	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,126 ± 0,092	1,120 ± 0,062	µg/l
Recov. ± CI(99%)	97,5 ± 8,0	97,0 ± 5,4	%
SD between labs	0,175	0,113	µg/l
RSD between labs	15,6	10,1	%
n for calculation	28	26	

Sample M164B
Parameter Lead

Target value ± U (k=2)	2,84 µg/l	±	0,02 µg/l
IFA result ± U (k=2)	2,62 µg/l	±	0,07 µg/l
Stability test ± U (k=2)	2,67 µg/l	±	0,07 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	<3.0	1	µg/l	•	
B			µg/l		
C	3.064	0.31	µg/l	108%	1.16
D	2.17 *	0.4	µg/l	76%	-3.47
E	2.89	0.040	µg/l	102%	0.26
F	2.77	0.29	µg/l	98%	-0.36
G	2.59	0.52	µg/l	91%	-1.29
H			µg/l		
I	<10		µg/l	•	
J	2.80	0.42	µg/l	99%	-0.21
K	2.70	0.5	µg/l	95%	-0.72
L	2.73	0.41	µg/l	96%	-0.57
M	2.74	0.33	µg/l	96%	-0.52
N			µg/l		
O	2.54	0.61	µg/l	89%	-1.55
P			µg/l		
Q	3.00	1.00	µg/l	106%	0.83
R	2.80	0.224	µg/l	99%	-0.21
S	2.91	0.0765	µg/l	102%	0.36
T	2.65	0.28	µg/l	93%	-0.98
U	3.13	0.54	µg/l	110%	1.50
V	2.78	0.22	µg/l	98%	-0.31
W	2.74	0.33	µg/l	96%	-0.52
X	2.58	0.258	µg/l	91%	-1.35
Y	3.30 *	0.66	µg/l	116%	2.38
Z	3.15	0.47	µg/l	111%	1.61
AA	2.65	0.27	µg/l	93%	-0.98
AB	2.36	0.05	µg/l	83%	-2.49
AC	2.67		µg/l	94%	-0.88
AD	<5		µg/l	•	
AE	2.50	0.67	µg/l	88%	-1.76
AF	2.66	0.14	µg/l	94%	-0.93
AG	2.52	0.378	µg/l	89%	-1.66
AH	2.76	1	µg/l	97%	-0.41
AI	2.78	0.56	µg/l	98%	-0.31
AJ	2.70	0.54	µg/l	95%	-0.72



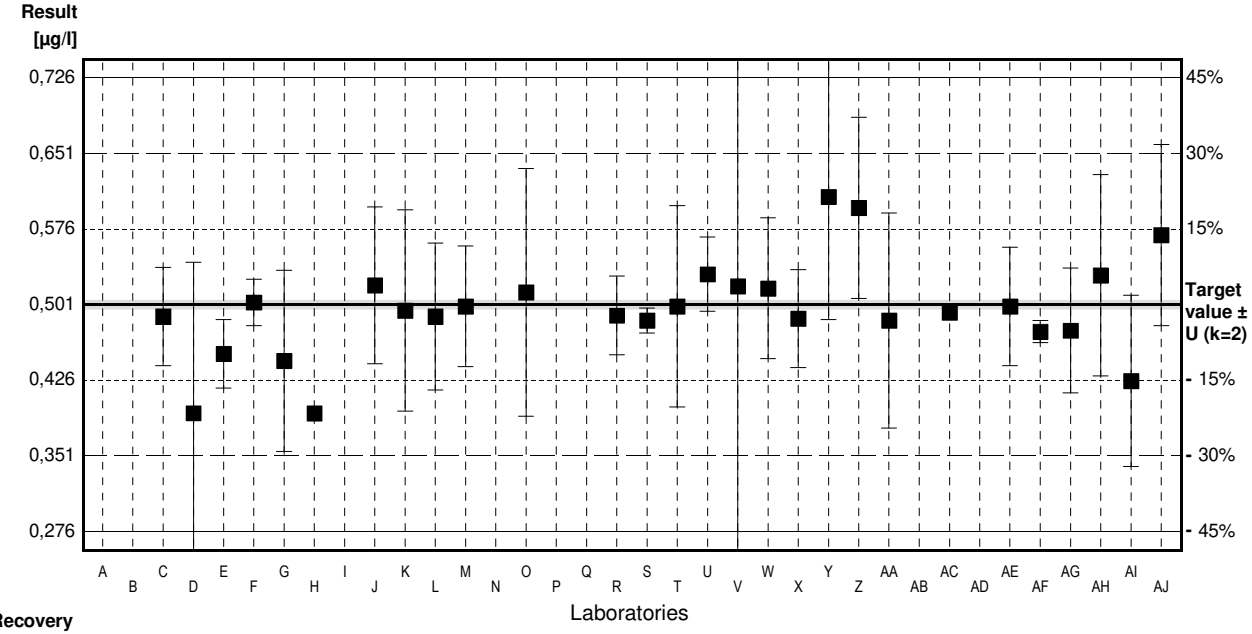


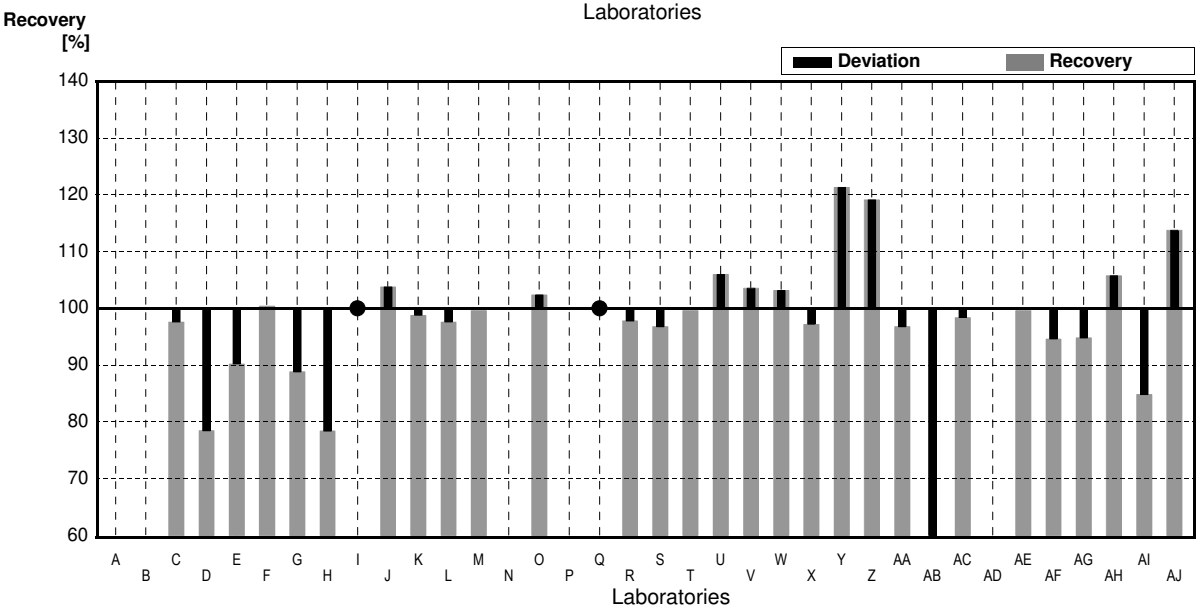
	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,75 ± 0,12	2,75 ± 0,10	µg/l
Recov. ± CI(99%)	96,7 ± 4,3	96,7 ± 3,6	%
SD between labs	0,24	0,19	µg/l
RSD between labs	8,6	6,9	%
n for calculation	29	27	

Sample M164A
Parameter Cadmium

Target value	± U (k=2)	0,501 µg/l	±	0,004 µg/l
IFA result	± U (k=2)	0,504 µg/l	±	0,030 µg/l
Stability test	± U (k=2)	0,481 µg/l	±	0,028 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	0,489	0,049	µg/l	98%	-0,43
D	0,393 *	0,15	µg/l	78%	-3,85
E	0,452	0,034	µg/l	90%	-1,75
F	0,503	0,023	µg/l	100%	0,07
G	0,445	0,09	µg/l	89%	-2,00
H	0,3927 *		µg/l	78%	-3,86
I	<40		µg/l	•	
J	0,52	0,078	µg/l	104%	0,68
K	0,495	0,1	µg/l	99%	-0,21
L	0,489	0,073	µg/l	98%	-0,43
M	0,499	0,060	µg/l	100%	-0,07
N			µg/l		
O	0,513	0,123	µg/l	102%	0,43
P			µg/l		
Q	<1,00	1,00	µg/l	•	
R	0,490	0,0392	µg/l	98%	-0,39
S	0,485	0,0123	µg/l	97%	-0,57
T	0,499	0,1	µg/l	100%	-0,07
U	0,531	0,037	µg/l	106%	1,07
V	0,519	0,25	µg/l	104%	0,64
W	0,517	0,07	µg/l	103%	0,57
X	0,487	0,0487	µg/l	97%	-0,50
Y	0,608 *	0,122	µg/l	121%	3,81
Z	0,597 *	0,09	µg/l	119%	3,42
AA	0,485	0,107	µg/l	97%	-0,57
AB	0,270 *	0,05	µg/l	54%	-8,23
AC	0,493		µg/l	98%	-0,29
AD			µg/l		
AE	0,499	0,059	µg/l	100%	-0,07
AF	0,474	0,011	µg/l	95%	-0,96
AG	0,475	0,062	µg/l	95%	-0,93
AH	0,53	0,1	µg/l	106%	1,03
AI	0,425	0,085	µg/l	85%	-2,71
AJ	0,57	0,09	µg/l	114%	2,46



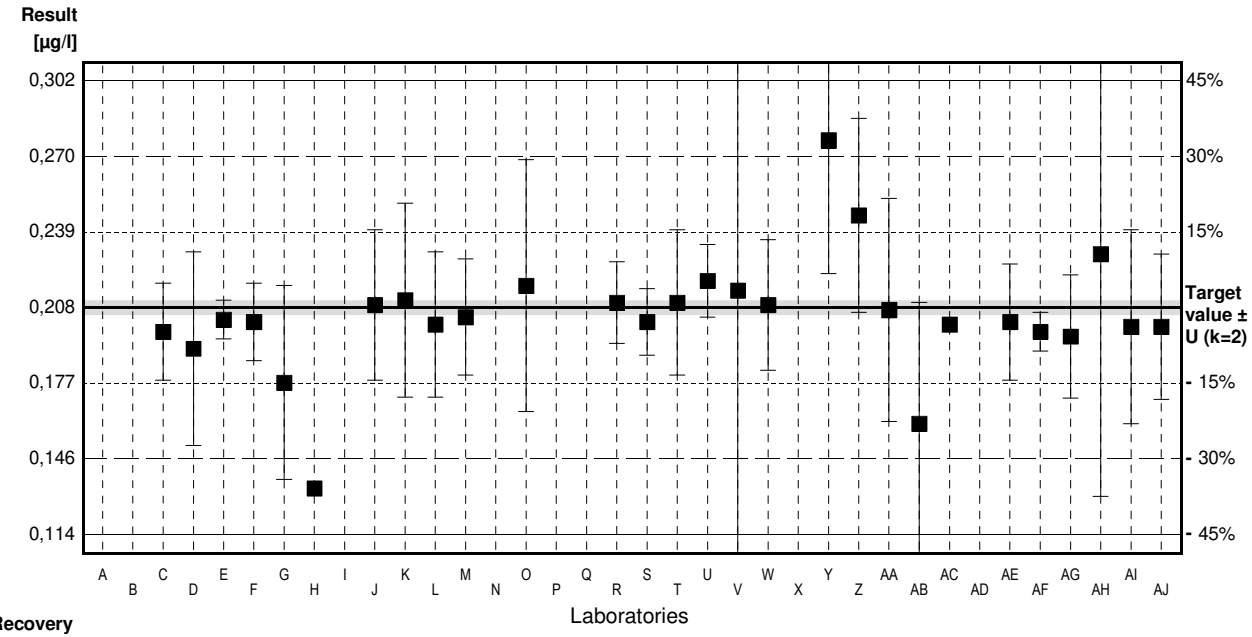


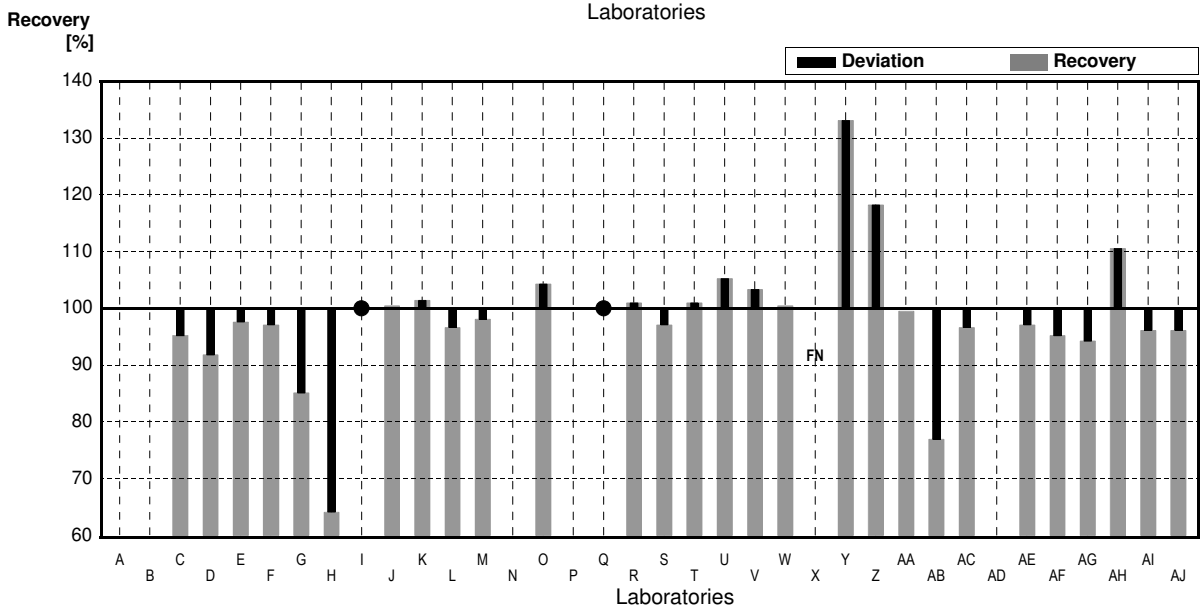
	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,488 ± 0,033	0,495 ± 0,017	µg/l
Recov. ± CI(99%)	97,4 ± 6,5	98,8 ± 3,4	%
SD between labs	0,064	0,030	µg/l
RSD between labs	13,1	6,1	%
n for calculation	29	24	

Sample M164B
Parameter Cadmium

Target value	± U (k=2)	0,208 µg/l	±	0,003 µg/l
IFA result	± U (k=2)	0,211 µg/l	±	0,012 µg/l
Stability test	± U (k=2)	0,204 µg/l	±	0,012 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	0,198	0,02	µg/l	95%	-0,86
D	0,191	0,04	µg/l	92%	-1,46
E	0,203	0,008	µg/l	98%	-0,43
F	0,202	0,016	µg/l	97%	-0,52
G	0,177	0,04	µg/l	85%	-2,66
H	0,1333 *		µg/l	64%	-6,41
I	<40		µg/l	•	
J	0,209	0,031	µg/l	100%	0,09
K	0,211	0,04	µg/l	101%	0,26
L	0,201	0,030	µg/l	97%	-0,60
M	0,204	0,024	µg/l	98%	-0,34
N			µg/l		
O	0,217	0,052	µg/l	104%	0,77
P			µg/l		
Q	<1,00	1,00	µg/l	•	
R	0,210	0,0168	µg/l	101%	0,17
S	0,202	0,0137	µg/l	97%	-0,52
T	0,210	0,03	µg/l	101%	0,17
U	0,219	0,015	µg/l	105%	0,94
V	0,215	0,18	µg/l	103%	0,60
W	0,209	0,027	µg/l	100%	0,09
X	<0,2		µg/l	FN	
Y	0,277 *	0,055	µg/l	133%	5,92
Z	0,246 *	0,04	µg/l	118%	3,26
AA	0,207	0,046	µg/l	100%	-0,09
AB	0,160 *	0,05	µg/l	77%	-4,12
AC	0,201		µg/l	97%	-0,60
AD			µg/l		
AE	0,202	0,024	µg/l	97%	-0,52
AF	0,198	0,008	µg/l	95%	-0,86
AG	0,196	0,0254	µg/l	94%	-1,03
AH	0,230	0,1	µg/l	111%	1,89
AI	0,200	0,040	µg/l	96%	-0,69
AJ	0,200	0,03	µg/l	96%	-0,69



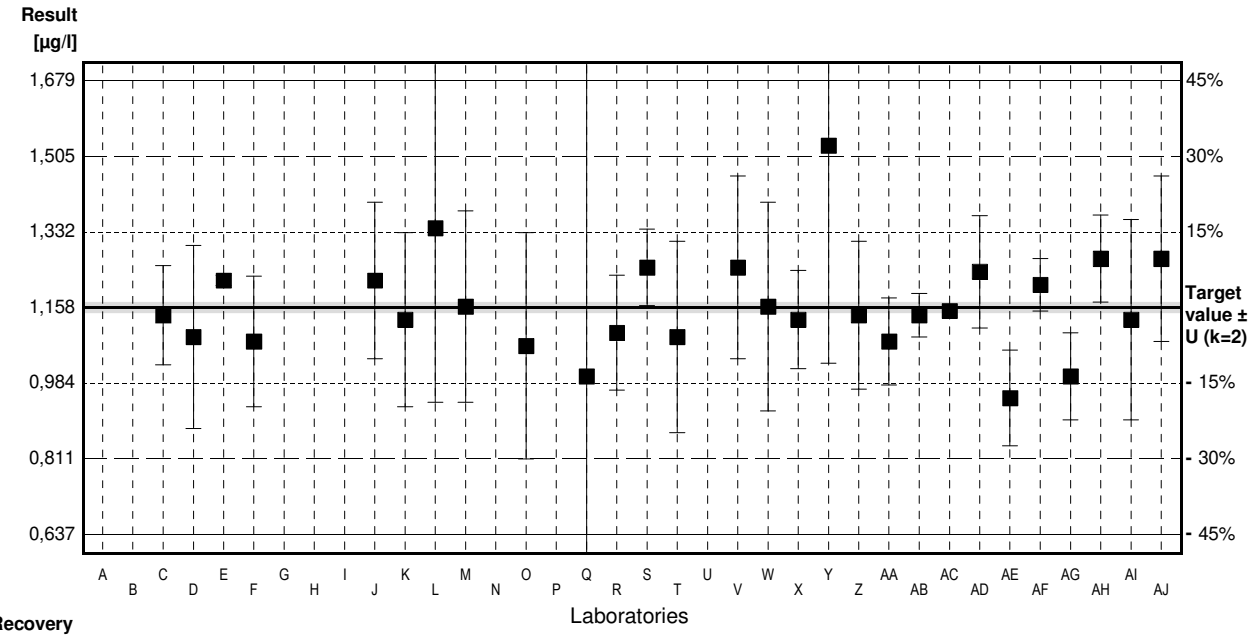


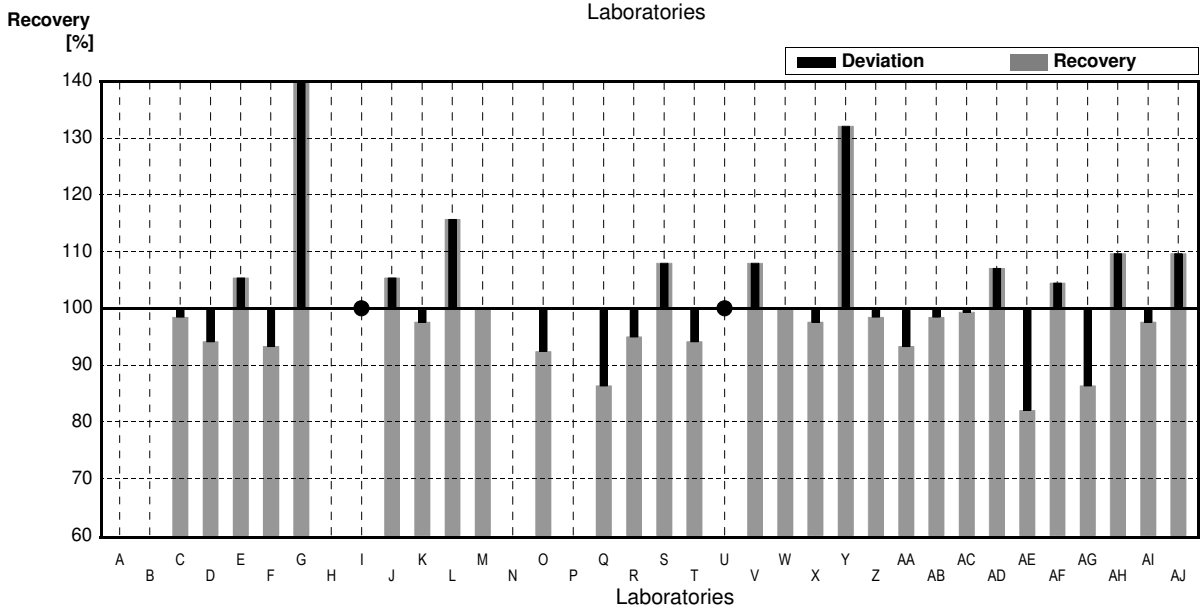
	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,205 ± 0,013	0,205 ± 0,006	µg/l
Recov. ± CI(99%)	98,4 ± 6,2	98,4 ± 2,9	%
SD between labs	0,025	0,010	µg/l
RSD between labs	12,1	5,1	%
n for calculation	28	24	

Sample M164A
Parameter Chromium

Target value	± U (k=2)	1,158 µg/l	±	0,012 µg/l
IFA result	± U (k=2)	1,18 µg/l	±	0,06 µg/l
Stability test	± U (k=2)	1,17 µg/l	±	0,06 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	1,140	0,114	µg/l	98%	-0,25
D	1,09	0,21	µg/l	94%	-0,93
E	1,22	0,012	µg/l	105%	0,85
F	1,08	0,15	µg/l	93%	-1,07
G	3,08 *	0,62	µg/l	266%	26,35
H			µg/l		
I	<30		µg/l	•	
J	1,22	0,18	µg/l	105%	0,85
K	1,13	0,2	µg/l	98%	-0,38
L	1,34	0,40	µg/l	116%	2,49
M	1,16	0,22	µg/l	100%	0,03
N			µg/l		
O	1,07	0,26	µg/l	92%	-1,21
P			µg/l		
Q	1,00	1,00	µg/l	86%	-2,17
R	1,10	0,132	µg/l	95%	-0,80
S	1,25	0,088	µg/l	108%	1,26
T	1,09	0,22	µg/l	94%	-0,93
U	<5		µg/l	•	
V	1,25	0,21	µg/l	108%	1,26
W	1,16	0,24	µg/l	100%	0,03
X	1,13	0,113	µg/l	98%	-0,38
Y	1,53 *	0,50	µg/l	132%	5,10
Z	1,14	0,17	µg/l	98%	-0,25
AA	1,08	0,10	µg/l	93%	-1,07
AB	1,14	0,05	µg/l	98%	-0,25
AC	1,15		µg/l	99%	-0,11
AD	1,24	0,129	µg/l	107%	1,12
AE	0,95	0,11	µg/l	82%	-2,85
AF	1,21	0,06	µg/l	104%	0,71
AG	1,00	0,100	µg/l	86%	-2,17
AH	1,27	0,1	µg/l	110%	1,54
AI	1,13	0,23	µg/l	98%	-0,38
AJ	1,27	0,19	µg/l	110%	1,54



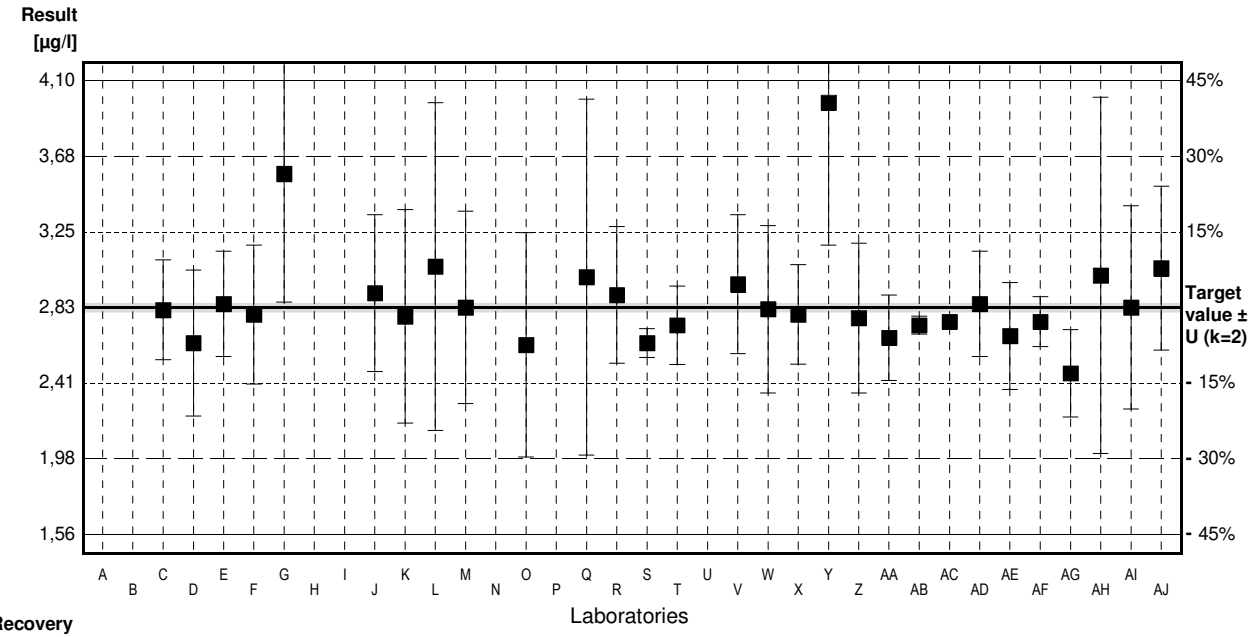


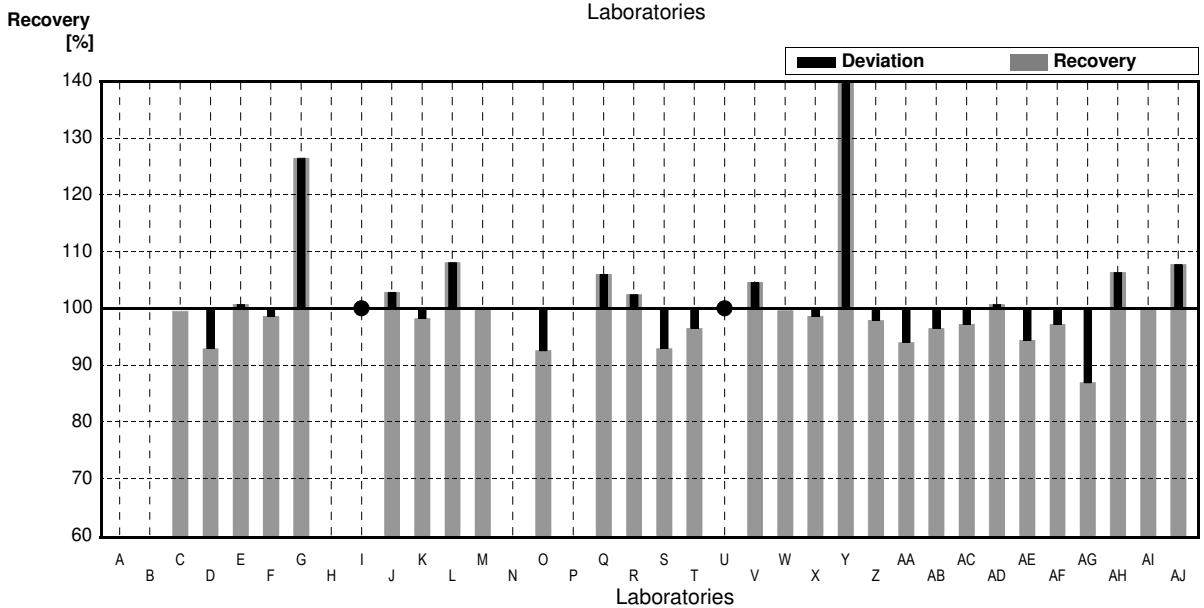
	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,228 ± 0,192	1,149 ± 0,049	µg/l
Recov. ± CI(99%)	106,1 ± 16,5	99,2 ± 4,2	%
SD between labs	0,374	0,092	µg/l
RSD between labs	30,4	8,0	%
n for calculation	29	27	

Sample M164B
Parameter Chromium

Target value ± U (k=2)	2,83 µg/l	±	0,02 µg/l
IFA result ± U (k=2)	2,78 µg/l	±	0,10 µg/l
Stability test ± U (k=2)	2,91 µg/l	±	0,11 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	2,816	0,28	µg/l	100%	-0,08
D	2,63	0,41	µg/l	93%	-1,12
E	2,85	0,295	µg/l	101%	0,11
F	2,79	0,39	µg/l	99%	-0,22
G	3,58 *	0,72	µg/l	127%	4,21
H			µg/l		
I	<30		µg/l	•	
J	2,91	0,44	µg/l	103%	0,45
K	2,78	0,6	µg/l	98%	-0,28
L	3,06	0,92	µg/l	108%	1,29
M	2,83	0,54	µg/l	100%	0,00
N			µg/l		
O	2,62	0,63	µg/l	93%	-1,18
P			µg/l		
Q	3,00	1,00	µg/l	106%	0,95
R	2,90	0,384	µg/l	102%	0,39
S	2,63	0,081	µg/l	93%	-1,12
T	2,73	0,22	µg/l	96%	-0,56
U	<5		µg/l	•	
V	2,96	0,39	µg/l	105%	0,73
W	2,82	0,47	µg/l	100%	-0,06
X	2,79	0,279	µg/l	99%	-0,22
Y	3,98 *	0,80	µg/l	141%	6,45
Z	2,77	0,42	µg/l	98%	-0,34
AA	2,66	0,24	µg/l	94%	-0,95
AB	2,73	0,05	µg/l	96%	-0,56
AC	2,75		µg/l	97%	-0,45
AD	2,85	0,296	µg/l	101%	0,11
AE	2,67	0,30	µg/l	94%	-0,90
AF	2,75	0,14	µg/l	97%	-0,45
AG	2,46	0,246	µg/l	87%	-2,08
AH	3,01	1	µg/l	106%	1,01
AI	2,83	0,57	µg/l	100%	0,00
AJ	3,05	0,46	µg/l	108%	1,23





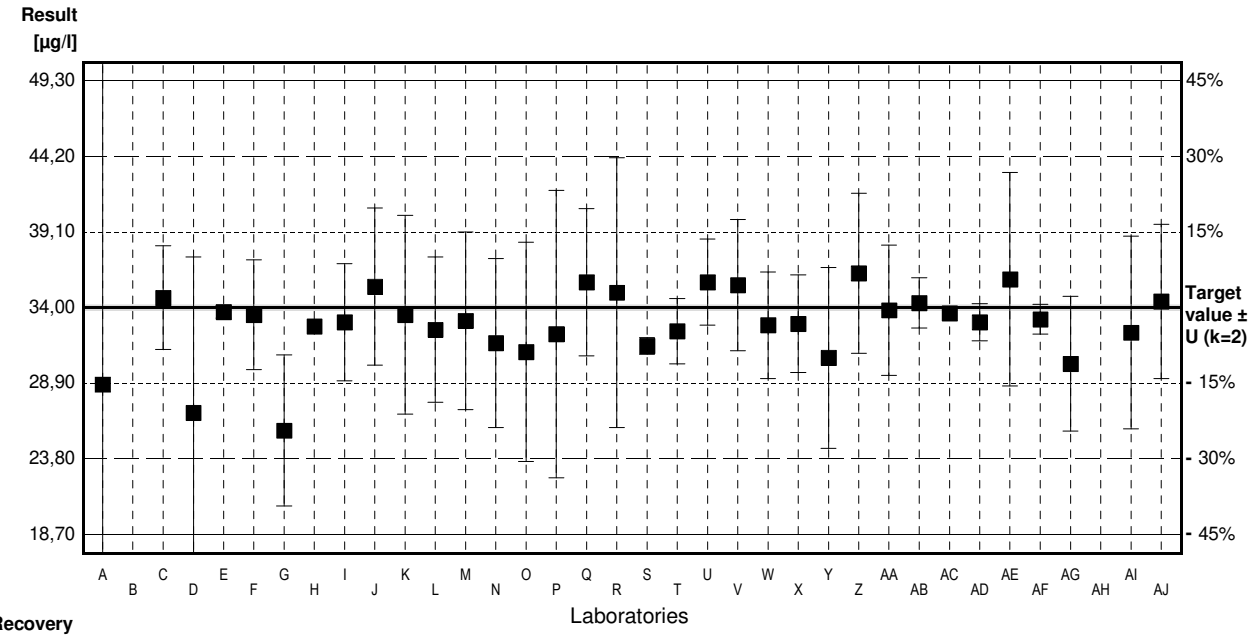
	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,87 ± 0,15	2,80 ± 0,08	µg/l
Recov. ± CI(99%)	101,4 ± 5,3	99,0 ± 2,7	%
SD between labs	0,29	0,14	µg/l
RSD between labs	10,2	5,1	%
n for calculation	29	27	

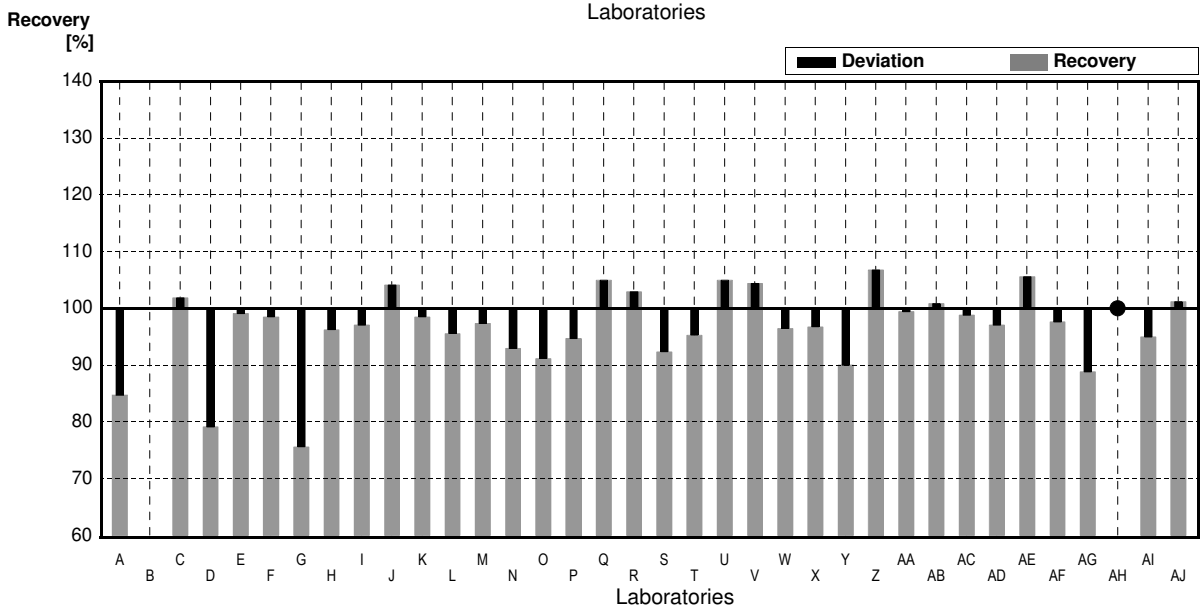
Sample M164A

Parameter Iron

Target value	± U (k=2)	34,00 µg/l	±	0,18 µg/l
IFA result	± U (k=2)	34,5 µg/l	±	2,7 µg/l
Stability test	± U (k=2)	33,9 µg/l	±	2,6 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	28,8	31	µg/l	85%	-2,32
B			µg/l		
C	34,65	3,5	µg/l	102%	0,29
D	26,9 *	10,5	µg/l	79%	-3,16
E	33,7	0,416	µg/l	99%	-0,13
F	33,5	3,7	µg/l	99%	-0,22
G	25,7 *	5,1	µg/l	76%	-3,70
H	32,73		µg/l	96%	-0,57
I	33,0	3,96	µg/l	97%	-0,45
J	35,4	5,3	µg/l	104%	0,62
K	33,5	6,7	µg/l	99%	-0,22
L	32,5	4,9	µg/l	96%	-0,67
M	33,1	6,0	µg/l	97%	-0,40
N	31,6	5,7	µg/l	93%	-1,07
O	31,0	7,4	µg/l	91%	-1,34
P	32,2	9,7	µg/l	95%	-0,80
Q	35,7	4,96	µg/l	105%	0,76
R	35,0	9,10	µg/l	103%	0,45
S	31,4	0,572	µg/l	92%	-1,16
T	32,4	2,2	µg/l	95%	-0,71
U	35,7	2,9	µg/l	105%	0,76
V	35,5	4,43	µg/l	104%	0,67
W	32,8	3,6	µg/l	96%	-0,53
X	32,9	3,29	µg/l	97%	-0,49
Y	30,6	6,1	µg/l	90%	-1,52
Z	36,3	5,4	µg/l	107%	1,02
AA	33,81	4,40	µg/l	99%	-0,08
AB	34,3	1,7	µg/l	101%	0,13
AC	33,6		µg/l	99%	-0,18
AD	33,0	1,25	µg/l	97%	-0,45
AE	35,9	7,2	µg/l	106%	0,85
AF	33,2	1,0	µg/l	98%	-0,36
AG	30,2	4,54	µg/l	89%	-1,69
AH	<50		µg/l	•	
AI	32,3	6,5	µg/l	95%	-0,76
AJ	34,4	5,2	µg/l	101%	0,18



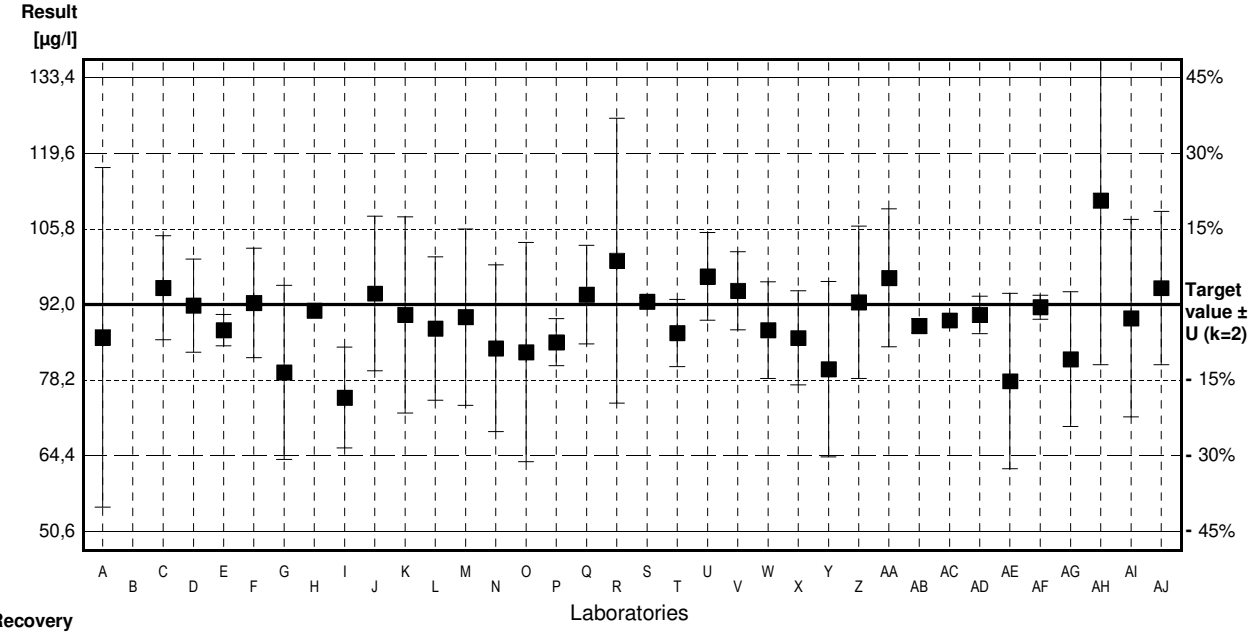


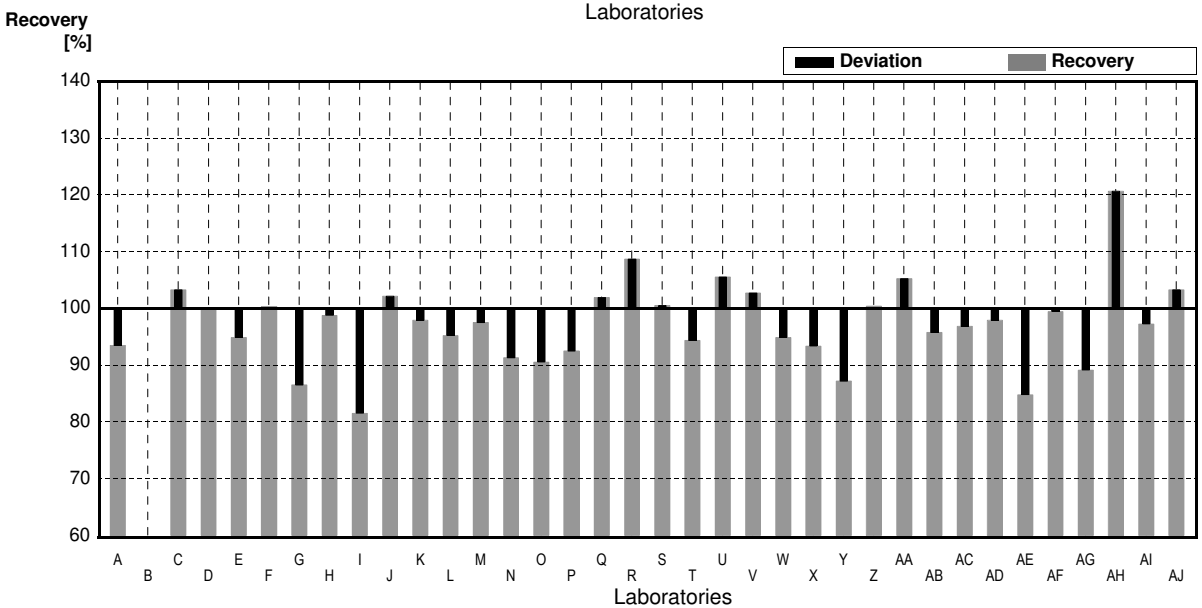
	All results	Outliers excl.	Unit
Mean ± CI(99%)	32,86 ± 1,13	33,27 ± 0,86	µg/l
Recov. ± CI(99%)	96,7 ± 3,3	97,9 ± 2,5	%
SD between labs	2,40	1,77	µg/l
RSD between labs	7,3	5,3	%
n for calculation	34	32	

Sample M164B
Parameter Iron

Target value ± U (k=2)	92,0 µg/l	±	0,4 µg/l
IFA result ± U (k=2)	83 µg/l	±	6 µg/l
Stability test ± U (k=2)	94 µg/l	±	7 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	86.0	31	µg/l	93%	-0.99
B			µg/l		
C	95.05	9.5	µg/l	103%	0.50
D	91.8	8.5	µg/l	100%	-0.03
E	87.3	2.88	µg/l	95%	-0.77
F	92.3	10	µg/l	100%	0.05
G	79.6	15.9	µg/l	87%	-2.04
H	90.90		µg/l	99%	-0.18
I	75	9.20	µg/l	82%	-2.80
J	94.0	14.1	µg/l	102%	0.33
K	90.1	17.9	µg/l	98%	-0.31
L	87.6	13.1	µg/l	95%	-0.72
M	89.7	16.1	µg/l	98%	-0.38
N	84	15.2	µg/l	91%	-1.32
O	83.3	20.0	µg/l	91%	-1.43
P	85.1	4.3	µg/l	93%	-1.14
Q	93.8	9.00	µg/l	102%	0.30
R	100	26.0	µg/l	109%	1.32
S	92.5	0.703	µg/l	101%	0.08
T	86.8	6.13	µg/l	94%	-0.86
U	97.1	8.0	µg/l	106%	0.84
V	94.5	7.1	µg/l	103%	0.41
W	87.3	8.8	µg/l	95%	-0.77
X	85.9	8.59	µg/l	93%	-1.00
Y	80.2	16.0	µg/l	87%	-1.94
Z	92.4	13.9	µg/l	100%	0.07
AA	96.83	12.59	µg/l	105%	0.80
AB	88.1	1.34	µg/l	96%	-0.64
AC	89.1		µg/l	97%	-0.48
AD	90.1	3.42	µg/l	98%	-0.31
AE	78	16	µg/l	85%	-2.31
AF	91.5	2.2	µg/l	99%	-0.08
AG	82	12.3	µg/l	89%	-1.65
AH	111 *	30	µg/l	121%	3.13
AI	89.5	18	µg/l	97%	-0.41
AJ	95	14	µg/l	103%	0.49



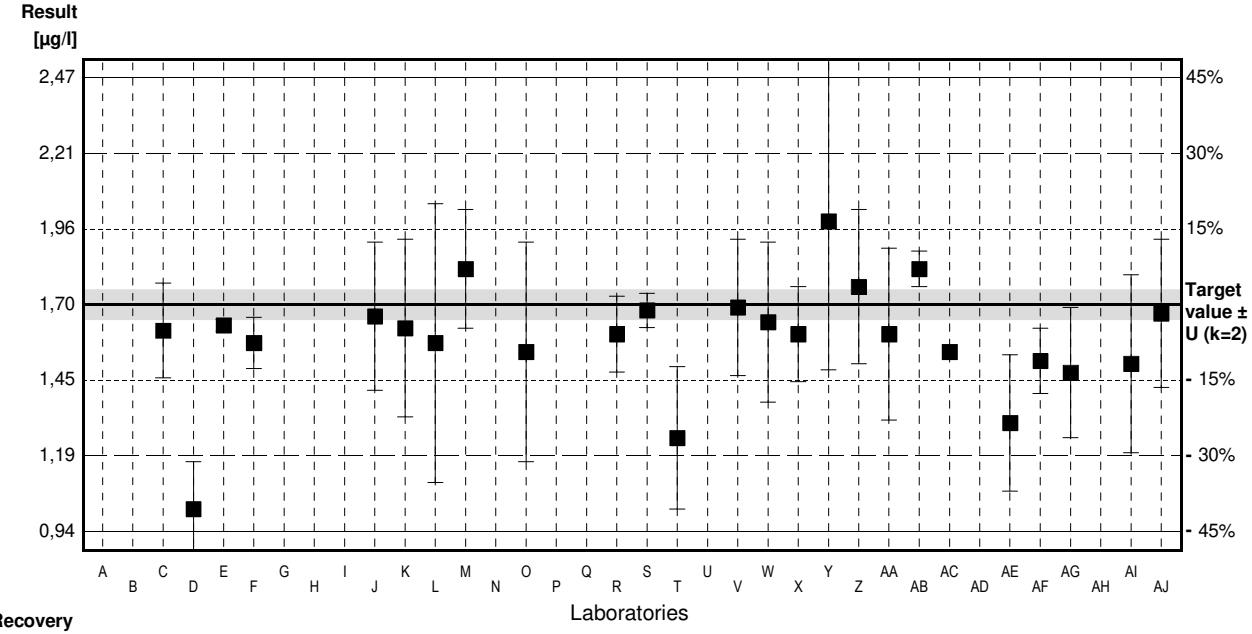


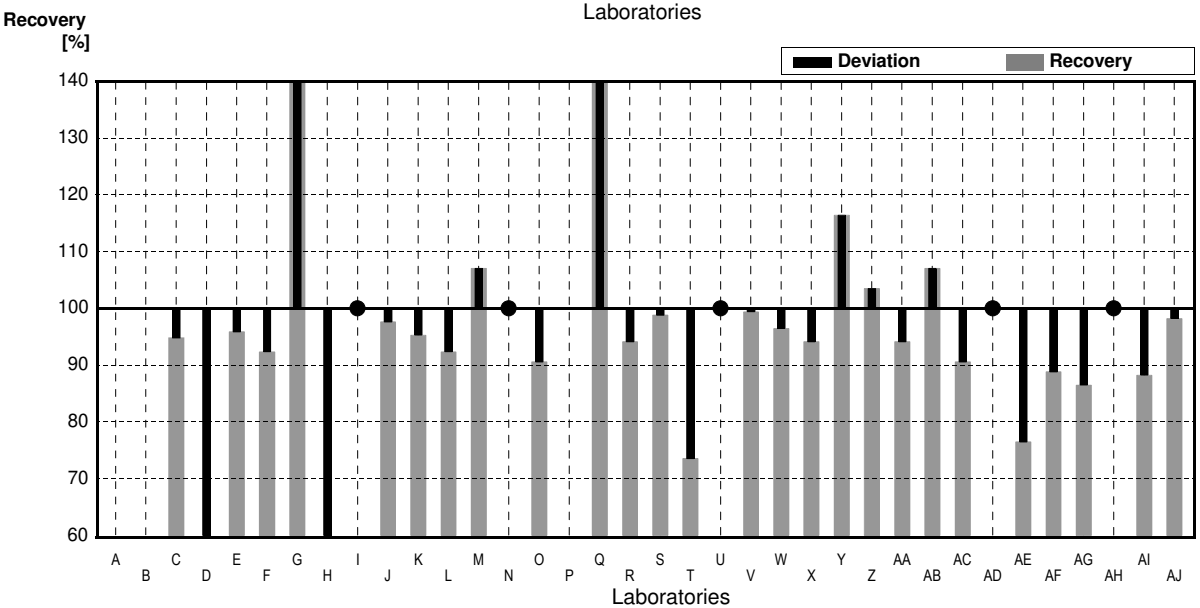
	All results	Outliers excl.	Unit
Mean ± CI(99%)	89,5 ± 3,1	88,9 ± 2,7	µg/l
Recov. ± CI(99%)	97,3 ± 3,4	96,6 ± 2,9	%
SD between labs	6,8	5,7	µg/l
RSD between labs	7,6	6,5	%
n for calculation	35	34	

Sample M164A
Parameter Copper

Target value ± U (k=2)	1,70 µg/l	±	0,05 µg/l
IFA result ± U (k=2)	1,82 µg/l	±	0,13 µg/l
Stability test ± U (k=2)	1,75 µg/l	±	0,13 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	1,612	0,16	µg/l	95%	-0,66
D	1,01 *	0,16	µg/l	59%	-5,20
E	1,63	0,020	µg/l	96%	-0,53
F	1,57	0,086	µg/l	92%	-0,98
G	4,71 *	0,94	µg/l	277%	22,70
H	0,7645 *		µg/l	45%	-7,06
I	<20		µg/l	•	
J	1,66	0,25	µg/l	98%	-0,30
K	1,62	0,3	µg/l	95%	-0,60
L	1,57	0,47	µg/l	92%	-0,98
M	1,82	0,20	µg/l	107%	0,90
N	<10		µg/l	•	
O	1,54	0,37	µg/l	91%	-1,21
P			µg/l		
Q	3,00 *	1,00	µg/l	176%	9,80
R	1,60	0,128	µg/l	94%	-0,75
S	1,68	0,0578	µg/l	99%	-0,15
T	1,25	0,24	µg/l	74%	-3,39
U	<10		µg/l	•	
V	1,69	0,23	µg/l	99%	-0,08
W	1,64	0,27	µg/l	96%	-0,45
X	1,60	0,16	µg/l	94%	-0,75
Y	1,98 *	0,50	µg/l	116%	2,11
Z	1,76	0,26	µg/l	104%	0,45
AA	1,60	0,29	µg/l	94%	-0,75
AB	1,82	0,06	µg/l	107%	0,90
AC	1,54		µg/l	91%	-1,21
AD	<100		µg/l	•	
AE	1,30	0,23	µg/l	76%	-3,02
AF	1,51	0,11	µg/l	89%	-1,43
AG	1,47	0,220	µg/l	86%	-1,73
AH	<2		µg/l	•	
AI	1,50	0,30	µg/l	88%	-1,51
AJ	1,67	0,25	µg/l	98%	-0,23



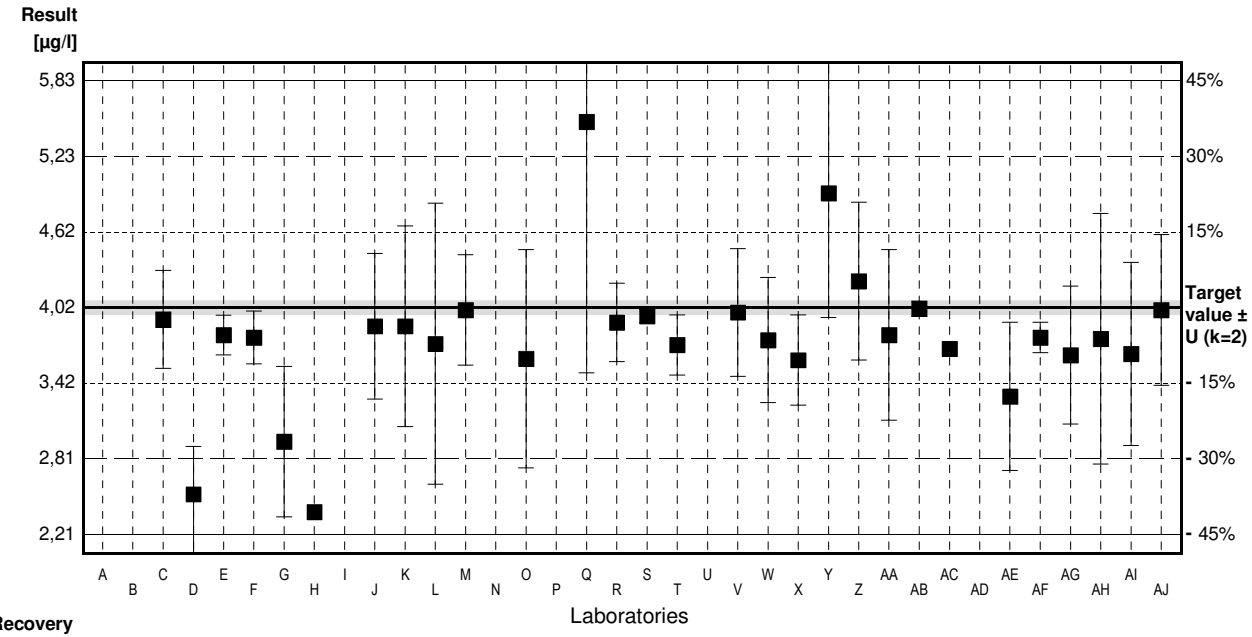


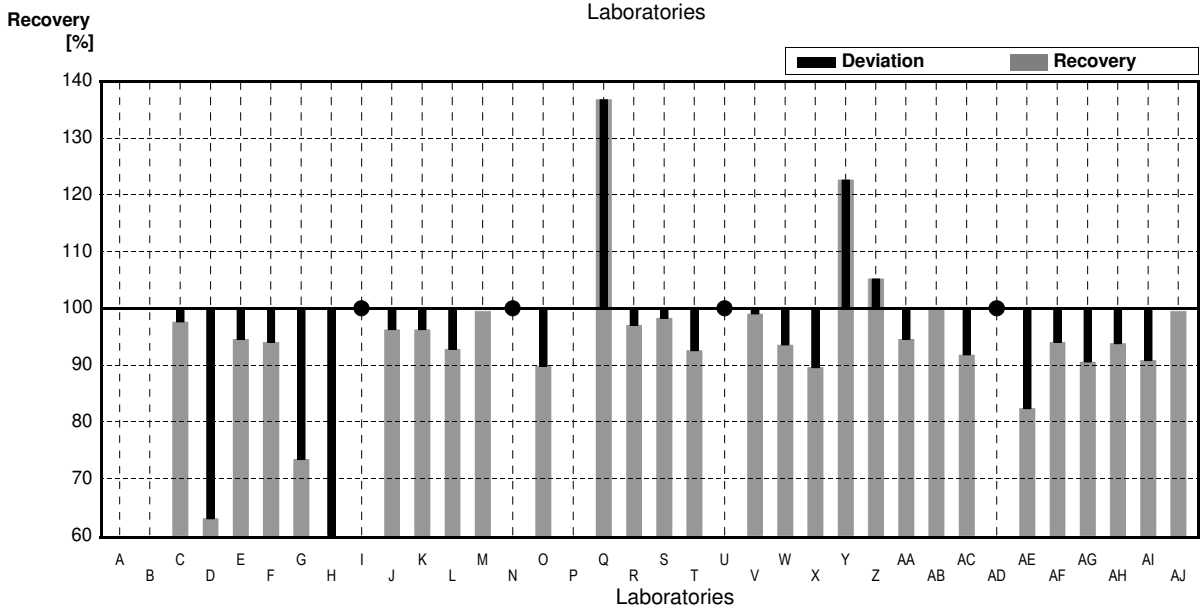
	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,72 ± 0,36	1,59 ± 0,08	µg/l
Recov. ± CI(99%)	101,1 ± 21,2	93,7 ± 4,7	%
SD between labs	0,69	0,14	µg/l
RSD between labs	40,1	8,5	%
n for calculation	28	23	

Sample M164B
Parameter Copper

Target value	± U (k=2)	4,02 µg/l	±	0,05 µg/l
IFA result	± U (k=2)	3,80 µg/l	±	0,20 µg/l
Stability test	± U (k=2)	4,14 µg/l	±	0,22 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	3,924	0,39	µg/l	98%	-0,31
D	2,53 *	0,38	µg/l	63%	-4,75
E	3,80	0,158	µg/l	95%	-0,70
F	3,78	0,21	µg/l	94%	-0,77
G	2,95 *	0,60	µg/l	73%	-3,41
H	2,388 *		µg/l	59%	-5,20
I	<20		µg/l	•	
J	3,87	0,58	µg/l	96%	-0,48
K	3,87	0,8	µg/l	96%	-0,48
L	3,73	1,12	µg/l	93%	-0,92
M	4,00	0,44	µg/l	100%	-0,06
N	<10		µg/l	•	
O	3,61	0,87	µg/l	90%	-1,31
P			µg/l		
Q	5,5 *	2,00	µg/l	137%	4,72
R	3,90	0,312	µg/l	97%	-0,38
S	3,95	0,0520	µg/l	98%	-0,22
T	3,72	0,24	µg/l	93%	-0,96
U	<10		µg/l	•	
V	3,98	0,51	µg/l	99%	-0,13
W	3,76	0,50	µg/l	94%	-0,83
X	3,60	0,36	µg/l	90%	-1,34
Y	4,93 *	0,99	µg/l	123%	2,90
Z	4,23	0,63	µg/l	105%	0,67
AA	3,80	0,68	µg/l	95%	-0,70
AB	4,01	0,06	µg/l	100%	-0,03
AC	3,69		µg/l	92%	-1,05
AD	<100		µg/l	•	
AE	3,31	0,59	µg/l	82%	-2,26
AF	3,78	0,12	µg/l	94%	-0,77
AG	3,64	0,55	µg/l	91%	-1,21
AH	3,77	1	µg/l	94%	-0,80
AI	3,65	0,73	µg/l	91%	-1,18
AJ	4,00	0,60	µg/l	100%	-0,06



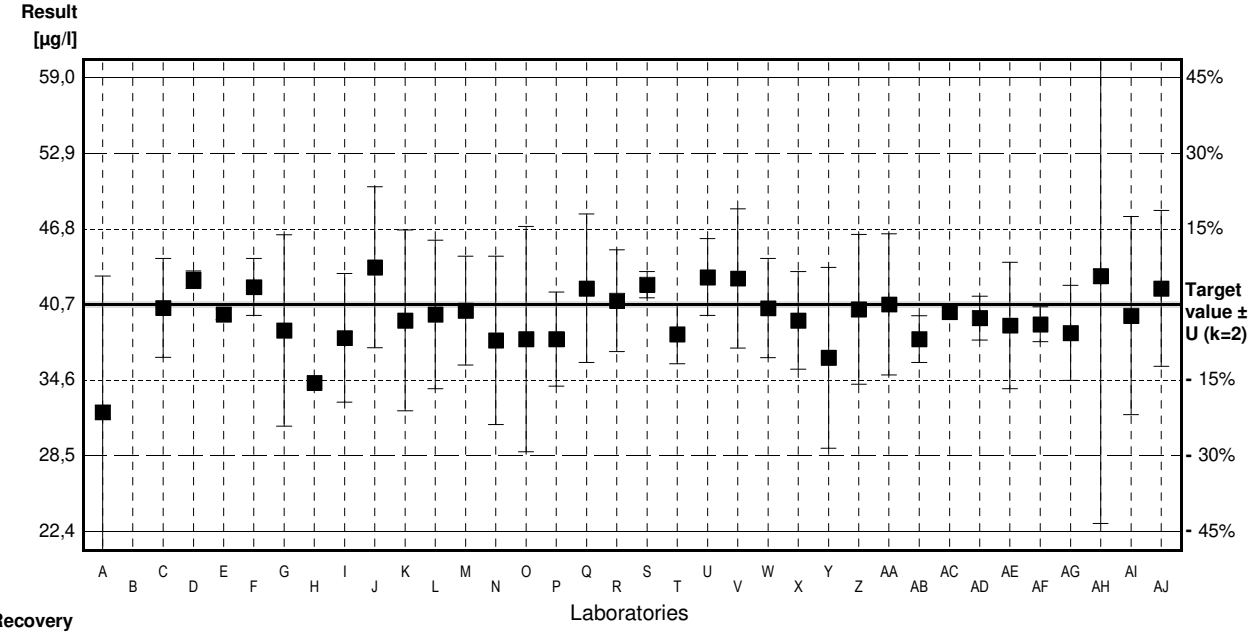


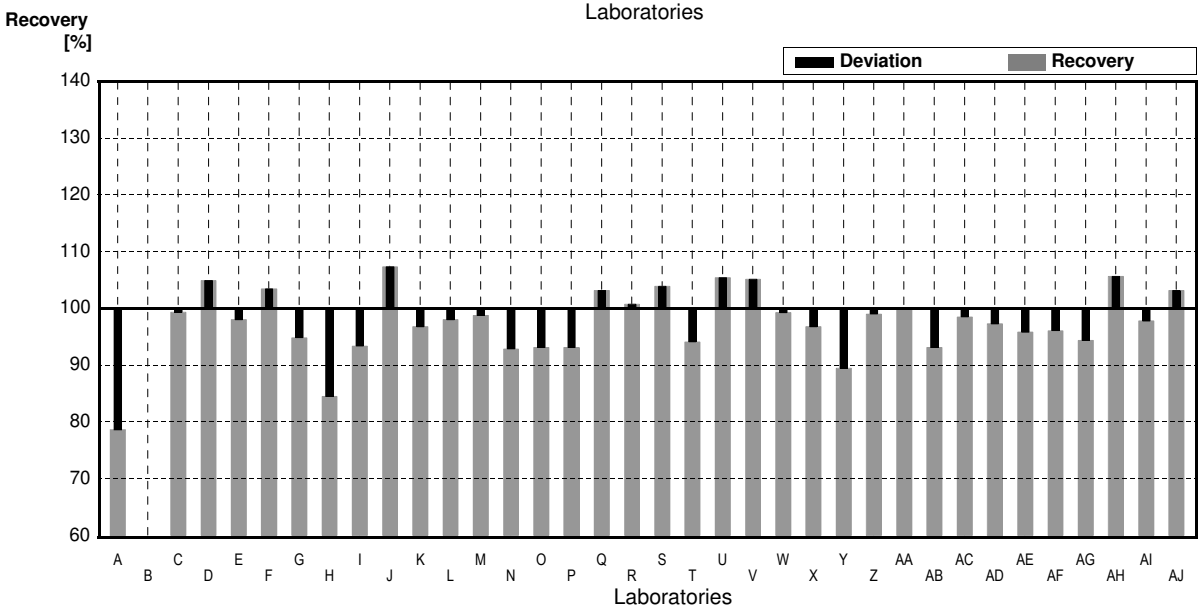
	All results	Outliers excl.	Unit
Mean ± CI(99%)	3,78 ± 0,30	3,81 ± 0,11	µg/l
Recov. ± CI(99%)	94,1 ± 7,3	94,7 ± 2,6	%
SD between labs	0,58	0,19	µg/l
RSD between labs	15,2	4,9	%
n for calculation	29	24	

Sample M164A
Parameter Manganese

Target value	± U (k=2)	40,7 µg/l	±	0,2 µg/l
IFA result	± U (k=2)	42,6 µg/l	±	2,9 µg/l
Stability test	± U (k=2)	41,8 µg/l	±	2,8 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	32,0 *	11	µg/l	79%	-3,96
B			µg/l		
C	40,42	4	µg/l	99%	-0,13
D	42,7	0,71	µg/l	105%	0,91
E	39,9	0,416	µg/l	98%	-0,36
F	42,1	2,3	µg/l	103%	0,64
G	38,6	7,72	µg/l	95%	-0,96
H	34,38		µg/l	84%	-2,88
I	38,0	5,2	µg/l	93%	-1,23
J	43,7	6,5	µg/l	107%	1,37
K	39,4	7,3	µg/l	97%	-0,59
L	39,9	6,0	µg/l	98%	-0,36
M	40,2	4,4	µg/l	99%	-0,23
N	37,8	6,8	µg/l	93%	-1,32
O	37,9	9,1	µg/l	93%	-1,27
P	37,9	3,8	µg/l	93%	-1,27
Q	42,0	6,0	µg/l	103%	0,59
R	41,0	4,10	µg/l	101%	0,14
S	42,3	1,06	µg/l	104%	0,73
T	38,3	2,4	µg/l	94%	-1,09
U	42,9	3,1	µg/l	105%	1,00
V	42,8	5,62	µg/l	105%	0,96
W	40,4	4,0	µg/l	99%	-0,14
X	39,4	3,94	µg/l	97%	-0,59
Y	36,4	7,3	µg/l	89%	-1,96
Z	40,3	6,04	µg/l	99%	-0,18
AA	40,71	5,70	µg/l	100%	0,00
AB	37,9	1,893	µg/l	93%	-1,27
AC	40,1		µg/l	99%	-0,27
AD	39,6	1,77	µg/l	97%	-0,50
AE	39,0	5,1	µg/l	96%	-0,77
AF	39,1	1,4	µg/l	96%	-0,73
AG	38,4	3,84	µg/l	94%	-1,05
AH	43,0	20	µg/l	106%	1,05
AI	39,8	8,0	µg/l	98%	-0,41
AJ	42,0	6,3	µg/l	103%	0,59



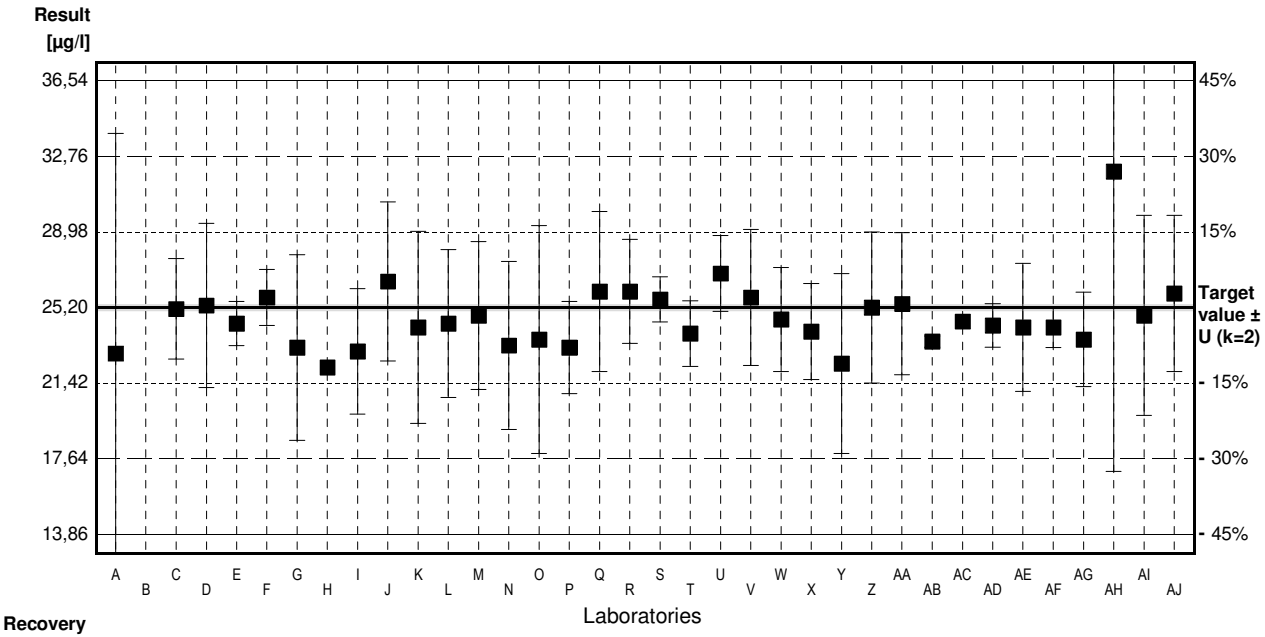


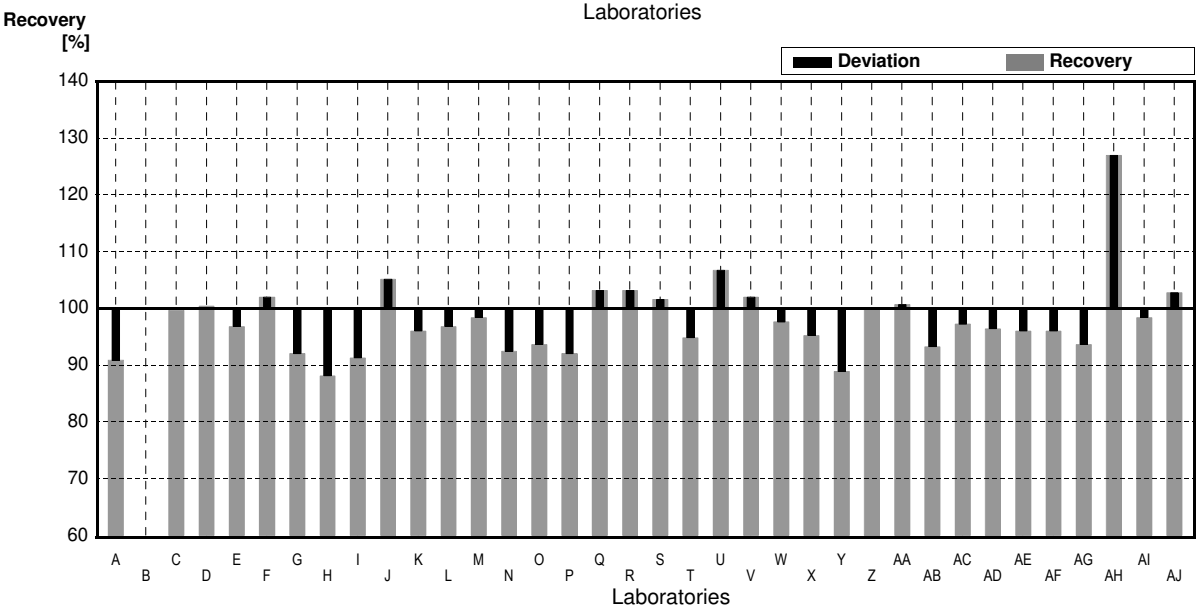
	All results	Outliers excl.	Unit
Mean ± CI(99%)	39,7 ± 1,1	40,0 ± 1,0	µg/l
Recov. ± CI(99%)	97,6 ± 2,8	98,2 ± 2,4	%
SD between labs	2,4	2,1	µg/l
RSD between labs	6,2	5,2	%
n for calculation	35	34	

Sample M164B
Parameter Manganese

Target value	± U (k=2)	25,20 µg/l	±	0,16 µg/l
IFA result	± U (k=2)	22,6 µg/l	±	1,5 µg/l
Stability test	± U (k=2)	26,2 µg/l	±	1,8 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	22,9	11	µg/l	91%	-1,69
B			µg/l		
C	25,126	2,51	µg/l	100%	-0,05
D	25,3	4,1	µg/l	100%	0,07
E	24,4	1,102	µg/l	97%	-0,59
F	25,7	1,4	µg/l	102%	0,37
G	23,2	4,64	µg/l	92%	-1,47
H	22,21		µg/l	88%	-2,20
I	23,0	3,13	µg/l	91%	-1,62
J	26,5	3,98	µg/l	105%	0,96
K	24,2	4,8	µg/l	96%	-0,73
L	24,4	3,7	µg/l	97%	-0,59
M	24,8	3,7	µg/l	98%	-0,29
N	23,3	4,20	µg/l	92%	-1,40
O	23,6	5,7	µg/l	94%	-1,18
P	23,2	2,3	µg/l	92%	-1,47
Q	26,0	4,00	µg/l	103%	0,59
R	26,0	2,60	µg/l	103%	0,59
S	25,6	1,13	µg/l	102%	0,29
T	23,9	1,64	µg/l	95%	-0,96
U	26,9	1,9	µg/l	107%	1,25
V	25,7	3,4	µg/l	102%	0,37
W	24,6	2,6	µg/l	98%	-0,44
X	24,0	2,4	µg/l	95%	-0,88
Y	22,4	4,5	µg/l	89%	-2,06
Z	25,2	3,78	µg/l	100%	0,00
AA	25,38	3,55	µg/l	101%	0,13
AB	23,5	0,28	µg/l	93%	-1,25
AC	24,5		µg/l	97%	-0,51
AD	24,3	1,09	µg/l	96%	-0,66
AE	24,2	3,2	µg/l	96%	-0,73
AF	24,2	1,0	µg/l	96%	-0,73
AG	23,6	2,36	µg/l	94%	-1,18
AH	32,0 *	15	µg/l	127%	5,00
AI	24,8	5,0	µg/l	98%	-0,29
AJ	25,9	3,9	µg/l	103%	0,51



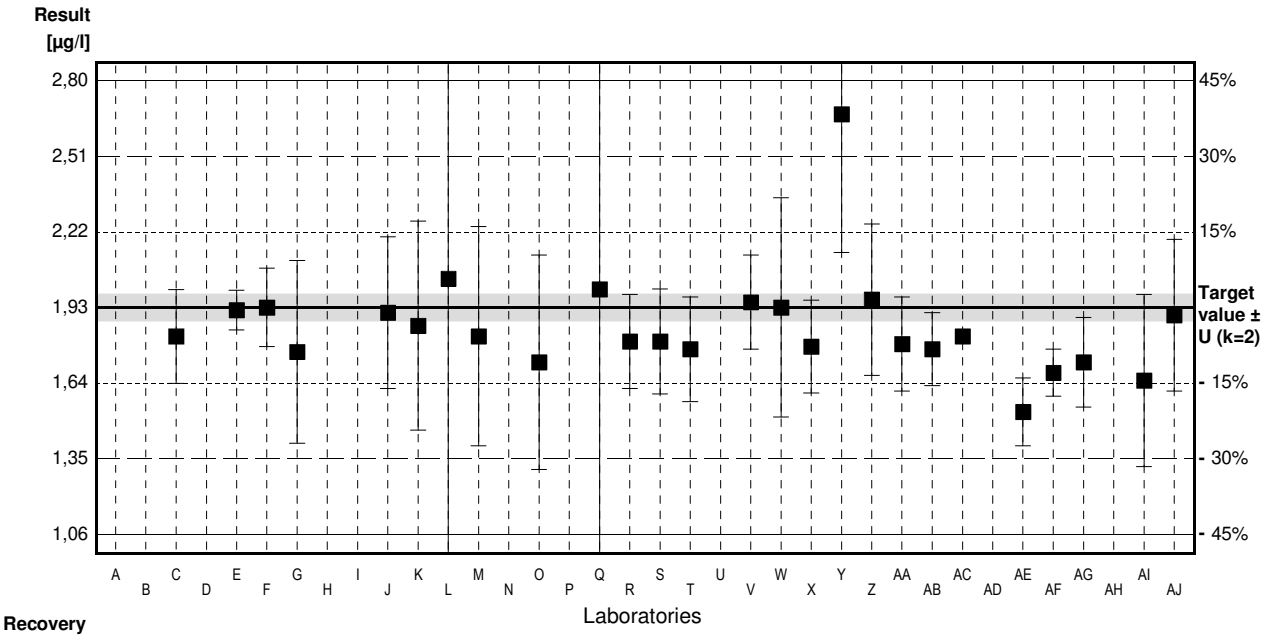


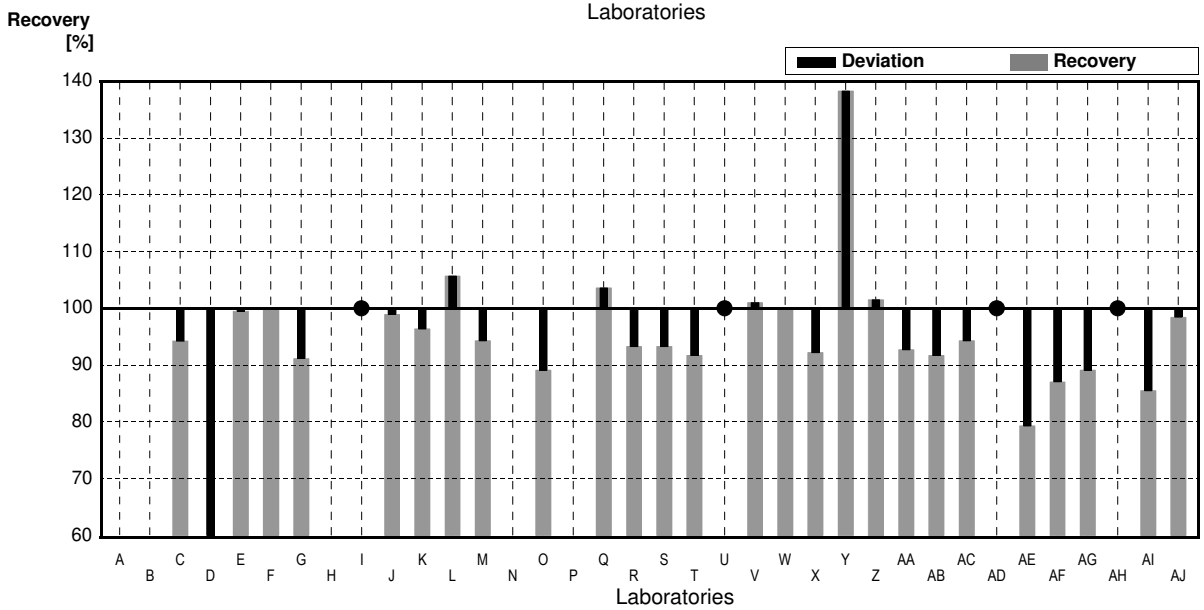
	All results	Outliers excl.	Unit
Mean ± CI(99%)	24,70 ± 0,79	24,49 ± 0,55	µg/l
Recov. ± CI(99%)	98,0 ± 3,1	97,2 ± 2,2	%
SD between labs	1,72	1,18	µg/l
RSD between labs	7,0	4,8	%
n for calculation	35	34	

Sample M164A
Parameter Nickel

Target value ± U (k=2)	1,93 µg/l	±	0,05 µg/l
IFA result ± U (k=2)	1,98 µg/l	±	0,12 µg/l
Stability test ± U (k=2)	1,88 µg/l	±	0,12 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	1,819	0,18	µg/l	94%	-0,77
D	0,68 *	0,28	µg/l	35%	-8,64
E	1,92	0,076	µg/l	99%	-0,07
F	1,93	0,15	µg/l	100%	0,00
G	1,76	0,35	µg/l	91%	-1,17
H			µg/l		
I	<30		µg/l	•	
J	1,91	0,29	µg/l	99%	-0,14
K	1,86	0,4	µg/l	96%	-0,48
L	2,04	1,02	µg/l	106%	0,76
M	1,82	0,42	µg/l	94%	-0,76
N			µg/l		
O	1,72	0,41	µg/l	89%	-1,45
P			µg/l		
Q	2,00	1,00	µg/l	104%	0,48
R	1,80	0,180	µg/l	93%	-0,90
S	1,80	0,201	µg/l	93%	-0,90
T	1,77	0,2	µg/l	92%	-1,11
U	<2		µg/l	•	
V	1,95	0,18	µg/l	101%	0,14
W	1,93	0,42	µg/l	100%	0,00
X	1,78	0,178	µg/l	92%	-1,04
Y	2,67 *	0,53	µg/l	138%	5,11
Z	1,96	0,29	µg/l	102%	0,21
AA	1,79	0,18	µg/l	93%	-0,97
AB	1,77	0,14	µg/l	92%	-1,11
AC	1,82		µg/l	94%	-0,76
AD	<5		µg/l	•	
AE	1,53	0,13	µg/l	79%	-2,76
AF	1,68	0,09	µg/l	87%	-1,73
AG	1,72	0,172	µg/l	89%	-1,45
AH	<2		µg/l	•	
AI	1,65	0,33	µg/l	85%	-1,93
AJ	1,90	0,29	µg/l	98%	-0,21



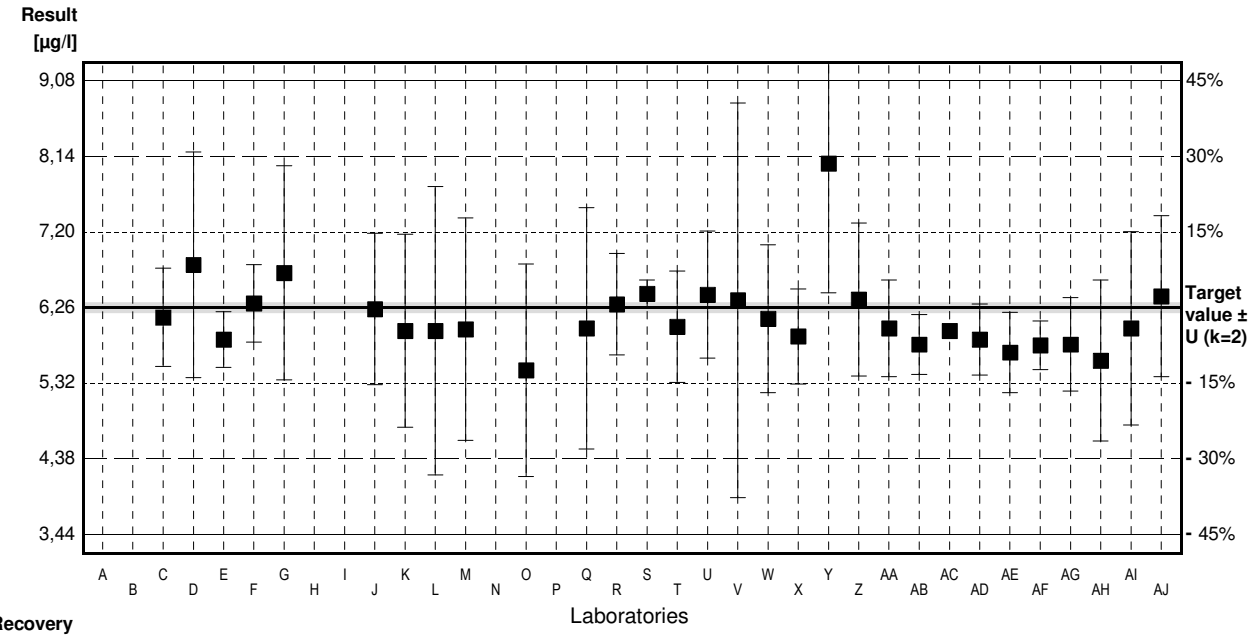


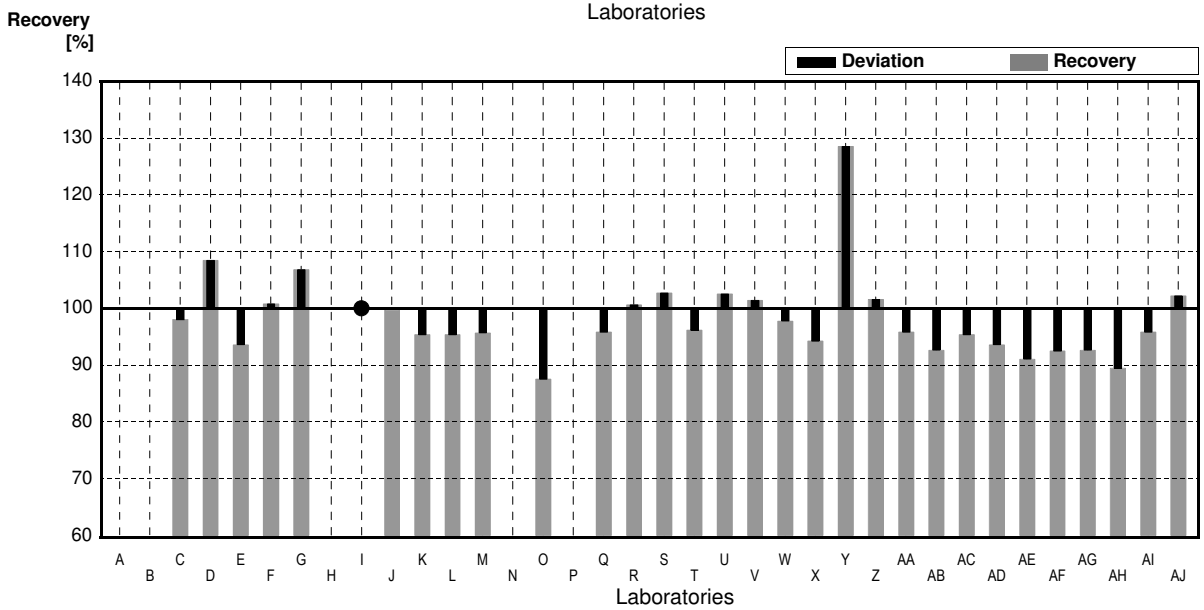
	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,81 ± 0,16	1,83 ± 0,07	µg/l
Recov. ± CI(99%)	94,0 ± 8,3	94,6 ± 3,4	%
SD between labs	0,30	0,12	µg/l
RSD between labs	16,6	6,4	%
n for calculation	27	25	

Sample M164B
Parameter Nickel

Target value ± U (k=2)	6,26 µg/l	±	0,06 µg/l
IFA result ± U (k=2)	6,1 µg/l	±	0,2 µg/l
Stability test ± U (k=2)	6,4 µg/l	±	0,2 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	6.137	0.61	µg/l	98%	-0.26
D	6.79	1.4	µg/l	108%	1.13
E	5.86	0.346	µg/l	94%	-0.85
F	6.31	0.48	µg/l	101%	0.11
G	6.69	1.33	µg/l	107%	0.92
H			µg/l		
I	<30		µg/l	•	
J	6.24	0.94	µg/l	100%	-0.04
K	5.97	1.2	µg/l	95%	-0.62
L	5.97	1.79	µg/l	95%	-0.62
M	5.99	1.38	µg/l	96%	-0.58
N			µg/l		
O	5.48	1.32	µg/l	88%	-1.66
P			µg/l		
Q	6.0	1.50	µg/l	96%	-0.55
R	6.30	0.63	µg/l	101%	0.09
S	6.43	0.171	µg/l	103%	0.36
T	6.02	0.69	µg/l	96%	-0.51
U	6.42	0.79	µg/l	103%	0.34
V	6.35	2.45	µg/l	101%	0.19
W	6.12	0.92	µg/l	98%	-0.30
X	5.90	0.59	µg/l	94%	-0.77
Y	8.05 *	1.61	µg/l	129%	3.81
Z	6.36	0.95	µg/l	102%	0.21
AA	6.00	0.60	µg/l	96%	-0.55
AB	5.8	0.37	µg/l	93%	-0.98
AC	5.97		µg/l	95%	-0.62
AD	5.86	0.44	µg/l	94%	-0.85
AE	5.7	0.5	µg/l	91%	-1.19
AF	5.79	0.30	µg/l	92%	-1.00
AG	5.8	0.58	µg/l	93%	-0.98
AH	5.6	1	µg/l	89%	-1.41
AI	6.00	1.2	µg/l	96%	-0.55
AJ	6.4	1.0	µg/l	102%	0.30



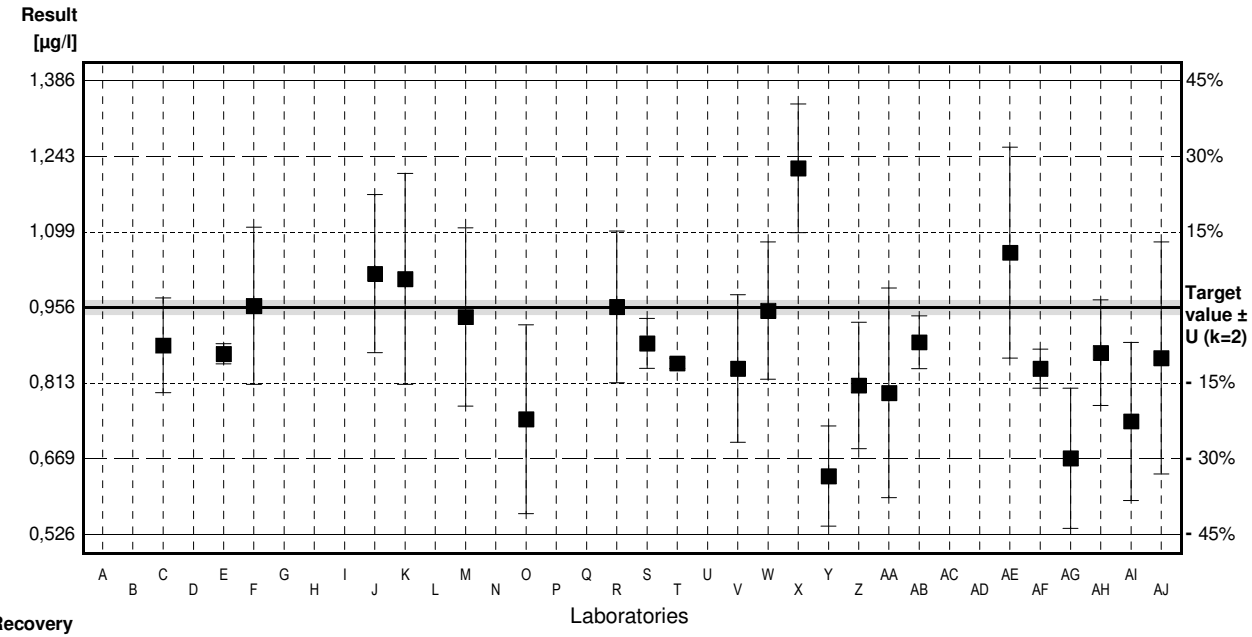


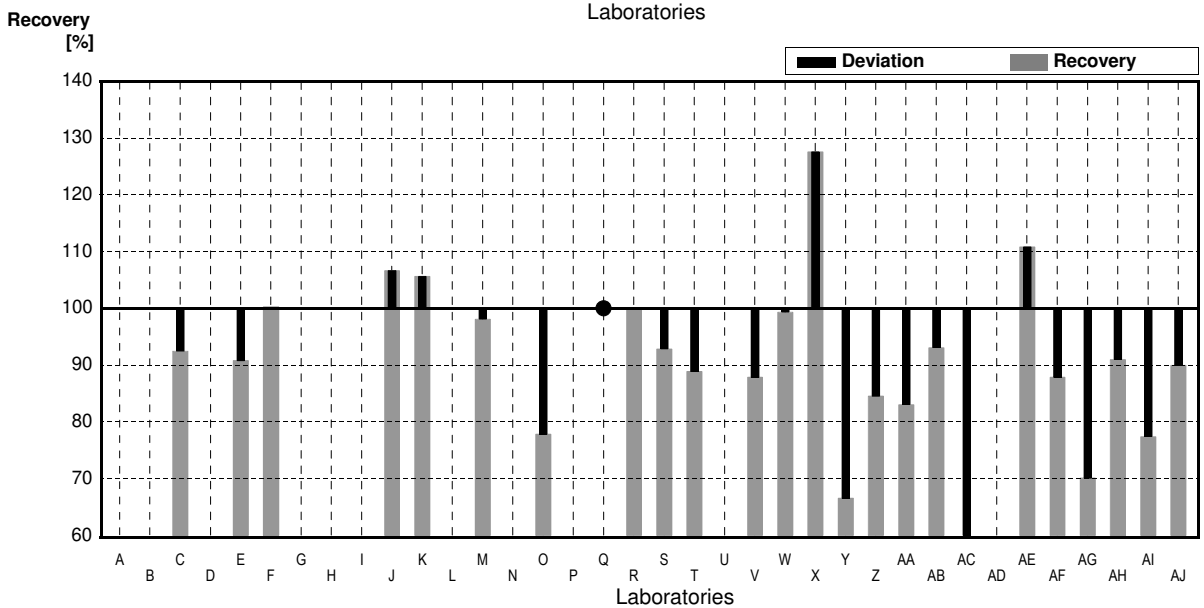
	All results	Outliers excl.	Unit
Mean ± CI(99%)	6,14 ± 0,24	6,08 ± 0,16	µg/l
Recov. ± CI(99%)	98,1 ± 3,8	97,1 ± 2,5	%
SD between labs	0,47	0,31	µg/l
RSD between labs	7,7	5,1	%
n for calculation	30	29	

Sample M164A
Parameter Mercury

Target value ± U (k=2)	0,956 µg/l	±	0,013 µg/l
IFA result ± U (k=2)	0,97 µg/l	±	0,18 µg/l
Stability test ± U (k=2)	0,90 µg/l	±	0,17 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	0,884	0,09	µg/l	92%	-0,68
D			µg/l		
E	0,868	0,019	µg/l	91%	-0,84
F	0,959	0,149	µg/l	100%	0,03
G			µg/l		
H			µg/l		
I			µg/l		
J	1,02	0,15	µg/l	107%	0,61
K	1,01	0,2	µg/l	106%	0,51
L			µg/l		
M	0,938	0,169	µg/l	98%	-0,17
N			µg/l		
O	0,744	0,179	µg/l	78%	-2,02
P			µg/l		
Q	<1,00	1,00	µg/l	•	
R	0,957	0,144	µg/l	100%	0,01
S	0,888	0,0474	µg/l	93%	-0,65
T	0,85	0,01	µg/l	89%	-1,01
U			µg/l		
V	0,84	0,14	µg/l	88%	-1,10
W	0,95	0,13	µg/l	99%	-0,06
X	1,22	0,122	µg/l	128%	2,51
Y	0,636	0,095	µg/l	67%	-3,04
Z	0,808	0,12	µg/l	85%	-1,41
AA	0,794	0,199	µg/l	83%	-1,54
AB	0,89	0,05	µg/l	93%	-0,63
AC	0,513		µg/l	54%	-4,21
AD			µg/l		
AE	1,06	0,20	µg/l	111%	0,99
AF	0,840	0,037	µg/l	88%	-1,10
AG	0,67	0,133	µg/l	70%	-2,72
AH	0,87	0,1	µg/l	91%	-0,82
AI	0,740	0,15	µg/l	77%	-2,05
AJ	0,86	0,22	µg/l	90%	-0,91



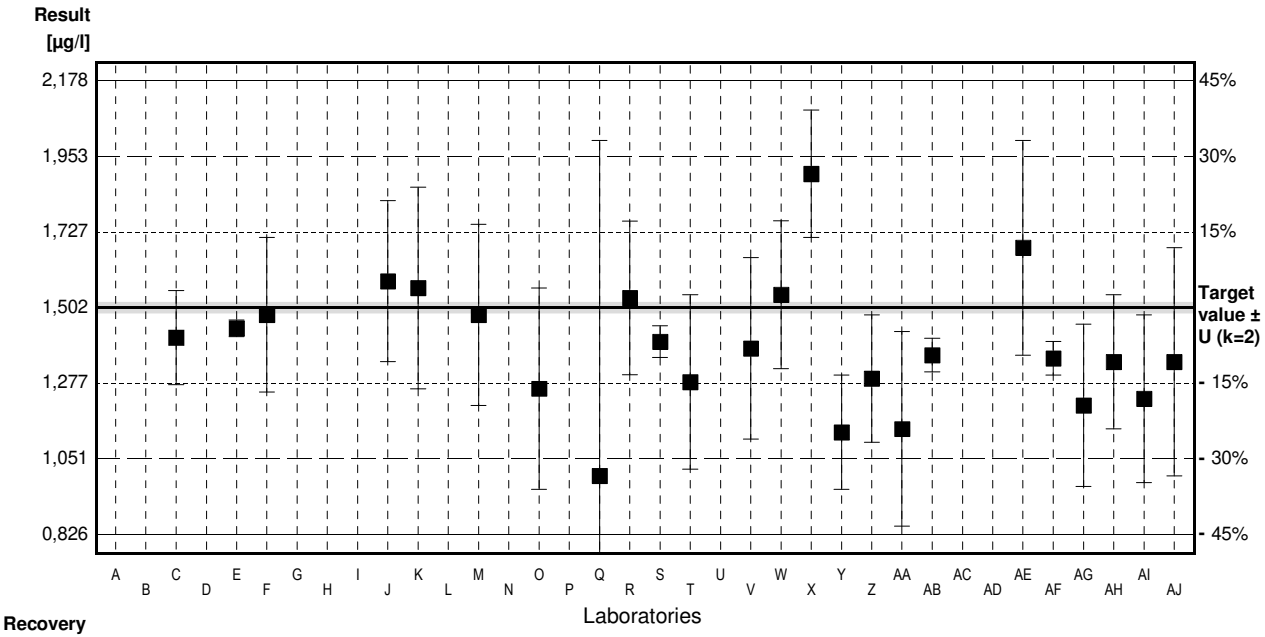


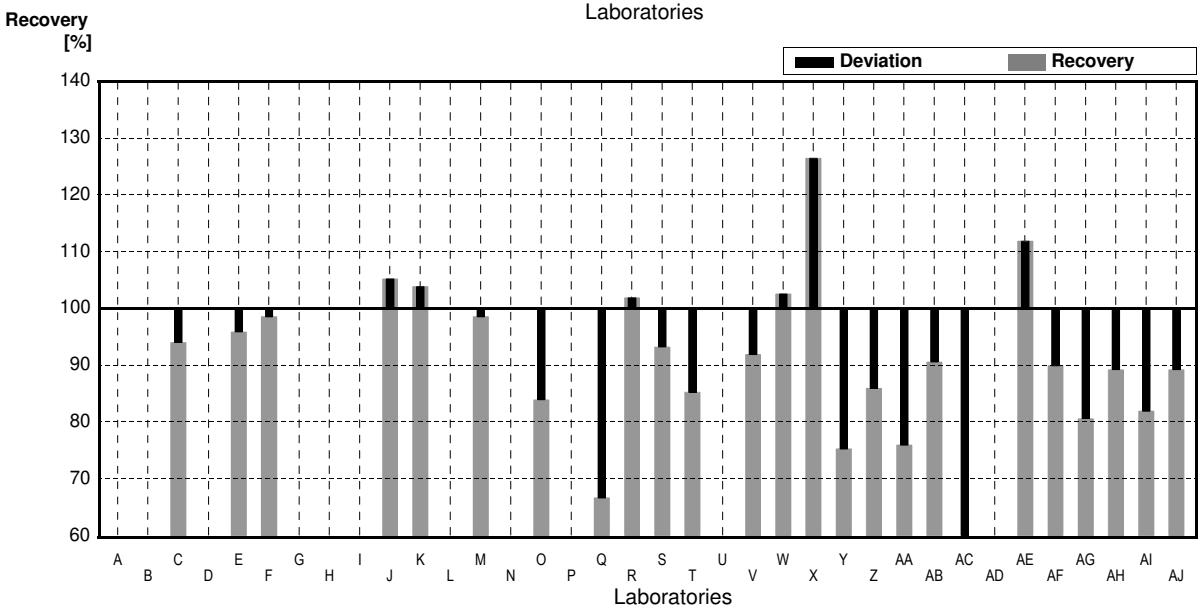
	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,867 ± 0,084	0,867 ± 0,084	µg/l
Recov. ± CI(99%)	90,7 ± 8,8	90,7 ± 8,8	%
SD between labs	0,147	0,147	µg/l
RSD between labs	16,9	16,9	%
n for calculation	24	24	

Sample M164B
Parameter Mercury

Target value ± U (k=2)	1,502 µg/l	±	0,016 µg/l
IFA result ± U (k=2)	1,34 µg/l	±	0,25 µg/l
Stability test ± U (k=2)	1,56 µg/l	±	0,29 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	1,412	0,14	µg/l	94%	-0,54
D			µg/l		
E	1,44	0,025	µg/l	96%	-0,38
F	1,48	0,23	µg/l	99%	-0,13
G			µg/l		
H			µg/l		
I			µg/l		
J	1,58	0,24	µg/l	105%	0,47
K	1,56	0,3	µg/l	104%	0,35
L			µg/l		
M	1,48	0,27	µg/l	99%	-0,13
N			µg/l		
O	1,26	0,30	µg/l	84%	-1,46
P			µg/l		
Q	1,00	1,00	µg/l	67%	-3,04
R	1,53	0,229	µg/l	102%	0,17
S	1,40	0,0475	µg/l	93%	-0,62
T	1,28	0,26	µg/l	85%	-1,34
U			µg/l		
V	1,38	0,27	µg/l	92%	-0,74
W	1,54	0,22	µg/l	103%	0,23
X	1,90	0,19	µg/l	126%	2,41
Y	1,13	0,17	µg/l	75%	-2,25
Z	1,29	0,19	µg/l	86%	-1,28
AA	1,14	0,29	µg/l	76%	-2,19
AB	1,36	0,05	µg/l	91%	-0,86
AC	0,815		µg/l	54%	-4,16
AD			µg/l		
AE	1,68	0,32	µg/l	112%	1,08
AF	1,35	0,05	µg/l	90%	-0,92
AG	1,21	0,242	µg/l	81%	-1,77
AH	1,34	0,2	µg/l	89%	-0,98
AI	1,23	0,25	µg/l	82%	-1,65
AJ	1,34	0,34	µg/l	89%	-0,98



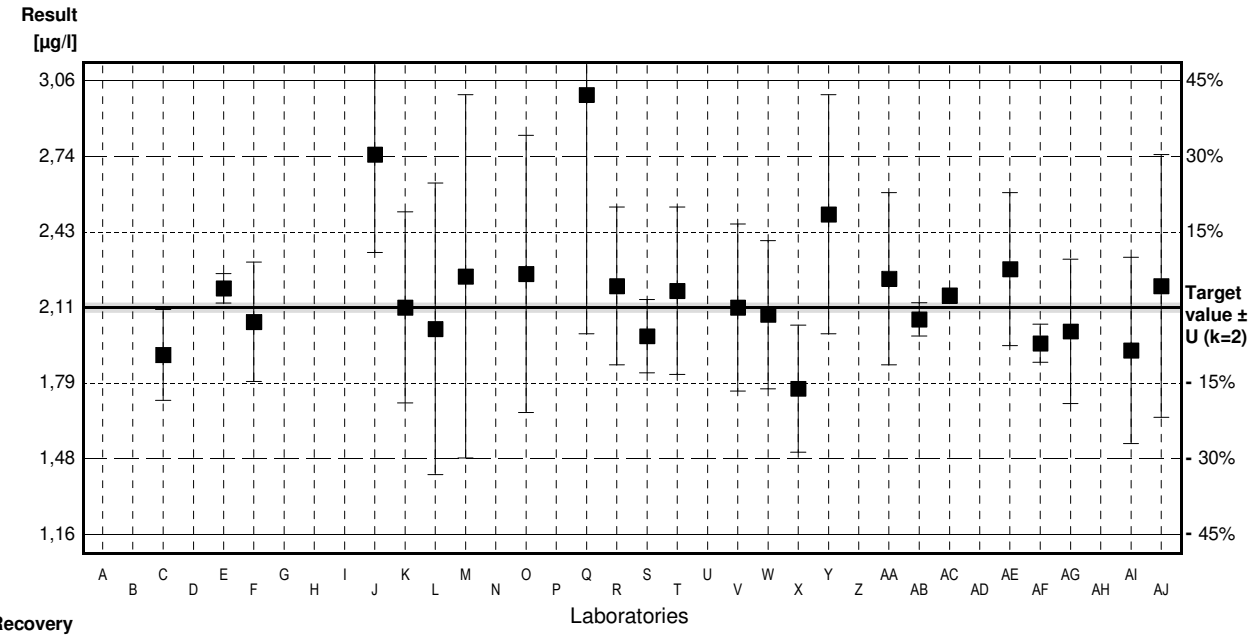


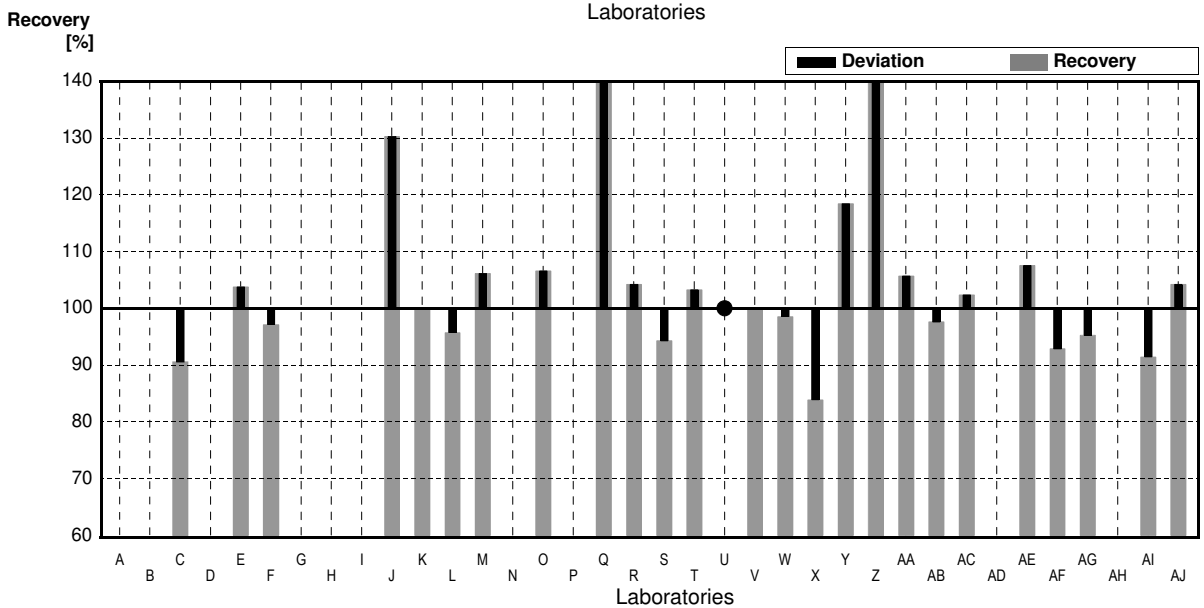
	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,365 ± 0,124	1,365 ± 0,124	µg/l
Recov. ± CI(99%)	90,9 ± 8,2	90,9 ± 8,2	%
SD between labs	0,221	0,221	µg/l
RSD between labs	16,2	16,2	%
n for calculation	25	25	

Sample M164A
Parameter Selenium

Target value ± U (k=2)	2,11 µg/l	±	0,02 µg/l
IFA result ± U (k=2)	2,34 µg/l	±	0,28 µg/l
Stability test ± U (k=2)	1,98 µg/l	±	0,23 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	1,911	0,19	µg/l	91%	-0,94
D			µg/l		
E	2,19	0,061	µg/l	104%	0,38
F	2,05	0,25	µg/l	97%	-0,28
G			µg/l		
H			µg/l		
I			µg/l		
J	2,75 *	0,41	µg/l	130%	3,03
K	2,11	0,4	µg/l	100%	0,00
L	2,02	0,61	µg/l	96%	-0,43
M	2,24	0,76	µg/l	106%	0,62
N			µg/l		
O	2,25	0,58	µg/l	107%	0,66
P			µg/l		
Q	3,00 *	1,00	µg/l	142%	4,22
R	2,20	0,330	µg/l	104%	0,43
S	1,99	0,153	µg/l	94%	-0,57
T	2,18	0,35	µg/l	103%	0,33
U	<5		µg/l	•	
V	2,11	0,35	µg/l	100%	0,00
W	2,08	0,31	µg/l	99%	-0,14
X	1,77	0,266	µg/l	84%	-1,61
Y	2,50	0,50	µg/l	118%	1,85
Z	3,73 *	0,56	µg/l	177%	7,68
AA	2,23	0,36	µg/l	106%	0,57
AB	2,06	0,07	µg/l	98%	-0,24
AC	2,16		µg/l	102%	0,24
AD			µg/l		
AE	2,27	0,32	µg/l	108%	0,76
AF	1,96	0,08	µg/l	93%	-0,71
AG	2,01	0,302	µg/l	95%	-0,47
AH			µg/l		
AI	1,93	0,39	µg/l	91%	-0,85
AJ	2,20	0,55	µg/l	104%	0,43



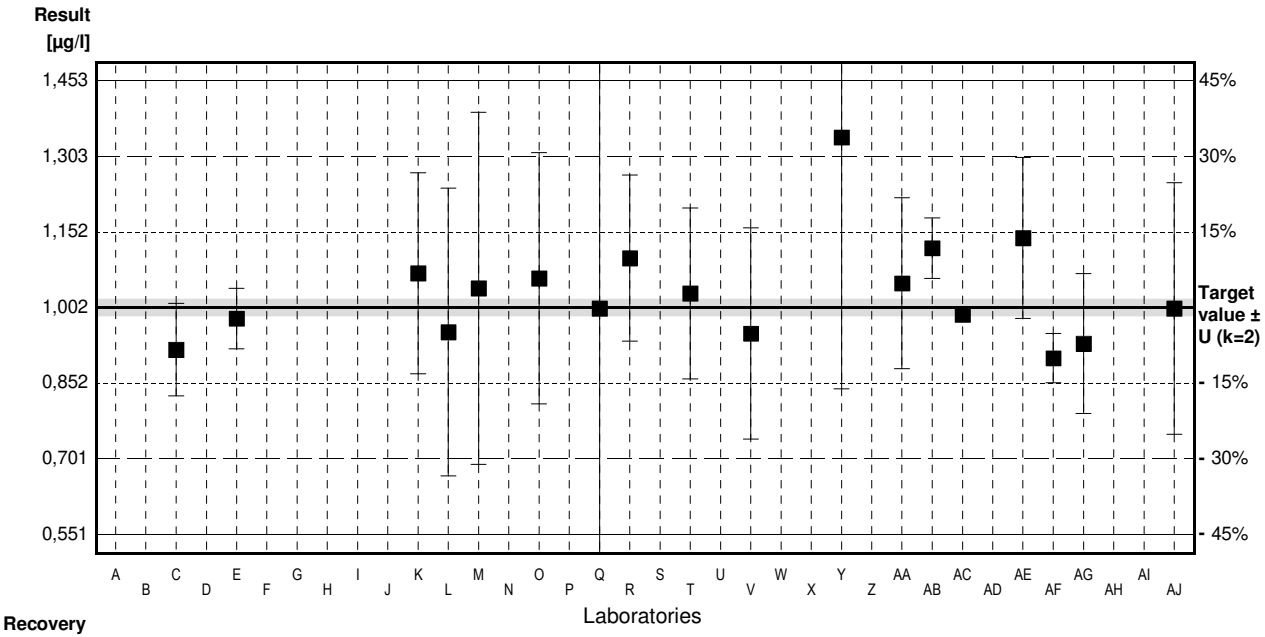


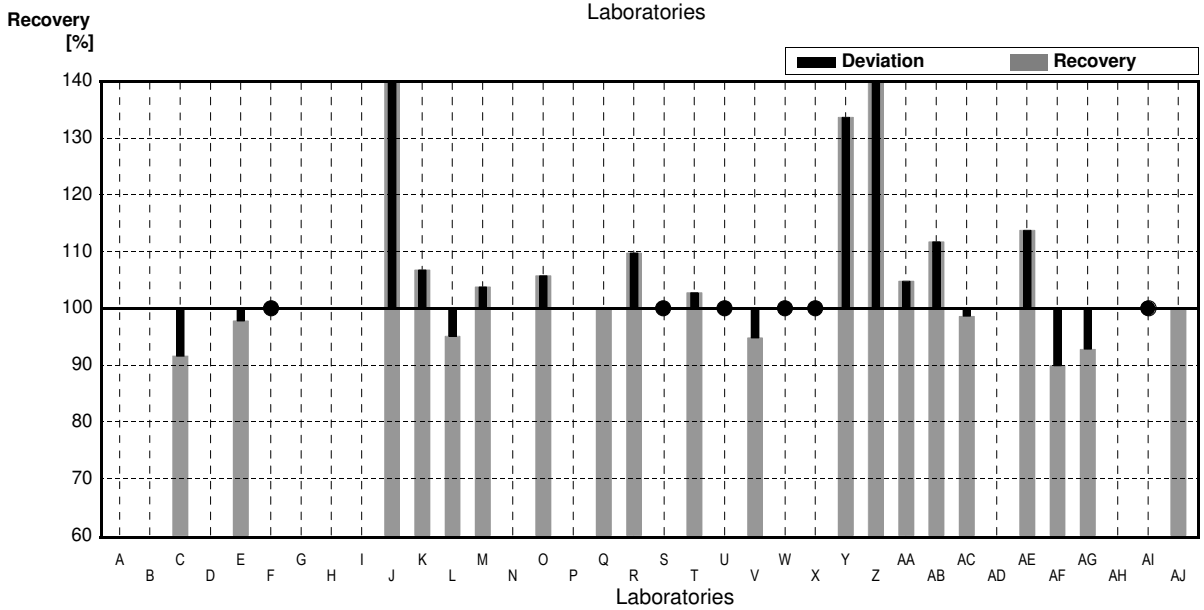
	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,24 ± 0,23	2,11 ± 0,09	µg/l
Recov. ± CI(99%)	106,0 ± 10,7	100,0 ± 4,4	%
SD between labs	0,41	0,16	µg/l
RSD between labs	18,1	7,4	%
n for calculation	25	22	

Sample M164B
Parameter Selenium

Target value	± U (k=2)	1,002 µg/l	±	0,017 µg/l
IFA result	± U (k=2)	0,92 µg/l	±	0,12 µg/l
Stability test	± U (k=2)	0,97 µg/l	±	0,12 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	0,918	0,092	µg/l	92%	-0,84
D			µg/l		
E	0,980	0,060	µg/l	98%	-0,22
F	<1		µg/l	•	
G			µg/l		
H			µg/l		
I			µg/l		
J	1,76 *	0,26	µg/l	176%	7,56
K	1,07	0,2	µg/l	107%	0,68
L	0,953	0,286	µg/l	95%	-0,49
M	1,04	0,35	µg/l	104%	0,38
N			µg/l		
O	1,06	0,25	µg/l	106%	0,58
P			µg/l		
Q	1,00	1,00	µg/l	100%	-0,02
R	1,10	0,165	µg/l	110%	0,98
S	<1		µg/l	•	
T	1,03	0,17	µg/l	103%	0,28
U	<5		µg/l	•	
V	0,95	0,21	µg/l	95%	-0,52
W	<2,0		µg/l	•	
X	<1,0		µg/l	•	
Y	1,34	0,50	µg/l	134%	3,37
Z	1,87 *	0,28	µg/l	187%	8,66
AA	1,05	0,17	µg/l	105%	0,48
AB	1,12	0,06	µg/l	112%	1,18
AC	0,988		µg/l	99%	-0,14
AD			µg/l		
AE	1,14	0,16	µg/l	114%	1,38
AF	0,901	0,049	µg/l	90%	-1,01
AG	0,93	0,139	µg/l	93%	-0,72
AH			µg/l		
AI	<1		µg/l	•	
AJ	1,00	0,25	µg/l	100%	-0,02



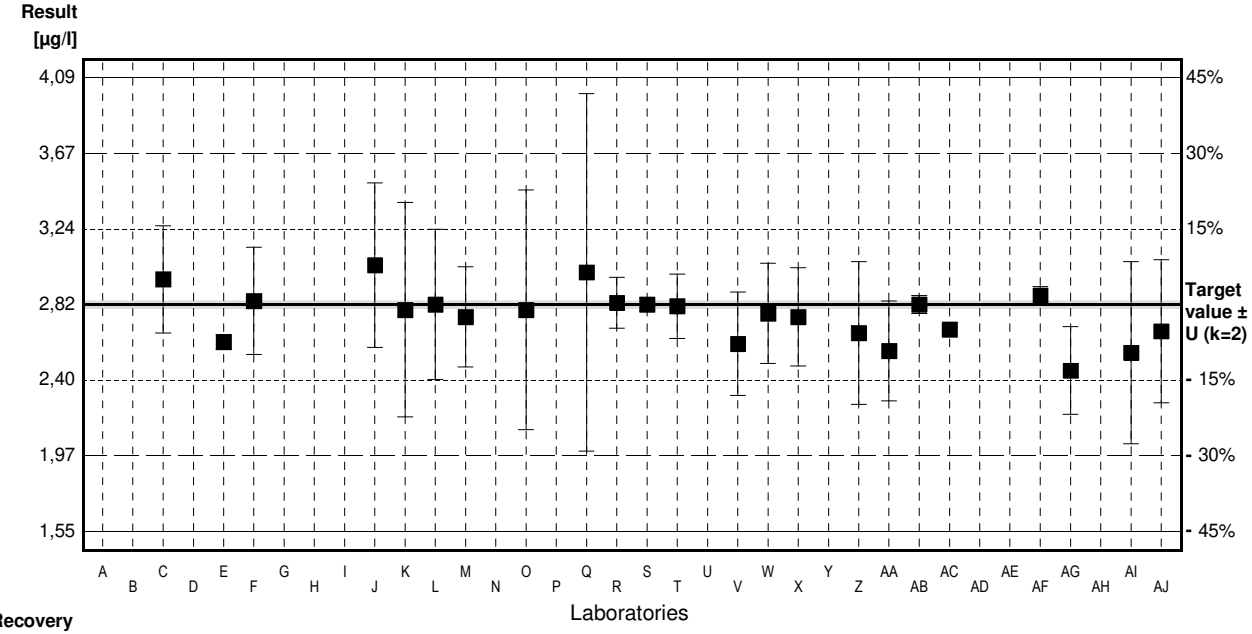


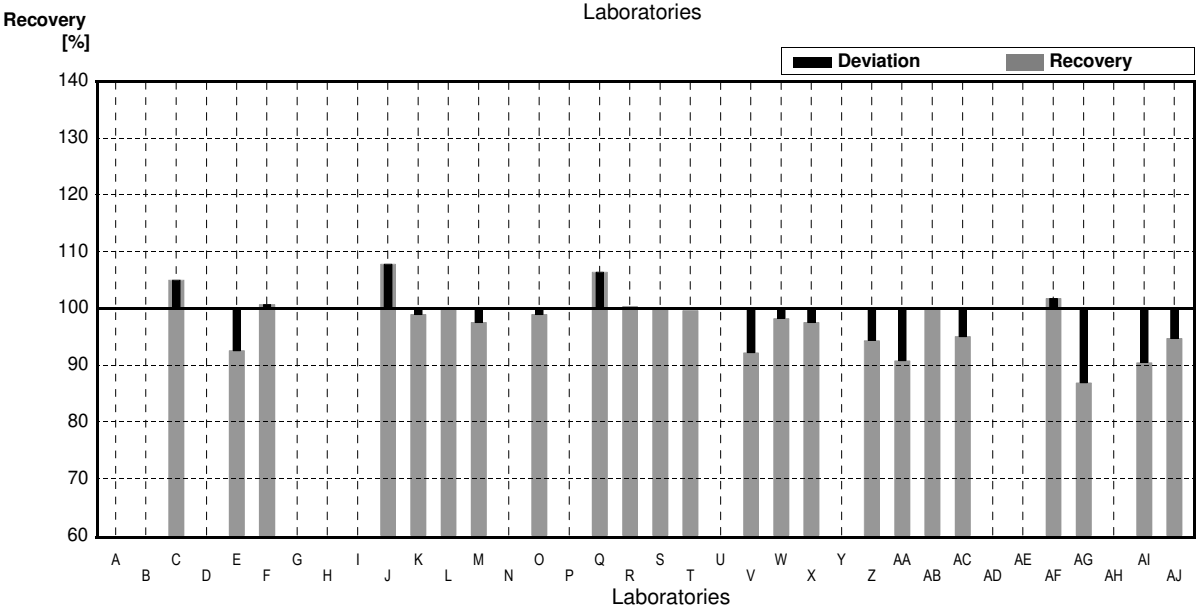
	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,110 ± 0,167	1,032 ± 0,071	µg/l
Recov. ± CI(99%)	110,8 ± 16,6	103,0 ± 7,1	%
SD between labs	0,261	0,103	µg/l
RSD between labs	23,5	10,0	%
n for calculation	20	18	

Sample M164A
Parameter Uranium

Target value	± U (k=2)	2,82 µg/l	±	0,02 µg/l
IFA result	± U (k=2)	2,63 µg/l	±	0,30 µg/l
Stability test	± U (k=2)	2,76 µg/l	±	0,31 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	2,961	0,3	µg/l	105%	0,89
D			µg/l		
E	2,61	0,042	µg/l	93%	-1,33
F	2,84	0,30	µg/l	101%	0,13
G			µg/l		
H			µg/l		
I			µg/l		
J	3,04	0,46	µg/l	108%	1,39
K	2,79	0,6	µg/l	99%	-0,19
L	2,82	0,42	µg/l	100%	0,00
M	2,75	0,28	µg/l	98%	-0,44
N			µg/l		
O	2,79	0,67	µg/l	99%	-0,19
P			µg/l		
Q	3,00	1,00	µg/l	106%	1,14
R	2,83	0,142	µg/l	100%	0,06
S	2,82	0,0368	µg/l	100%	0,00
T	2,81	0,18	µg/l	100%	-0,06
U			µg/l		
V	2,60	0,29	µg/l	92%	-1,39
W	2,77	0,28	µg/l	98%	-0,32
X	2,75	0,275	µg/l	98%	-0,44
Y			µg/l		
Z	2,66	0,4	µg/l	94%	-1,01
AA	2,56	0,28	µg/l	91%	-1,65
AB	2,82	0,05	µg/l	100%	0,00
AC	2,68		µg/l	95%	-0,89
AD			µg/l		
AE			µg/l		
AF	2,87	0,05	µg/l	102%	0,32
AG	2,45	0,245	µg/l	87%	-2,34
AH			µg/l		
AI	2,55	0,51	µg/l	90%	-1,71
AJ	2,67	0,40	µg/l	95%	-0,95



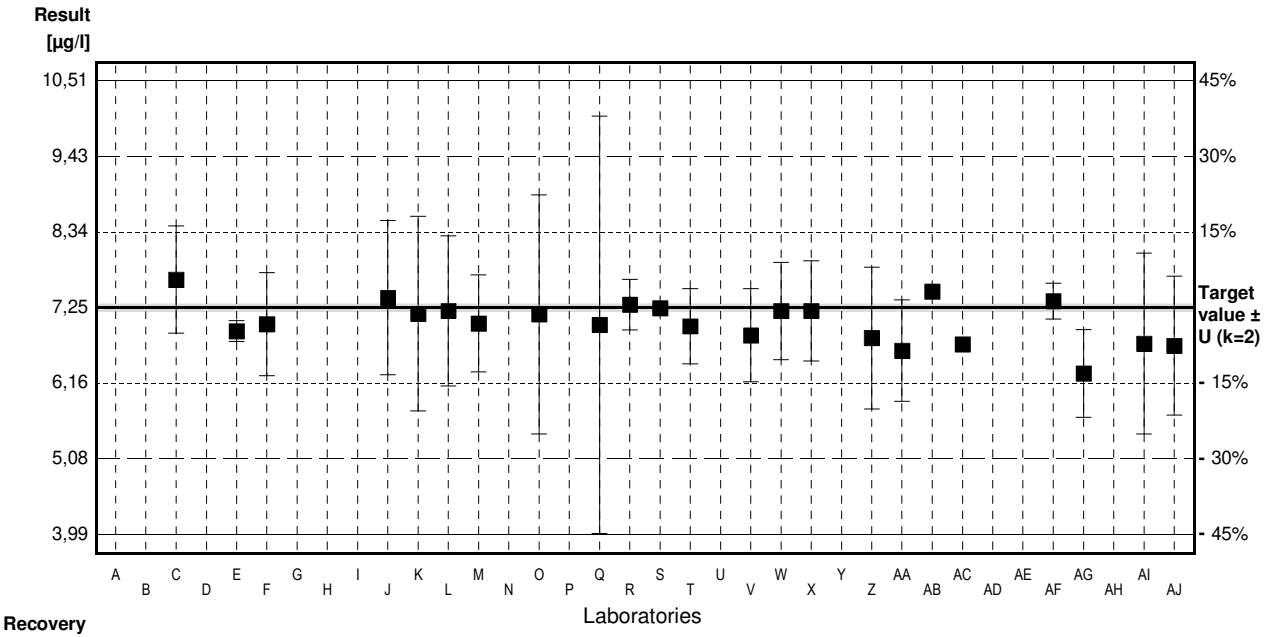


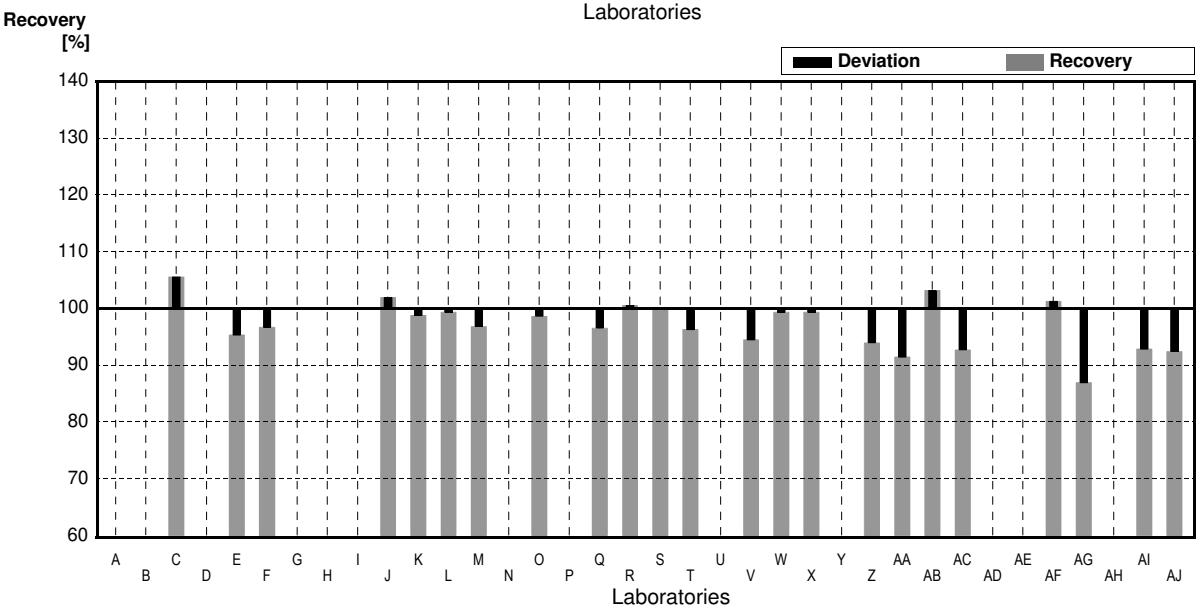
	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,76 ± 0,09	2,76 ± 0,09	µg/l
Recov. ± CI(99%)	97,8 ± 3,0	97,8 ± 3,0	%
SD between labs	0,15	0,15	µg/l
RSD between labs	5,3	5,3	%
n for calculation	23	23	

Sample M164B
Parameter Uranium

Target value ± U (k=2)	7,25 µg/l	±	0,05 µg/l
IFA result ± U (k=2)	6,8 µg/l	±	0,8 µg/l
Stability test ± U (k=2)	6,9 µg/l	±	0,8 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	7.651	0.77	µg/l	106%	0.99
D			µg/l		
E	6.91	0.150	µg/l	95%	-0.84
F	7.01	0.74	µg/l	97%	-0.59
G			µg/l		
H			µg/l		
I			µg/l		
J	7.39	1.11	µg/l	102%	0.34
K	7.16	1.4	µg/l	99%	-0.22
L	7.20	1.08	µg/l	99%	-0.12
M	7.02	0.70	µg/l	97%	-0.57
N			µg/l		
O	7.15	1.72	µg/l	99%	-0.25
P			µg/l		
Q	7.0	3.00	µg/l	97%	-0.62
R	7.29	0.365	µg/l	101%	0.10
S	7.24	0.0359	µg/l	100%	-0.02
T	6.98	0.54	µg/l	96%	-0.67
U			µg/l		
V	6.85	0.67	µg/l	94%	-0.99
W	7.2	0.7	µg/l	99%	-0.12
X	7.2	0.72	µg/l	99%	-0.12
Y			µg/l		
Z	6.81	1.02	µg/l	94%	-1.08
AA	6.63	0.73	µg/l	91%	-1.53
AB	7.48	0.06	µg/l	103%	0.57
AC	6.72		µg/l	93%	-1.31
AD			µg/l		
AE			µg/l		
AF	7.34	0.26	µg/l	101%	0.22
AG	6.3	0.63	µg/l	87%	-2.34
AH			µg/l		
AI	6.73	1.3	µg/l	93%	-1.28
AJ	6.7	1.0	µg/l	92%	-1.35



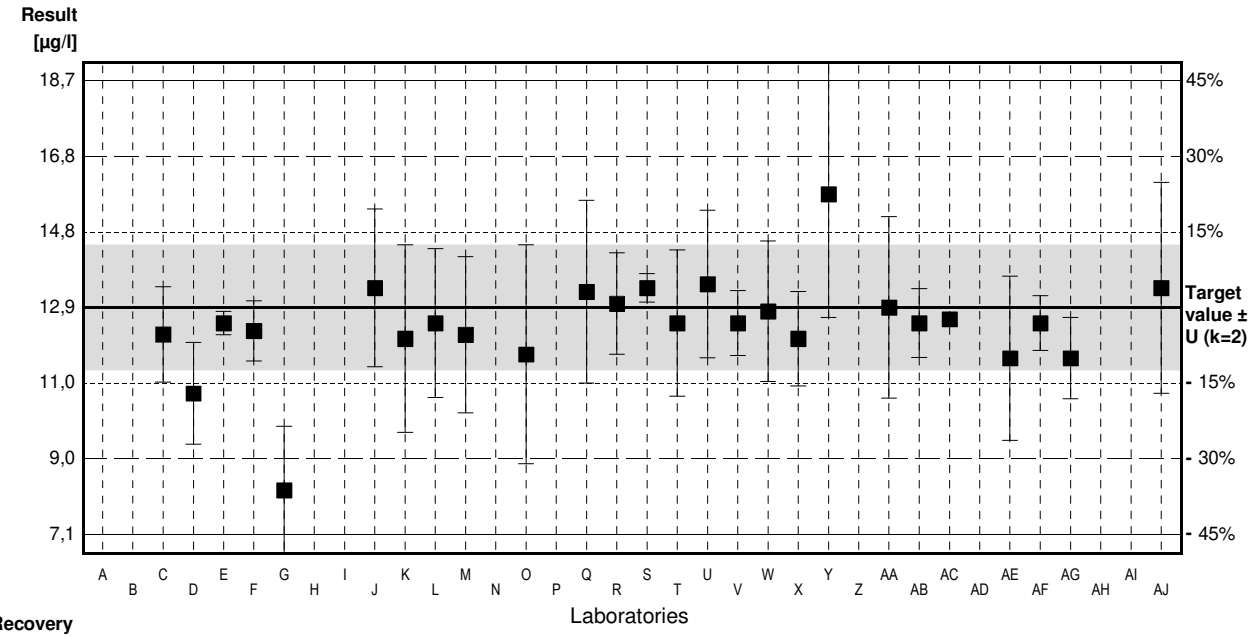


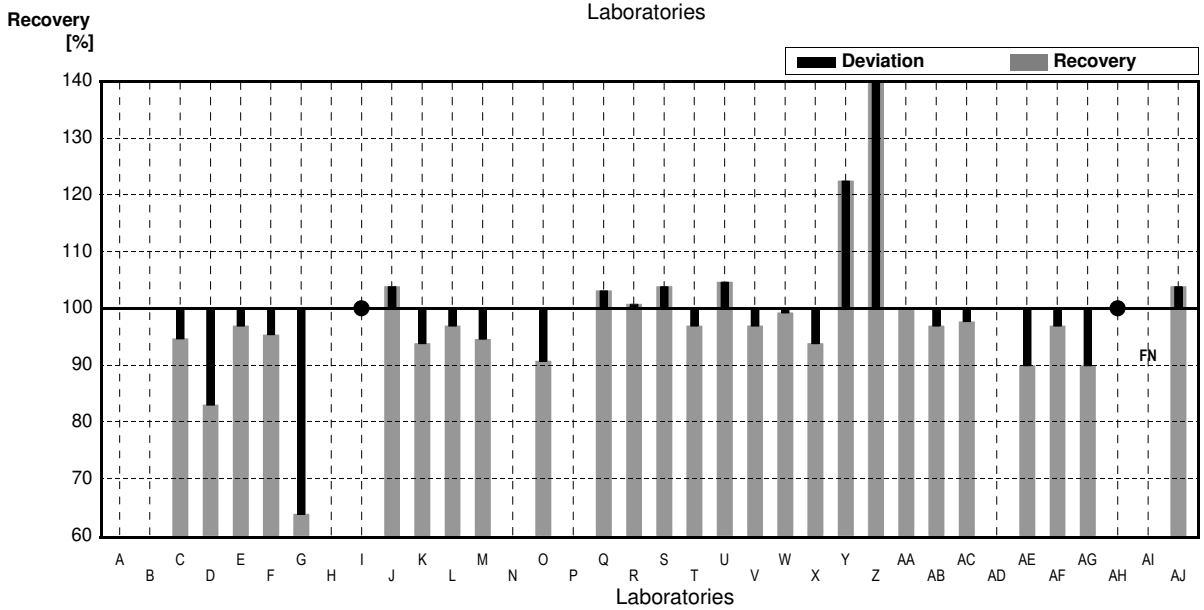
	All results	Outliers excl.	Unit
Mean ± CI(99%)	7,04 ± 0,18	7,04 ± 0,18	µg/l
Recov. ± CI(99%)	97,1 ± 2,5	97,1 ± 2,5	%
SD between labs	0,31	0,31	µg/l
RSD between labs	4,4	4,4	%
n for calculation	23	23	

Sample M164A
Parameter Zinc

Target value	± U (k=2)	12,9 µg/l	±	1,6 µg/l
IFA result	± U (k=2)	14,5 µg/l	±	1,9 µg/l
Stability test	± U (k=2)	16,8 µg/l	±	2,2 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	12,21	1,22	µg/l	95%	-0,72
D	10,7	1,3	µg/l	83%	-2,30
E	12,5	0,30	µg/l	97%	-0,42
F	12,3	0,77	µg/l	95%	-0,63
G	8,22 *	1,64	µg/l	64%	-4,90
H			µg/l		
I	<50		µg/l	•	
J	13,4	2,02	µg/l	104%	0,52
K	12,1	2,4	µg/l	94%	-0,84
L	12,5	1,9	µg/l	97%	-0,42
M	12,2	2,0	µg/l	95%	-0,73
N			µg/l		
O	11,7	2,8	µg/l	91%	-1,26
P			µg/l		
Q	13,3	2,34	µg/l	103%	0,42
R	13,0	1,30	µg/l	101%	0,10
S	13,4	0,362	µg/l	104%	0,52
T	12,5	1,87	µg/l	97%	-0,42
U	13,5	1,89	µg/l	105%	0,63
V	12,5	0,83	µg/l	97%	-0,42
W	12,8	1,8	µg/l	99%	-0,10
X	12,1	1,21	µg/l	94%	-0,84
Y	15,8 *	3,16	µg/l	122%	3,04
Z	19,0 *	2,85	µg/l	147%	6,39
AA	12,90	2,32	µg/l	100%	0,00
AB	12,5	0,88	µg/l	97%	-0,42
AC	12,6		µg/l	98%	-0,31
AD			µg/l		
AE	11,6	2,1	µg/l	90%	-1,36
AF	12,5	0,7	µg/l	97%	-0,42
AG	11,6	1,04	µg/l	90%	-1,36
AH	<20		µg/l	•	
AI	<10		µg/l	FN	
AJ	13,4	2,7	µg/l	104%	0,52



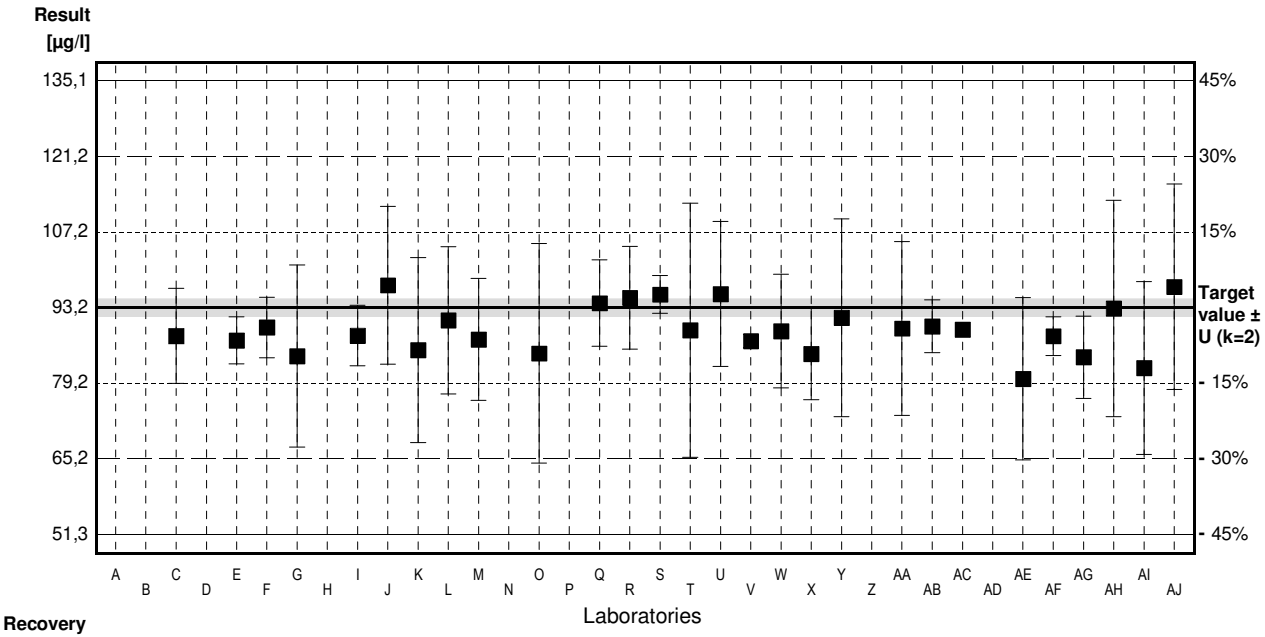


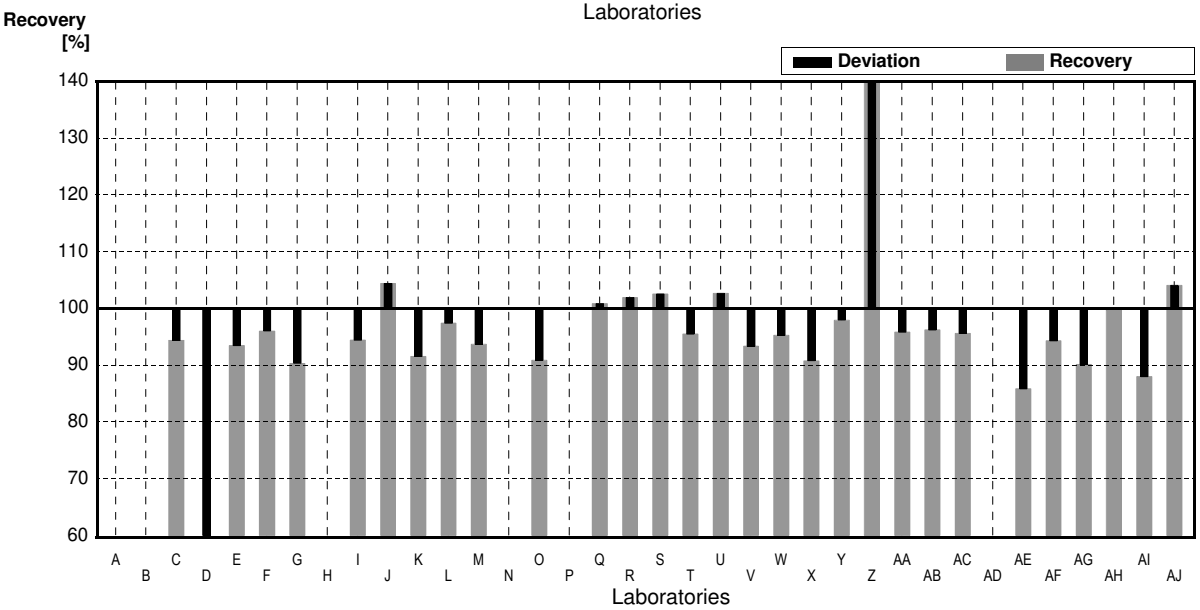
	All results	Outliers excl.	Unit
Mean ± CI(99%)	12,7 ± 0,9	12,5 ± 0,4	µg/l
Recov. ± CI(99%)	98,4 ± 7,3	96,8 ± 3,0	%
SD between labs	1,8	0,7	µg/l
RSD between labs	13,9	5,4	%
n for calculation	27	24	

Sample M164B
Parameter Zinc

Target value ± U (k=2)	93,2	µg/l	±	1,6	µg/l
IFA result ± U (k=2)	81	µg/l	±	9	µg/l
Stability test ± U (k=2)	104	µg/l	±	11	µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B			µg/l		
C	87,93	8,8	µg/l	94%	-0,76
D	43,3 *	4,6	µg/l	46%	-7,24
E	87,1	4,33	µg/l	93%	-0,88
F	89,5	5,6	µg/l	96%	-0,54
G	84,2	16,84	µg/l	90%	-1,30
H			µg/l		
I	88	5,6	µg/l	94%	-0,75
J	97,3	14,6	µg/l	104%	0,59
K	85,3	17,1	µg/l	92%	-1,15
L	90,8	13,6	µg/l	97%	-0,35
M	87,3	11,3	µg/l	94%	-0,86
N			µg/l		
O	84,7	20,3	µg/l	91%	-1,23
P			µg/l		
Q	94,0	8,0	µg/l	101%	0,12
R	95,0	9,50	µg/l	102%	0,26
S	95,6	3,48	µg/l	103%	0,35
T	89,0	23,5	µg/l	95%	-0,61
U	95,7	13,4	µg/l	103%	0,36
V	87	1,21	µg/l	93%	-0,90
W	88,8	10,5	µg/l	95%	-0,64
X	84,6	8,46	µg/l	91%	-1,25
Y	91,3	18,3	µg/l	98%	-0,28
Z	136 *	20,4	µg/l	146%	6,21
AA	89,30	16,07	µg/l	96%	-0,57
AB	89,7	4,89	µg/l	96%	-0,51
AC	89,1		µg/l	96%	-0,59
AD			µg/l		
AE	80	15	µg/l	86%	-1,91
AF	87,9	3,6	µg/l	94%	-0,77
AG	84	7,6	µg/l	90%	-1,33
AH	93	20	µg/l	100%	-0,03
AI	82,0	16	µg/l	88%	-1,62
AJ	97	19	µg/l	104%	0,55





	All results	Outliers excl.	Unit
Mean ± CI(99%)	89,1 ± 6,5	89,1 ± 2,4	µg/l
Recov. ± CI(99%)	95,7 ± 7,0	95,6 ± 2,5	%
SD between labs	12,9	4,5	µg/l
RSD between labs	14,5	5,1	%
n for calculation	30	28	

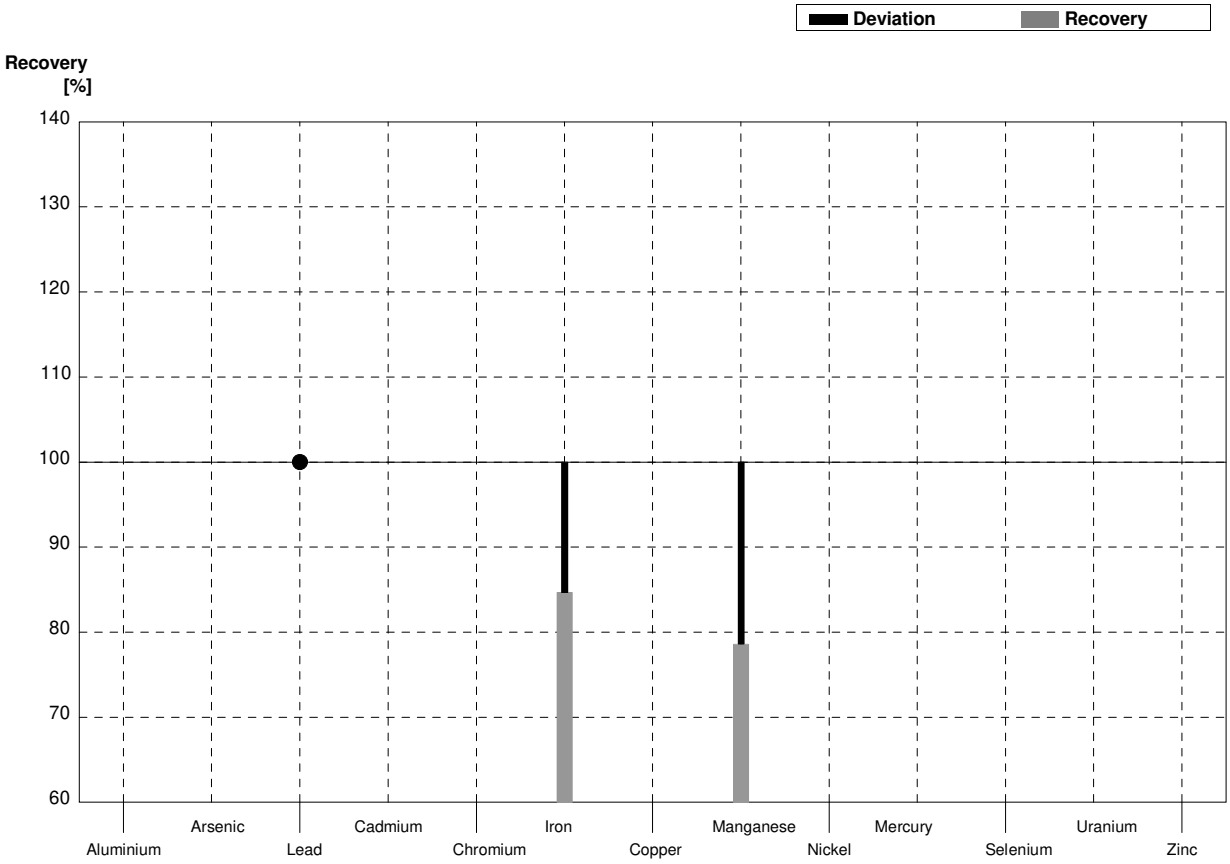
Illustration of Results
Laboratory Oriented Part

Round M164
Metals

Sample Dispatch: 14 November 2022

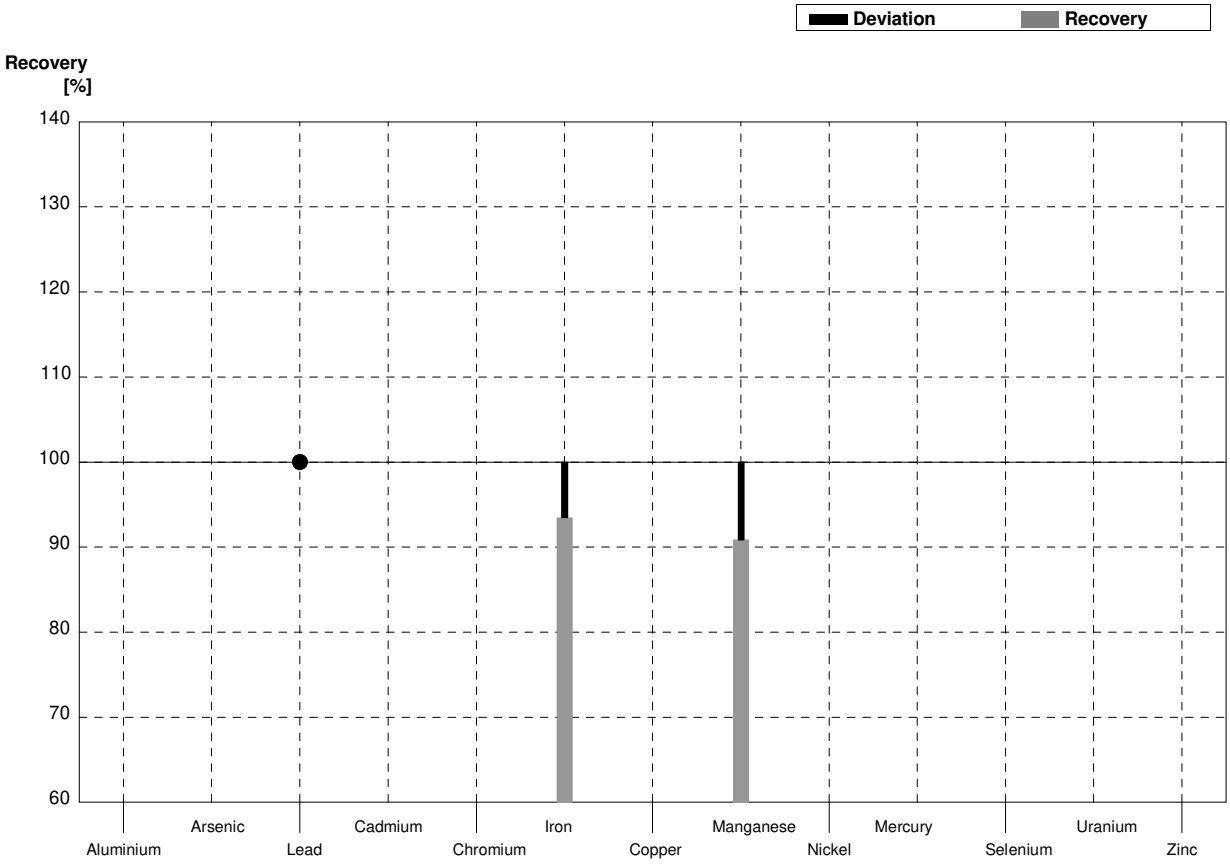
Sample **M164A**
Laboratory **A**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4			µg/l	
Arsenic	<0,5				µg/l	
Lead	1,154	0,013	<3,0	1	µg/l	•
Cadmium	0,501	0,004			µg/l	
Chromium	1,158	0,012			µg/l	
Iron	34,00	0,18	28,8	31	µg/l	85%
Copper	1,70	0,05			µg/l	
Manganese	40,7	0,2	32,0	11	µg/l	79%
Nickel	1,93	0,05			µg/l	
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6			µg/l	



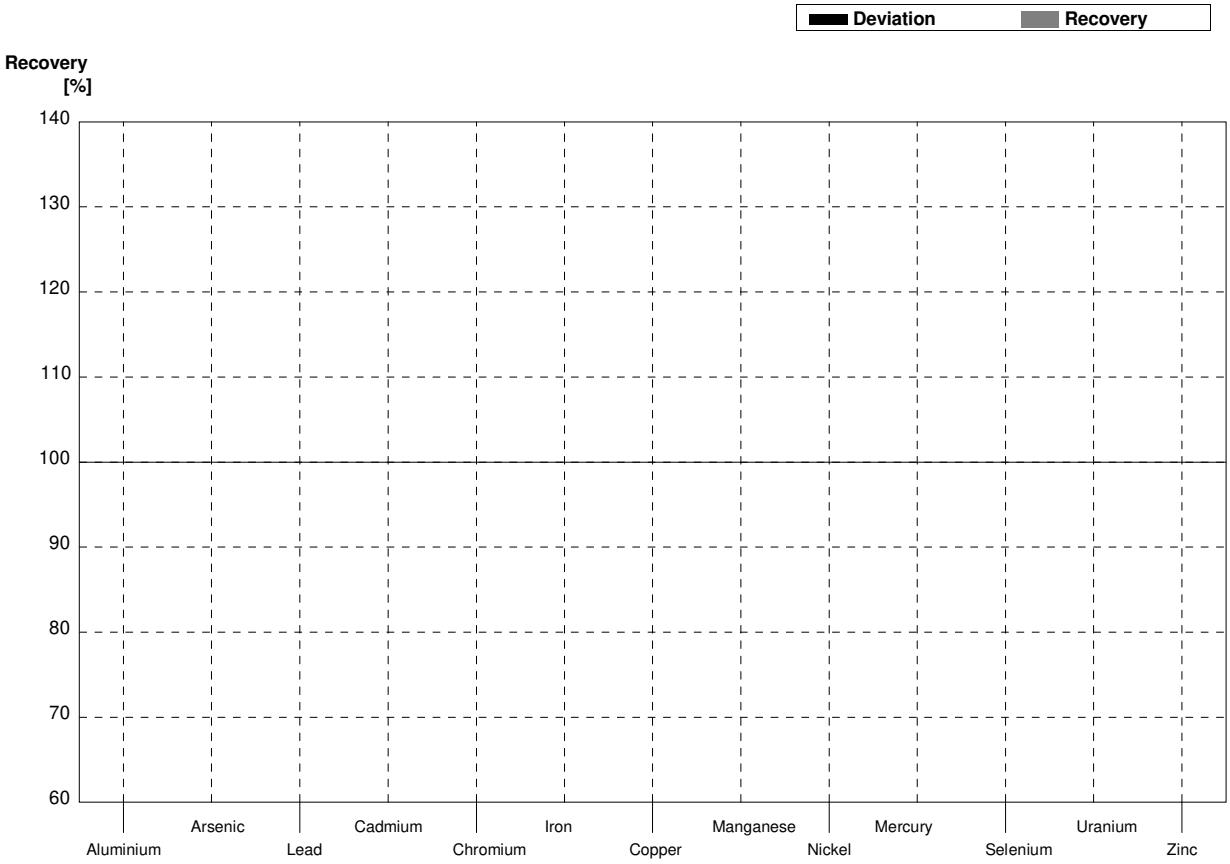
Sample **M164B**
Laboratory **A**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3			µg/l	
Arsenic	2,268	0,014			µg/l	
Lead	2,84	0,02	<3,0	1	µg/l	•
Cadmium	0,208	0,003			µg/l	
Chromium	2,83	0,02			µg/l	
Iron	92,0	0,4	86,0	31	µg/l	93%
Copper	4,02	0,05			µg/l	
Manganese	25,20	0,16	22,9	11	µg/l	91%
Nickel	6,26	0,06			µg/l	
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6			µg/l	



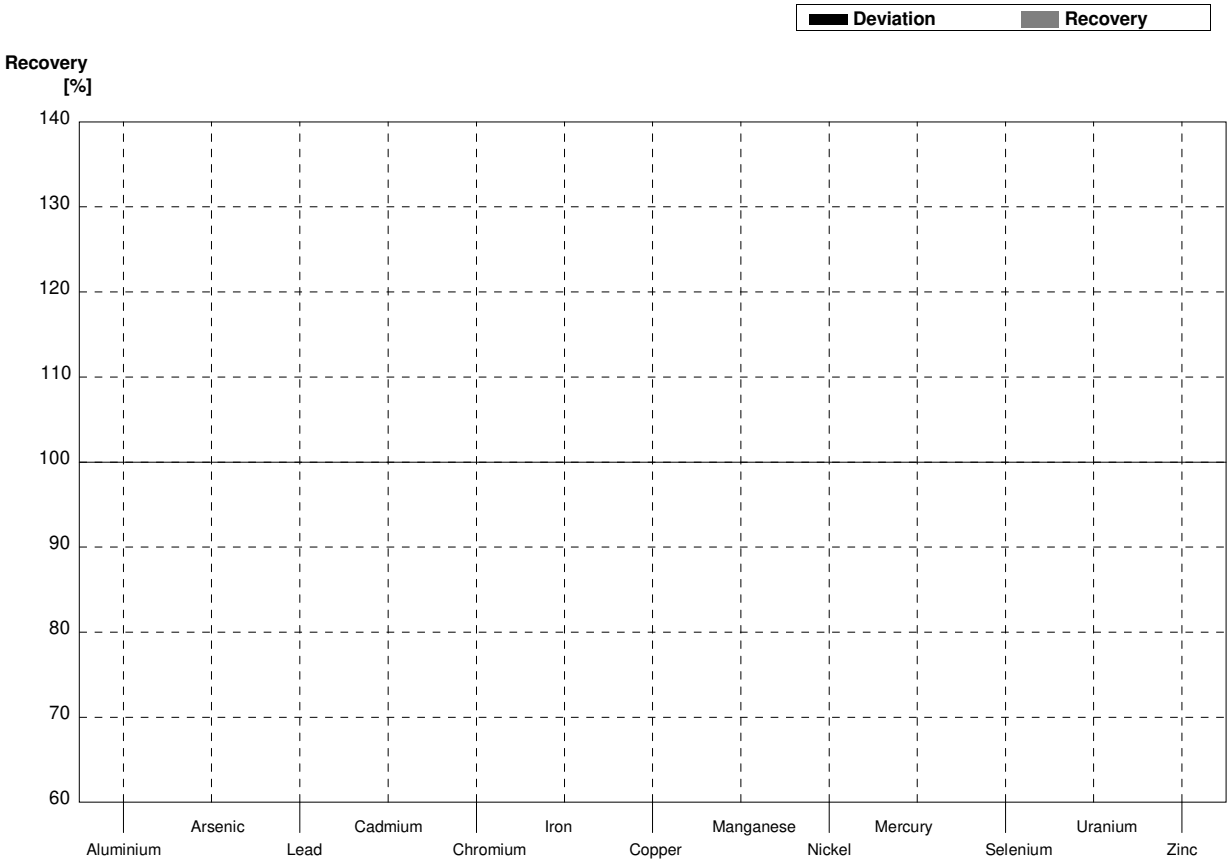
Sample **M164A**
Laboratory **B**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4			µg/l	
Arsenic	<0,5				µg/l	
Lead	1,154	0,013			µg/l	
Cadmium	0,501	0,004			µg/l	
Chromium	1,158	0,012			µg/l	
Iron	34,00	0,18			µg/l	
Copper	1,70	0,05			µg/l	
Manganese	40,7	0,2			µg/l	
Nickel	1,93	0,05			µg/l	
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6			µg/l	



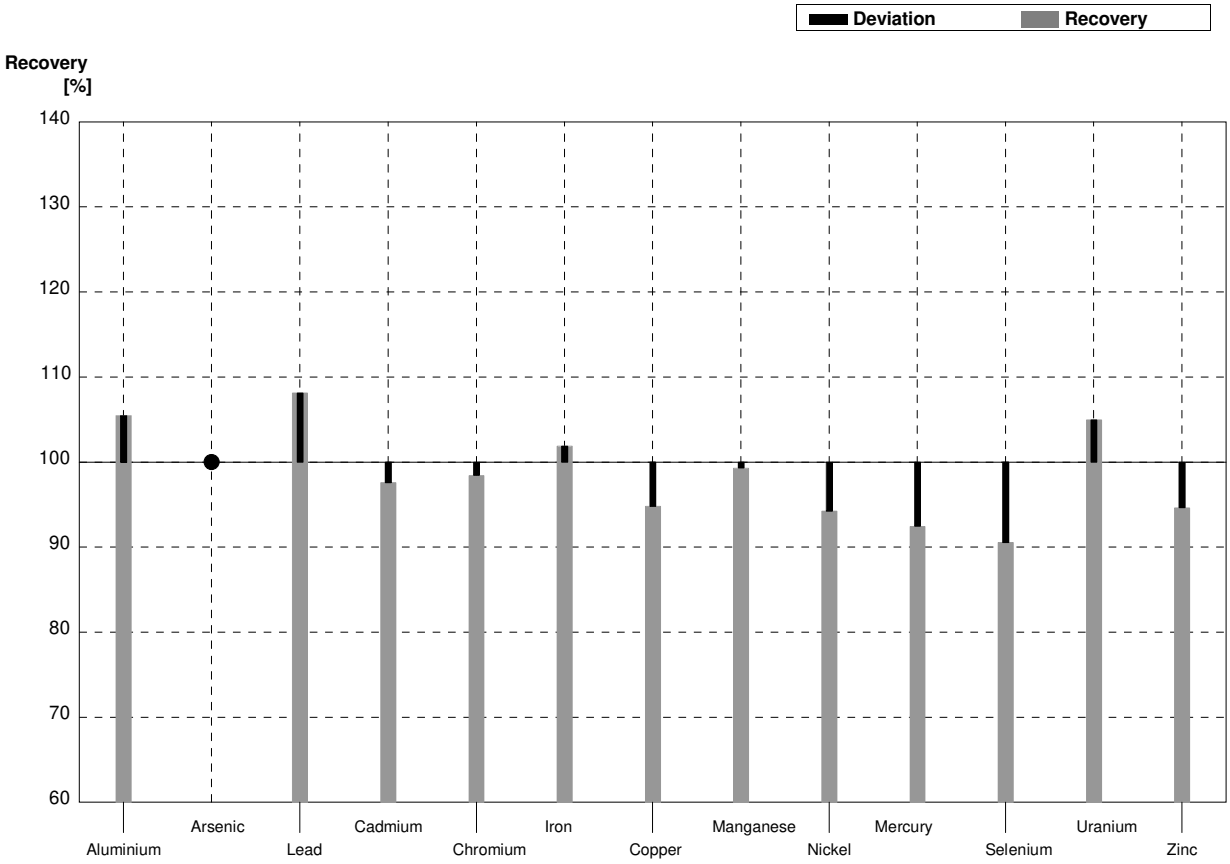
Sample **M164B**
Laboratory **B**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3			µg/l	
Arsenic	2,268	0,014			µg/l	
Lead	2,84	0,02			µg/l	
Cadmium	0,208	0,003			µg/l	
Chromium	2,83	0,02			µg/l	
Iron	92,0	0,4			µg/l	
Copper	4,02	0,05			µg/l	
Manganese	25,20	0,16			µg/l	
Nickel	6,26	0,06			µg/l	
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6			µg/l	



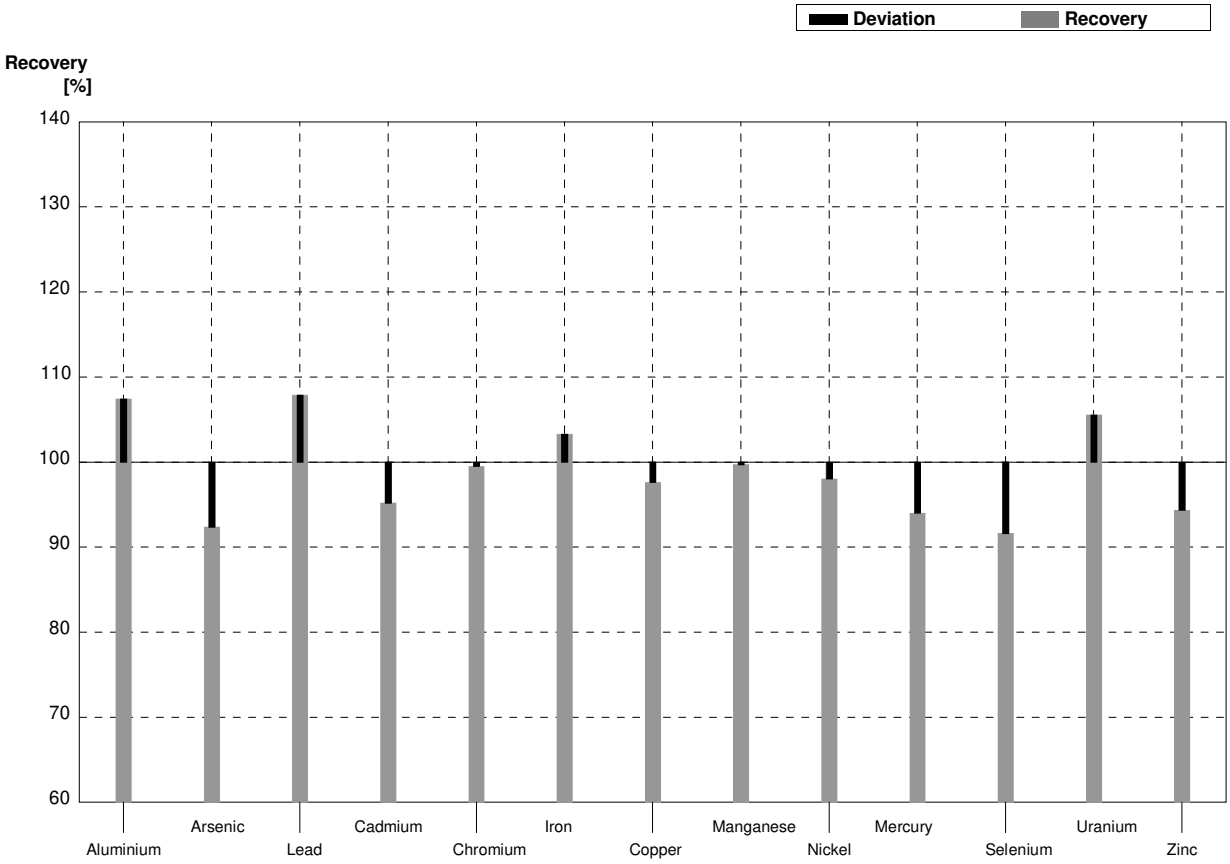
Sample **M164A**
Laboratory **C**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	48,3	4,83	µg/l	105%
Arsenic	<0,5		<0,1	0,01	µg/l	•
Lead	1,154	0,013	1,248	0,125	µg/l	108%
Cadmium	0,501	0,004	0,489	0,049	µg/l	98%
Chromium	1,158	0,012	1,140	0,114	µg/l	98%
Iron	34,00	0,18	34,65	3,5	µg/l	102%
Copper	1,70	0,05	1,612	0,16	µg/l	95%
Manganese	40,7	0,2	40,42	4	µg/l	99%
Nickel	1,93	0,05	1,819	0,18	µg/l	94%
Mercury	0,956	0,013	0,884	0,09	µg/l	92%
Selenium	2,11	0,02	1,911	0,19	µg/l	91%
Uranium	2,82	0,02	2,961	0,3	µg/l	105%
Zinc	12,9	1,6	12,21	1,22	µg/l	95%



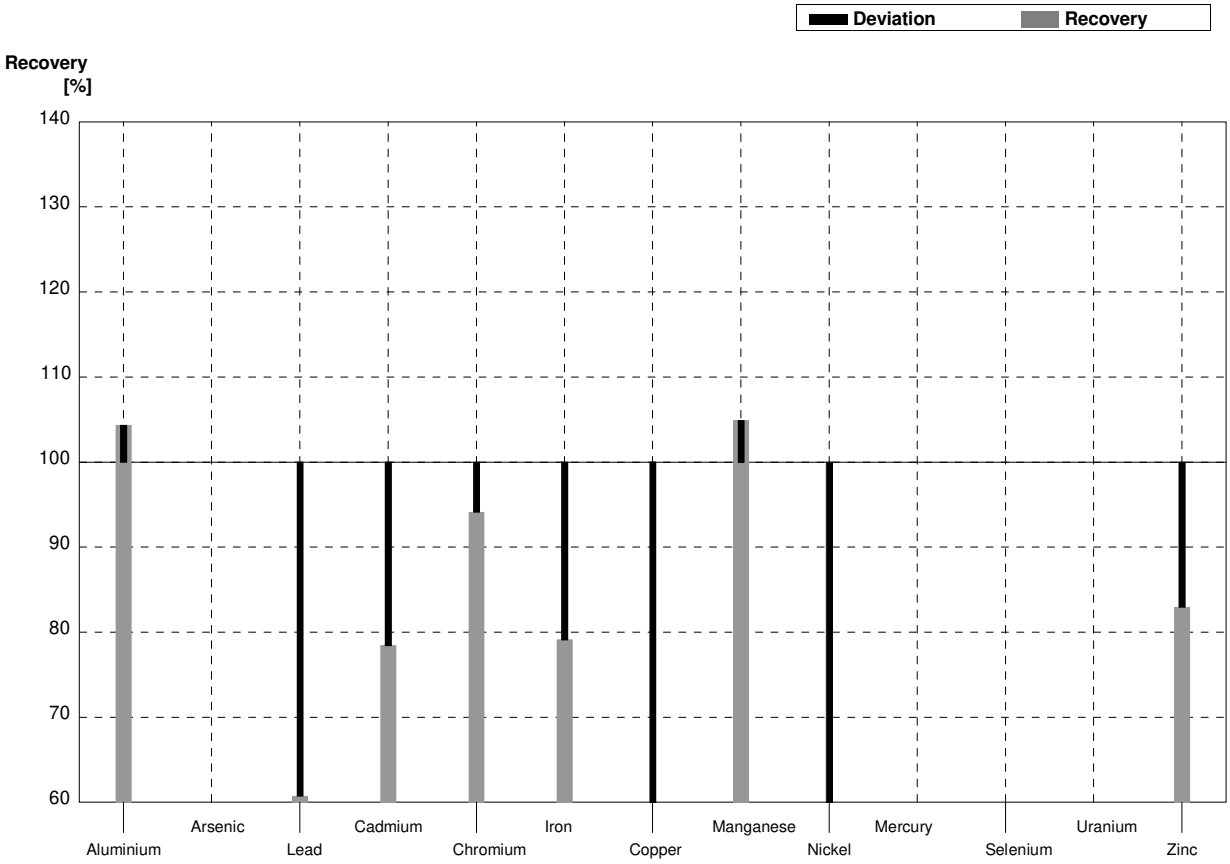
Sample **M164B**
Laboratory **C**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	18,48	1,85	µg/l	107%
Arsenic	2,268	0,014	2,095	0,21	µg/l	92%
Lead	2,84	0,02	3,064	0,31	µg/l	108%
Cadmium	0,208	0,003	0,198	0,02	µg/l	95%
Chromium	2,83	0,02	2,816	0,28	µg/l	100%
Iron	92,0	0,4	95,05	9,5	µg/l	103%
Copper	4,02	0,05	3,924	0,39	µg/l	98%
Manganese	25,20	0,16	25,126	2,51	µg/l	100%
Nickel	6,26	0,06	6,137	0,61	µg/l	98%
Mercury	1,502	0,016	1,412	0,14	µg/l	94%
Selenium	1,002	0,017	0,918	0,092	µg/l	92%
Uranium	7,25	0,05	7,651	0,77	µg/l	106%
Zinc	93,2	1,6	87,93	8,8	µg/l	94%



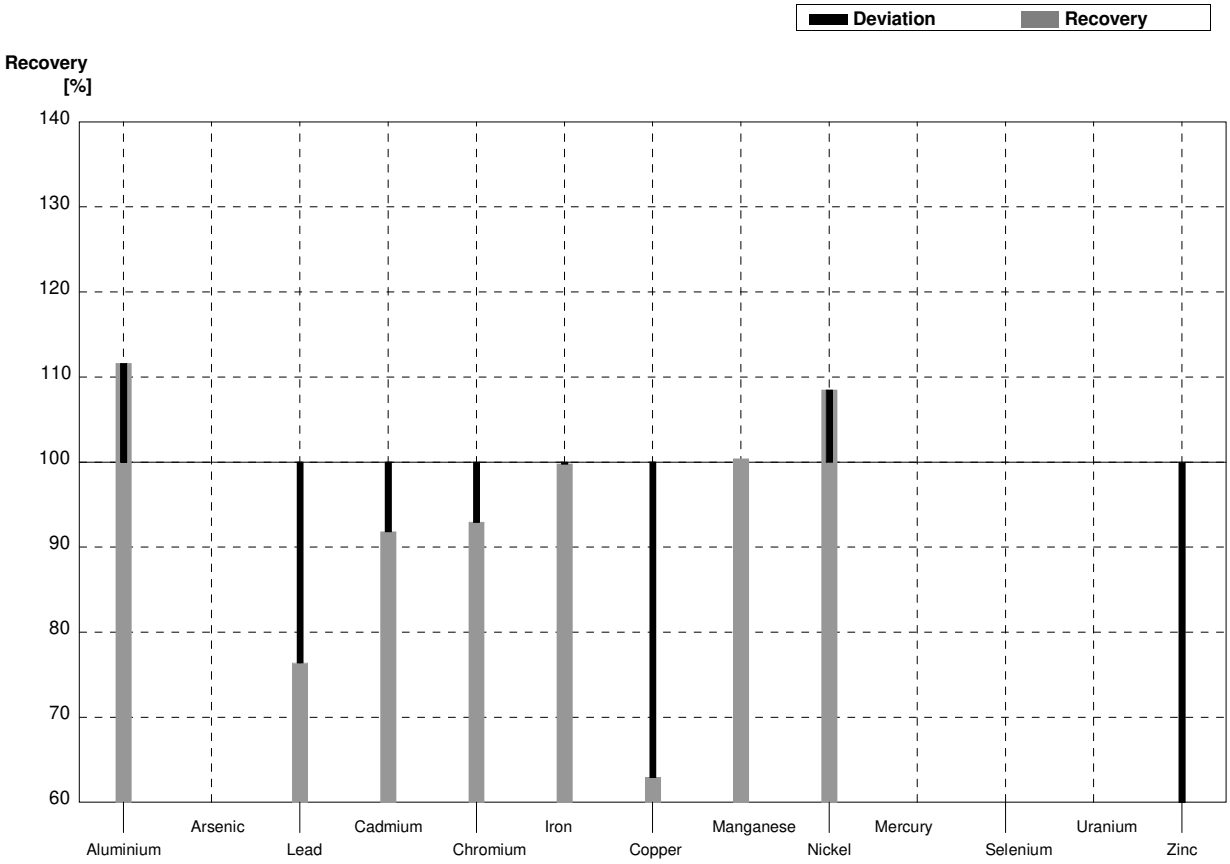
Sample **M164A**
Laboratory **D**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	47,8	4,2	µg/l	104%
Arsenic	<0,5				µg/l	
Lead	1,154	0,013	0,701	0,24	µg/l	61%
Cadmium	0,501	0,004	0,393	0,15	µg/l	78%
Chromium	1,158	0,012	1,09	0,21	µg/l	94%
Iron	34,00	0,18	26,9	10,5	µg/l	79%
Copper	1,70	0,05	1,01	0,16	µg/l	59%
Manganese	40,7	0,2	42,7	0,71	µg/l	105%
Nickel	1,93	0,05	0,68	0,28	µg/l	35%
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6	10,7	1,3	µg/l	83%



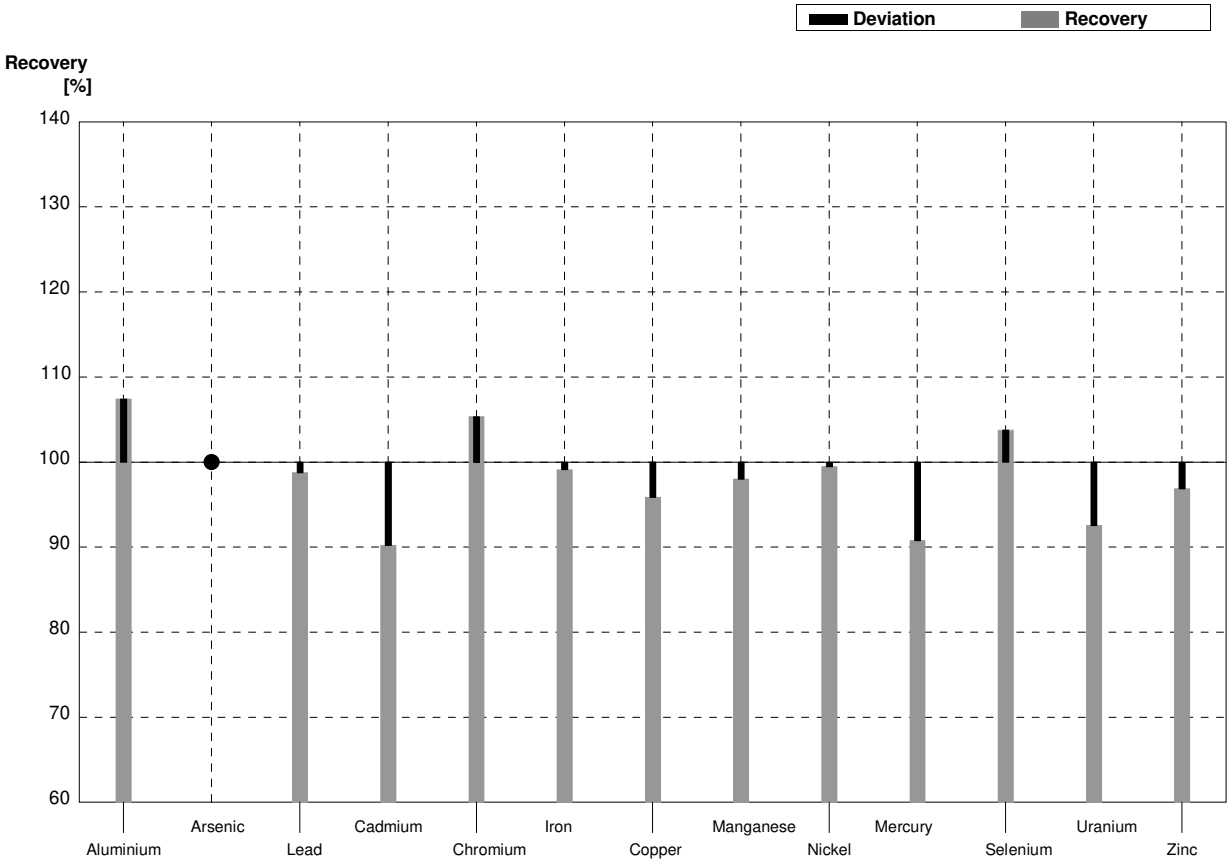
Sample **M164B**
Laboratory **D**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	19,2	2,6	µg/l	112%
Arsenic	2,268	0,014			µg/l	
Lead	2,84	0,02	2,17	0,4	µg/l	76%
Cadmium	0,208	0,003	0,191	0,04	µg/l	92%
Chromium	2,83	0,02	2,63	0,41	µg/l	93%
Iron	92,0	0,4	91,8	8,5	µg/l	100%
Copper	4,02	0,05	2,53	0,38	µg/l	63%
Manganese	25,20	0,16	25,3	4,1	µg/l	100%
Nickel	6,26	0,06	6,79	1,4	µg/l	108%
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6	43,3	4,6	µg/l	46%



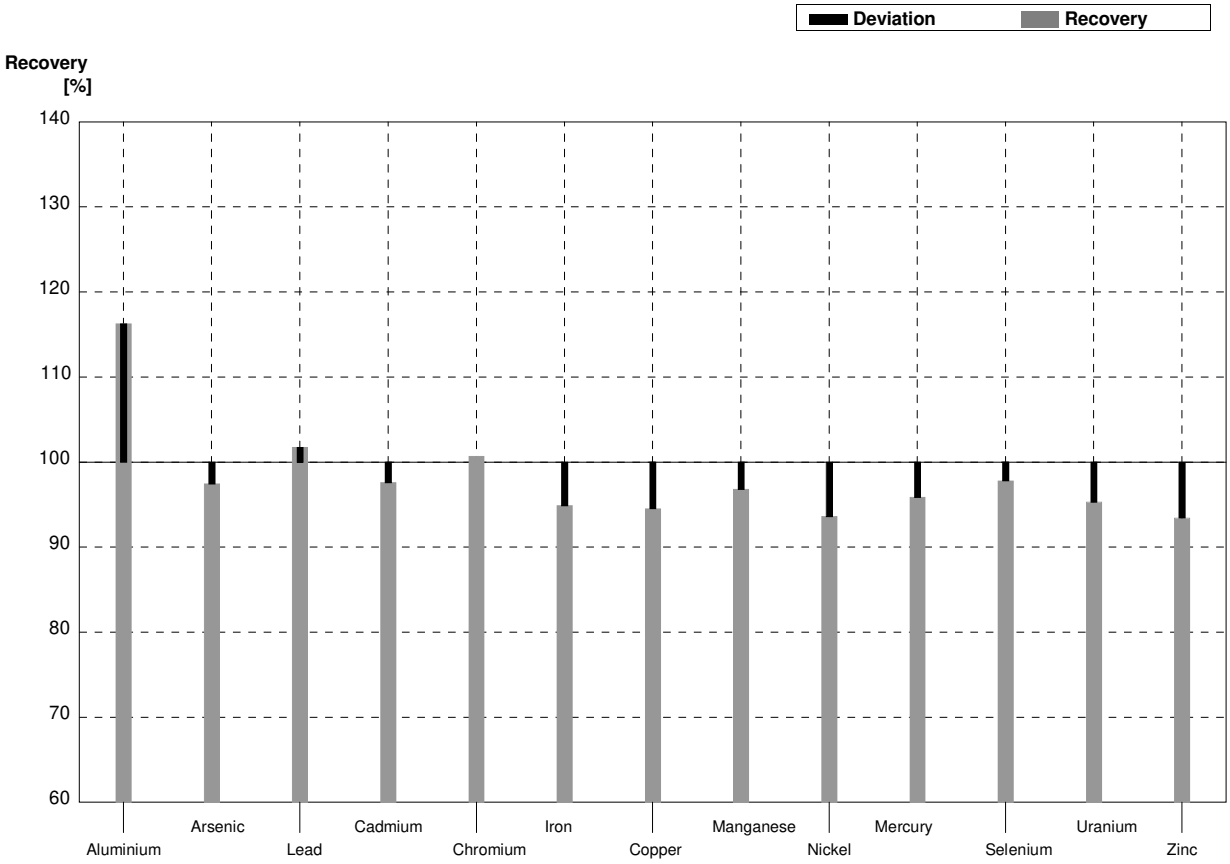
Sample **M164A**
Laboratory **E**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	49,2	0,721	µg/l	107%
Arsenic	<0,5		<0,22		µg/l	•
Lead	1,154	0,013	1,14	0,025	µg/l	99%
Cadmium	0,501	0,004	0,452	0,034	µg/l	90%
Chromium	1,158	0,012	1,22	0,012	µg/l	105%
Iron	34,00	0,18	33,7	0,416	µg/l	99%
Copper	1,70	0,05	1,63	0,020	µg/l	96%
Manganese	40,7	0,2	39,9	0,416	µg/l	98%
Nickel	1,93	0,05	1,92	0,076	µg/l	99%
Mercury	0,956	0,013	0,868	0,019	µg/l	91%
Selenium	2,11	0,02	2,19	0,061	µg/l	104%
Uranium	2,82	0,02	2,61	0,042	µg/l	93%
Zinc	12,9	1,6	12,5	0,30	µg/l	97%



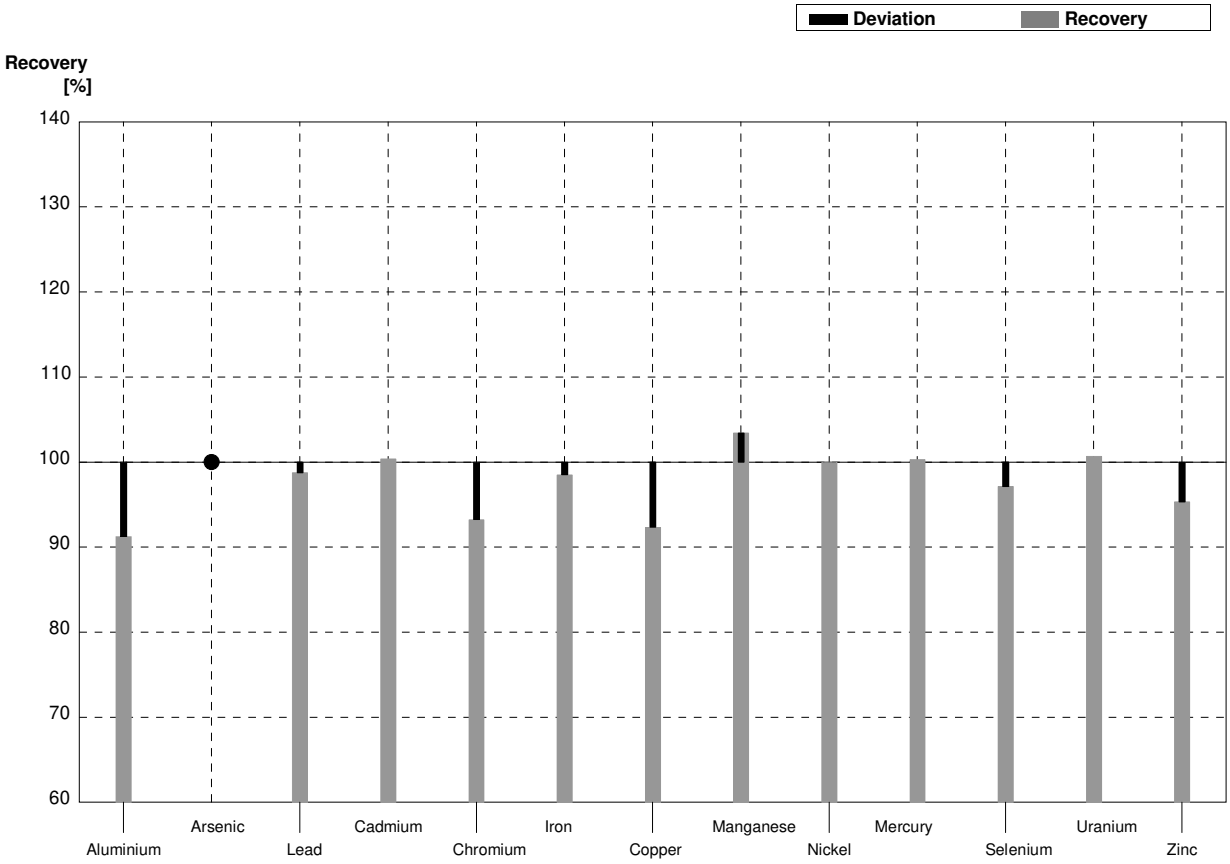
Sample **M164B**
Laboratory **E**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	20,0	0,153	µg/l	116%
Arsenic	2,268	0,014	2,21	0,151	µg/l	97%
Lead	2,84	0,02	2,89	0,040	µg/l	102%
Cadmium	0,208	0,003	0,203	0,008	µg/l	98%
Chromium	2,83	0,02	2,85	0,295	µg/l	101%
Iron	92,0	0,4	87,3	2,88	µg/l	95%
Copper	4,02	0,05	3,80	0,158	µg/l	95%
Manganese	25,20	0,16	24,4	1,102	µg/l	97%
Nickel	6,26	0,06	5,86	0,346	µg/l	94%
Mercury	1,502	0,016	1,44	0,025	µg/l	96%
Selenium	1,002	0,017	0,980	0,060	µg/l	98%
Uranium	7,25	0,05	6,91	0,150	µg/l	95%
Zinc	93,2	1,6	87,1	4,33	µg/l	93%



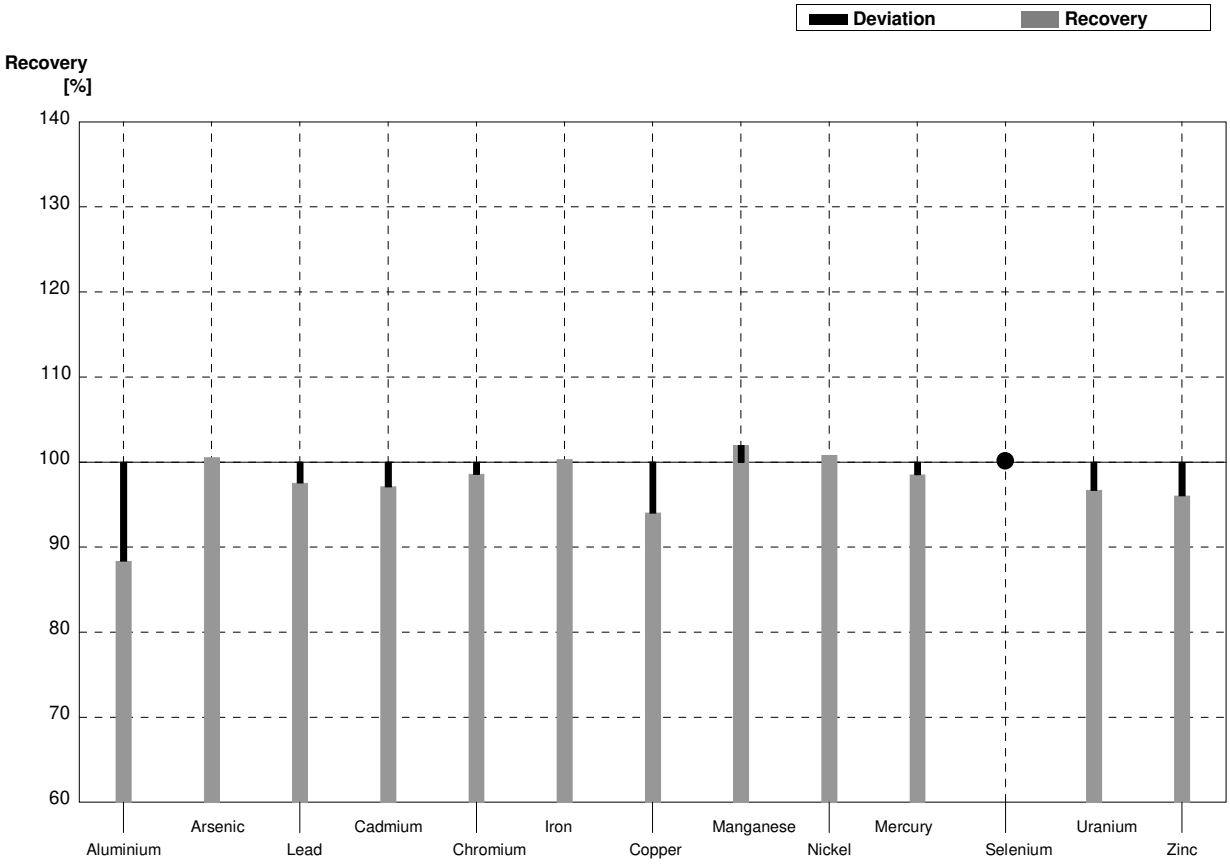
Sample **M164A**
Laboratory **F**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	41,8	4,6	µg/l	91%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,14	0,12	µg/l	99%
Cadmium	0,501	0,004	0,503	0,023	µg/l	100%
Chromium	1,158	0,012	1,08	0,15	µg/l	93%
Iron	34,00	0,18	33,5	3,7	µg/l	99%
Copper	1,70	0,05	1,57	0,086	µg/l	92%
Manganese	40,7	0,2	42,1	2,3	µg/l	103%
Nickel	1,93	0,05	1,93	0,15	µg/l	100%
Mercury	0,956	0,013	0,959	0,149	µg/l	100%
Selenium	2,11	0,02	2,05	0,25	µg/l	97%
Uranium	2,82	0,02	2,84	0,30	µg/l	101%
Zinc	12,9	1,6	12,3	0,77	µg/l	95%



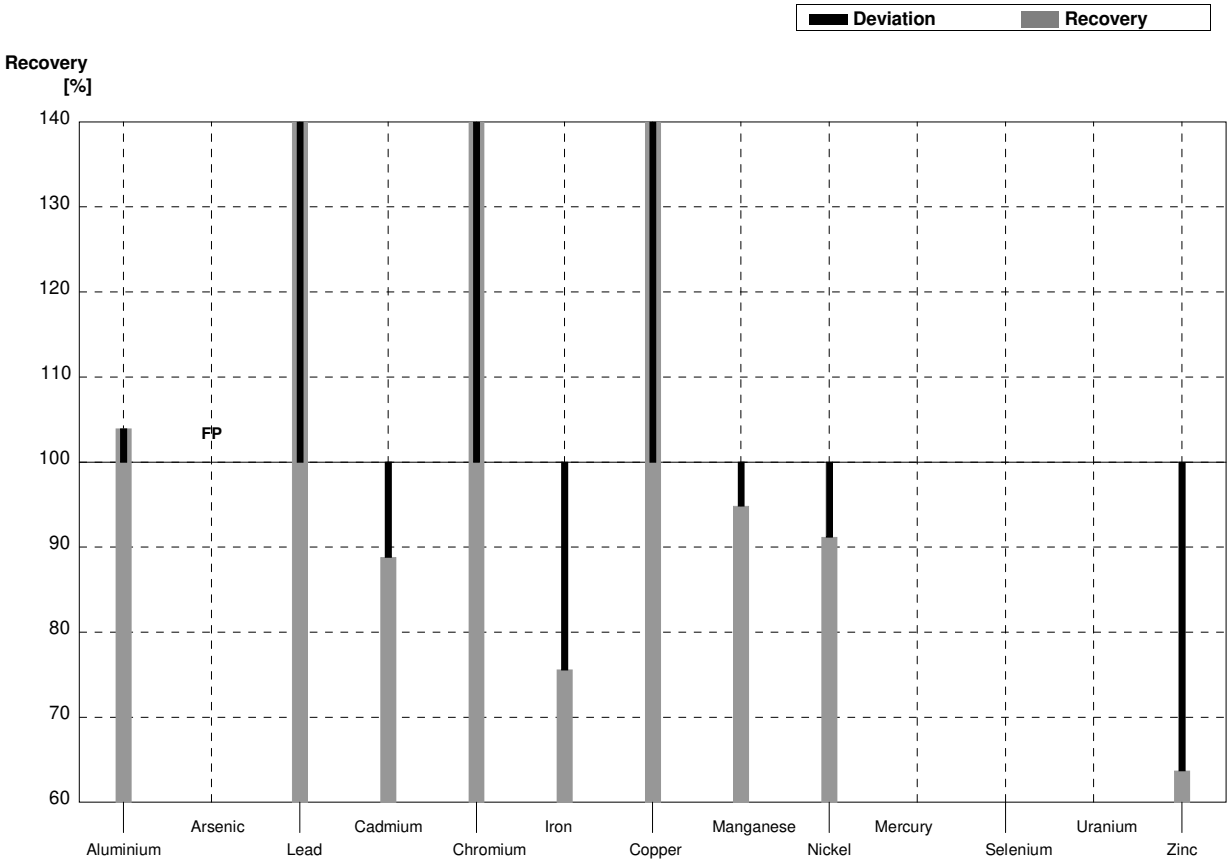
Sample **M164B**
Laboratory **F**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	15,2	1,7	µg/l	88%
Arsenic	2,268	0,014	2,28	0,13	µg/l	101%
Lead	2,84	0,02	2,77	0,29	µg/l	98%
Cadmium	0,208	0,003	0,202	0,016	µg/l	97%
Chromium	2,83	0,02	2,79	0,39	µg/l	99%
Iron	92,0	0,4	92,3	10	µg/l	100%
Copper	4,02	0,05	3,78	0,21	µg/l	94%
Manganese	25,20	0,16	25,7	1,4	µg/l	102%
Nickel	6,26	0,06	6,31	0,48	µg/l	101%
Mercury	1,502	0,016	1,48	0,23	µg/l	99%
Selenium	1,002	0,017	<1		µg/l	•
Uranium	7,25	0,05	7,01	0,74	µg/l	97%
Zinc	93,2	1,6	89,5	5,6	µg/l	96%



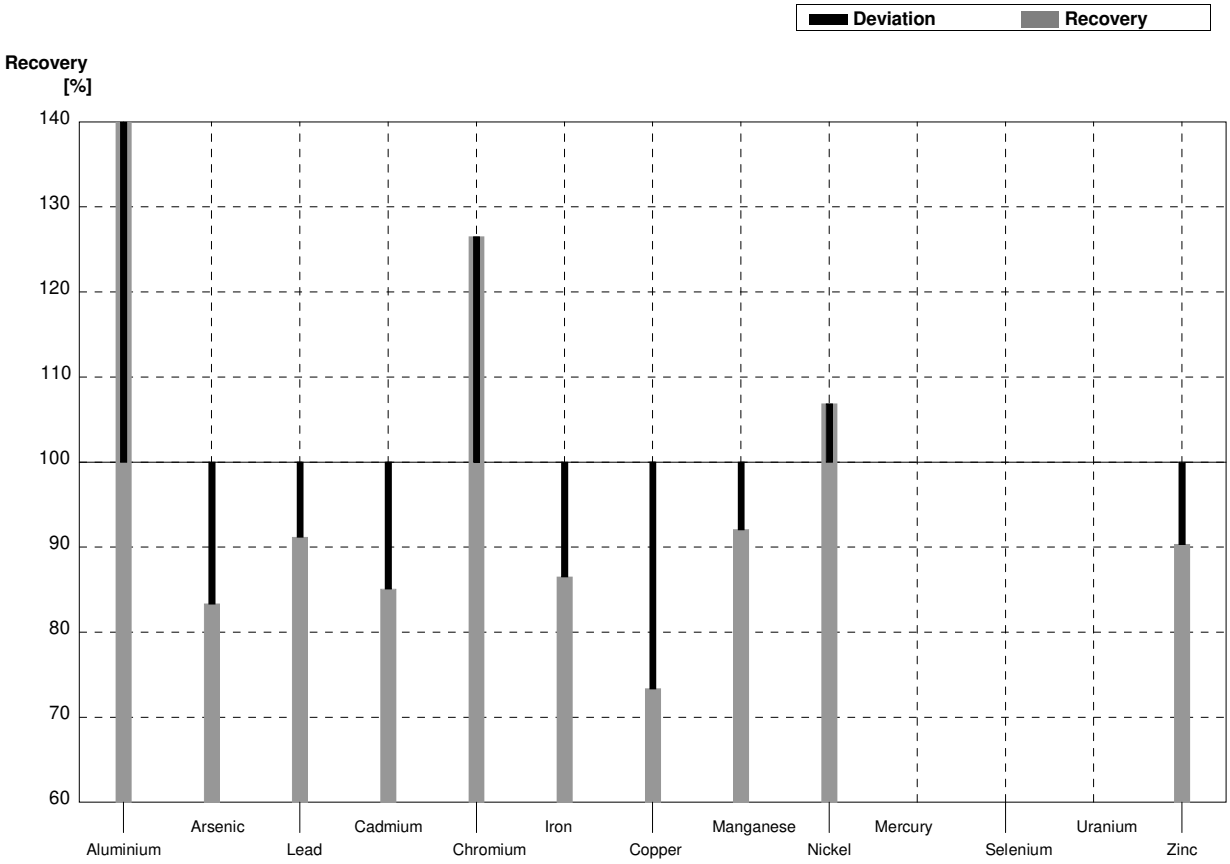
Sample **M164A**
Laboratory **G**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	47,6	9,5	µg/l	104%
Arsenic	<0,5		0,659	0,13	µg/l	FP
Lead	1,154	0,013	1,70	0,34	µg/l	147%
Cadmium	0,501	0,004	0,445	0,09	µg/l	89%
Chromium	1,158	0,012	3,08	0,62	µg/l	266%
Iron	34,00	0,18	25,7	5,1	µg/l	76%
Copper	1,70	0,05	4,71	0,94	µg/l	277%
Manganese	40,7	0,2	38,6	7,72	µg/l	95%
Nickel	1,93	0,05	1,76	0,35	µg/l	91%
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6	8,22	1,64	µg/l	64%



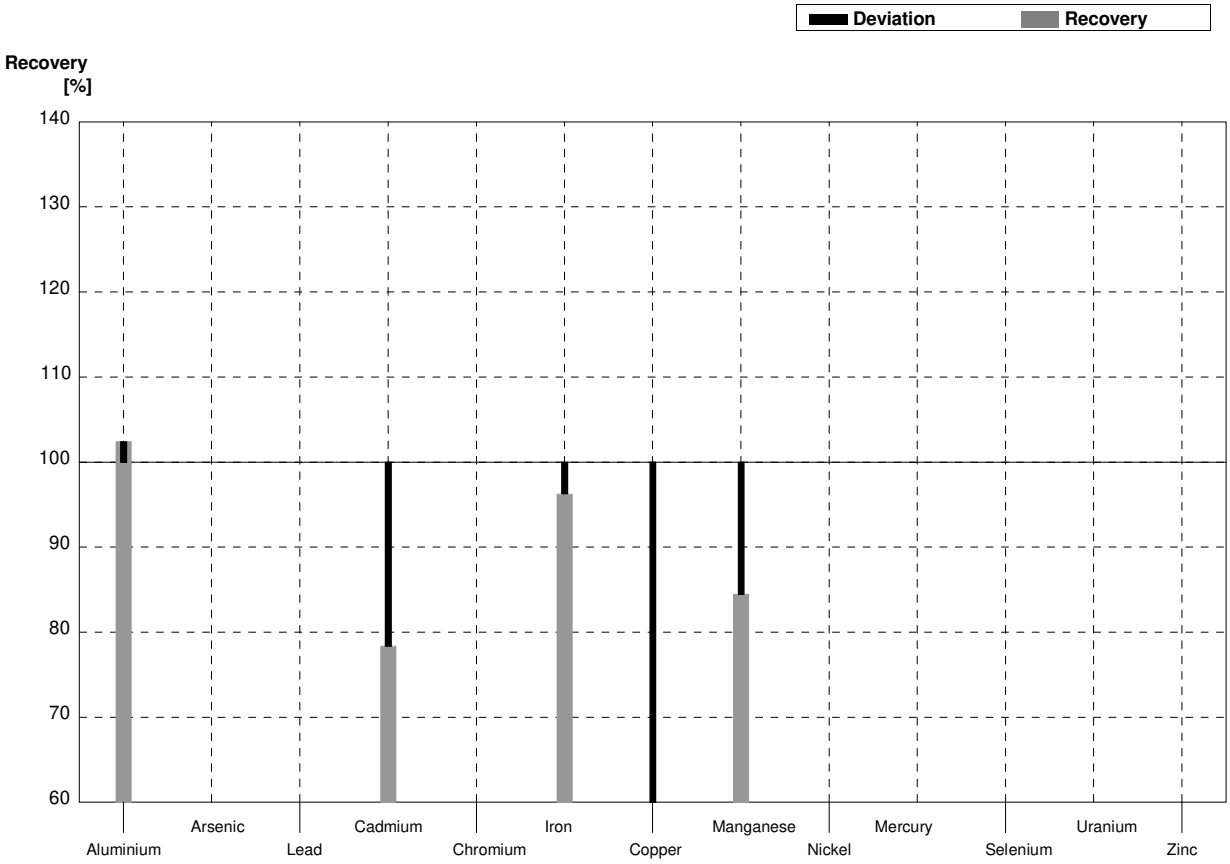
Sample **M164B**
Laboratory **G**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	25,8	5,2	µg/l	150%
Arsenic	2,268	0,014	1,89	0,38	µg/l	83%
Lead	2,84	0,02	2,59	0,52	µg/l	91%
Cadmium	0,208	0,003	0,177	0,04	µg/l	85%
Chromium	2,83	0,02	3,58	0,72	µg/l	127%
Iron	92,0	0,4	79,6	15,9	µg/l	87%
Copper	4,02	0,05	2,95	0,60	µg/l	73%
Manganese	25,20	0,16	23,2	4,64	µg/l	92%
Nickel	6,26	0,06	6,69	1,33	µg/l	107%
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6	84,2	16,84	µg/l	90%



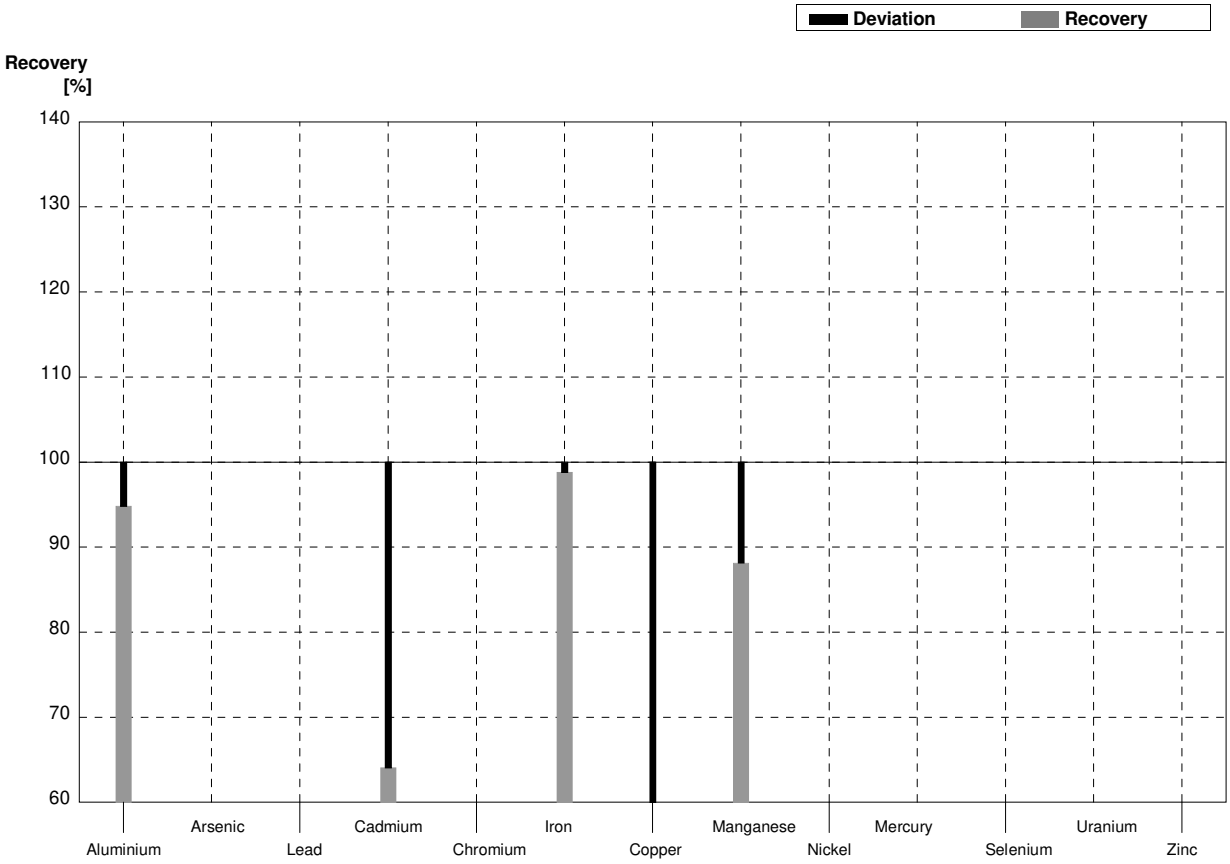
Sample **M164A**
Laboratory **H**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	46,91		µg/l	102%
Arsenic	<0,5				µg/l	
Lead	1,154	0,013			µg/l	
Cadmium	0,501	0,004	0,3927		µg/l	78%
Chromium	1,158	0,012			µg/l	
Iron	34,00	0,18	32,73		µg/l	96%
Copper	1,70	0,05	0,7645		µg/l	45%
Manganese	40,7	0,2	34,38		µg/l	84%
Nickel	1,93	0,05			µg/l	
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6			µg/l	



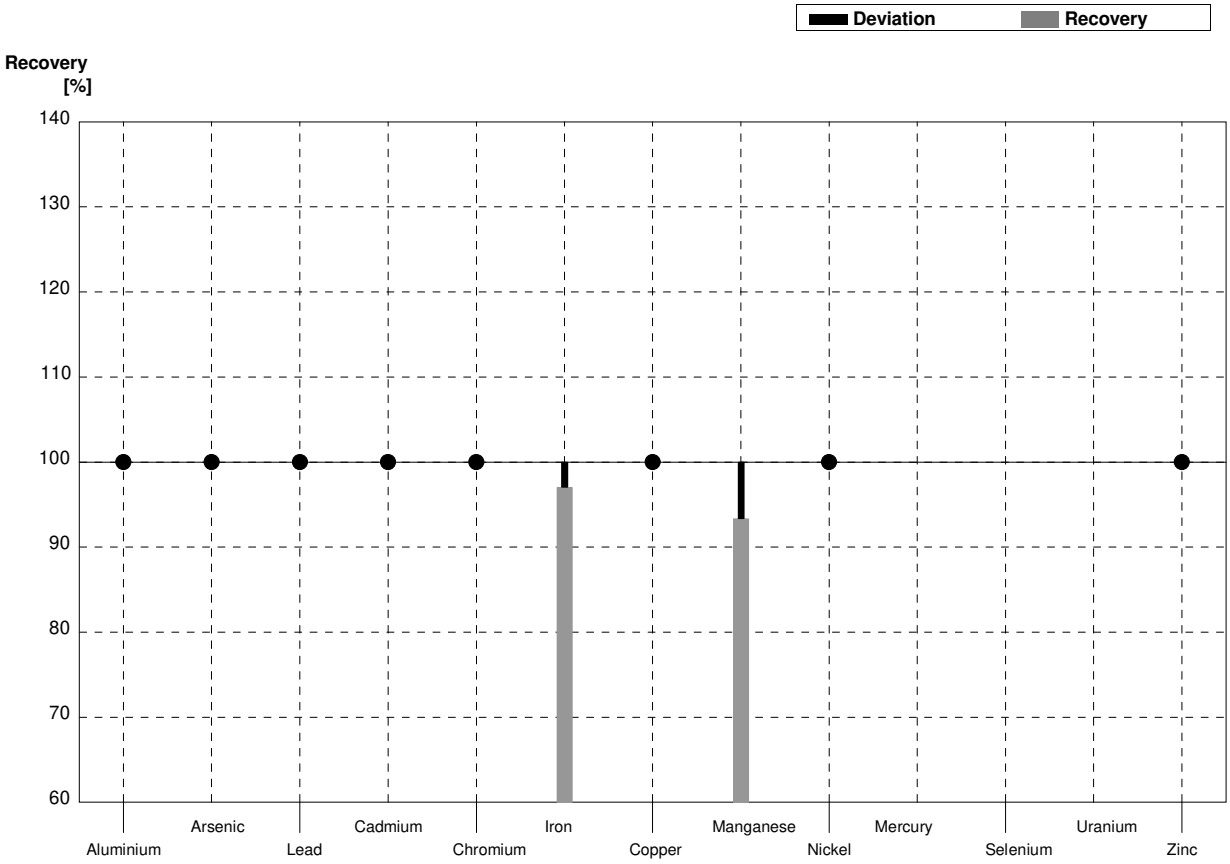
Sample **M164B**
Laboratory **H**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	16,31		µg/l	95%
Arsenic	2,268	0,014			µg/l	
Lead	2,84	0,02			µg/l	
Cadmium	0,208	0,003	0,1333		µg/l	64%
Chromium	2,83	0,02			µg/l	
Iron	92,0	0,4	90,90		µg/l	99%
Copper	4,02	0,05	2,388		µg/l	59%
Manganese	25,20	0,16	22,21		µg/l	88%
Nickel	6,26	0,06			µg/l	
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6			µg/l	



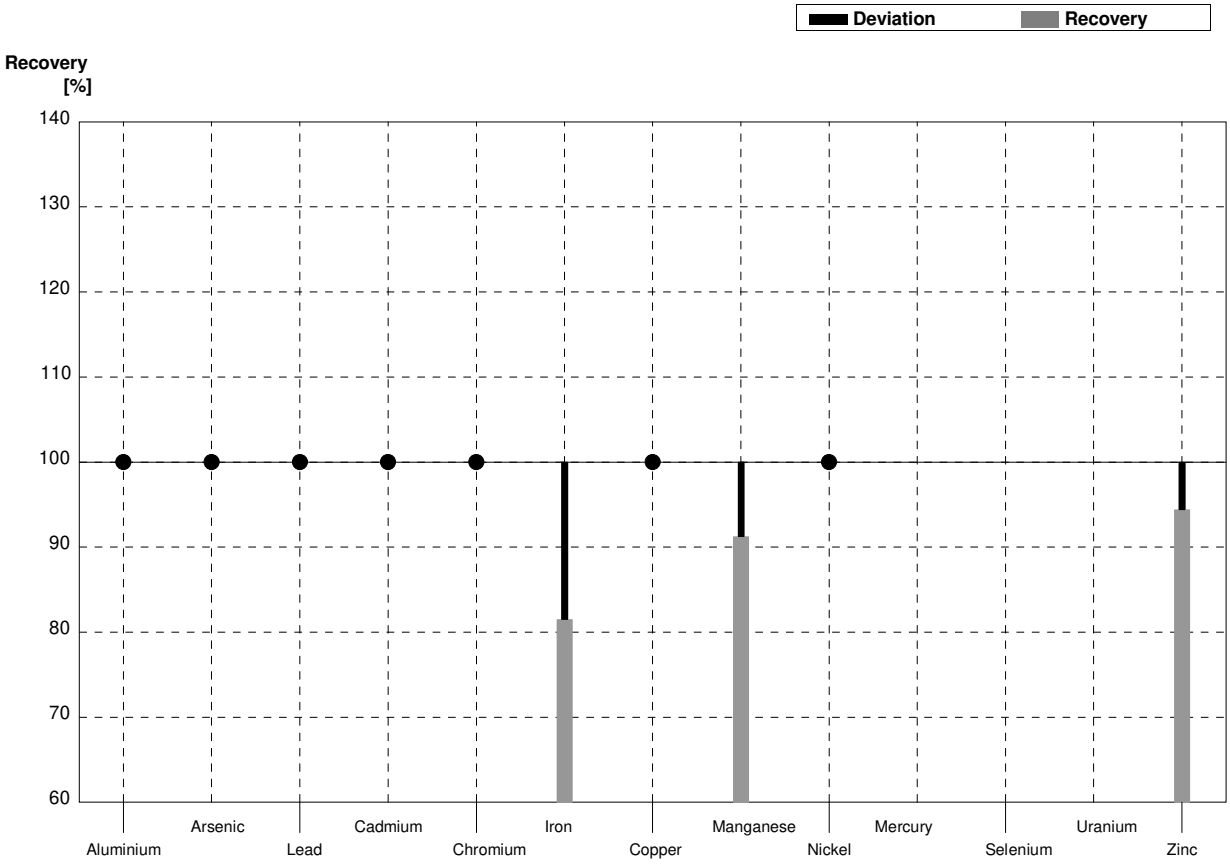
Sample M164A
Laboratory I

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	<150		µg/l	•
Arsenic	<0,5		<70		µg/l	•
Lead	1,154	0,013	<10		µg/l	•
Cadmium	0,501	0,004	<40		µg/l	•
Chromium	1,158	0,012	<30		µg/l	•
Iron	34,00	0,18	33,0	3,96	µg/l	97%
Copper	1,70	0,05	<20		µg/l	•
Manganese	40,7	0,2	38,0	5,2	µg/l	93%
Nickel	1,93	0,05	<30		µg/l	•
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6	<50		µg/l	•



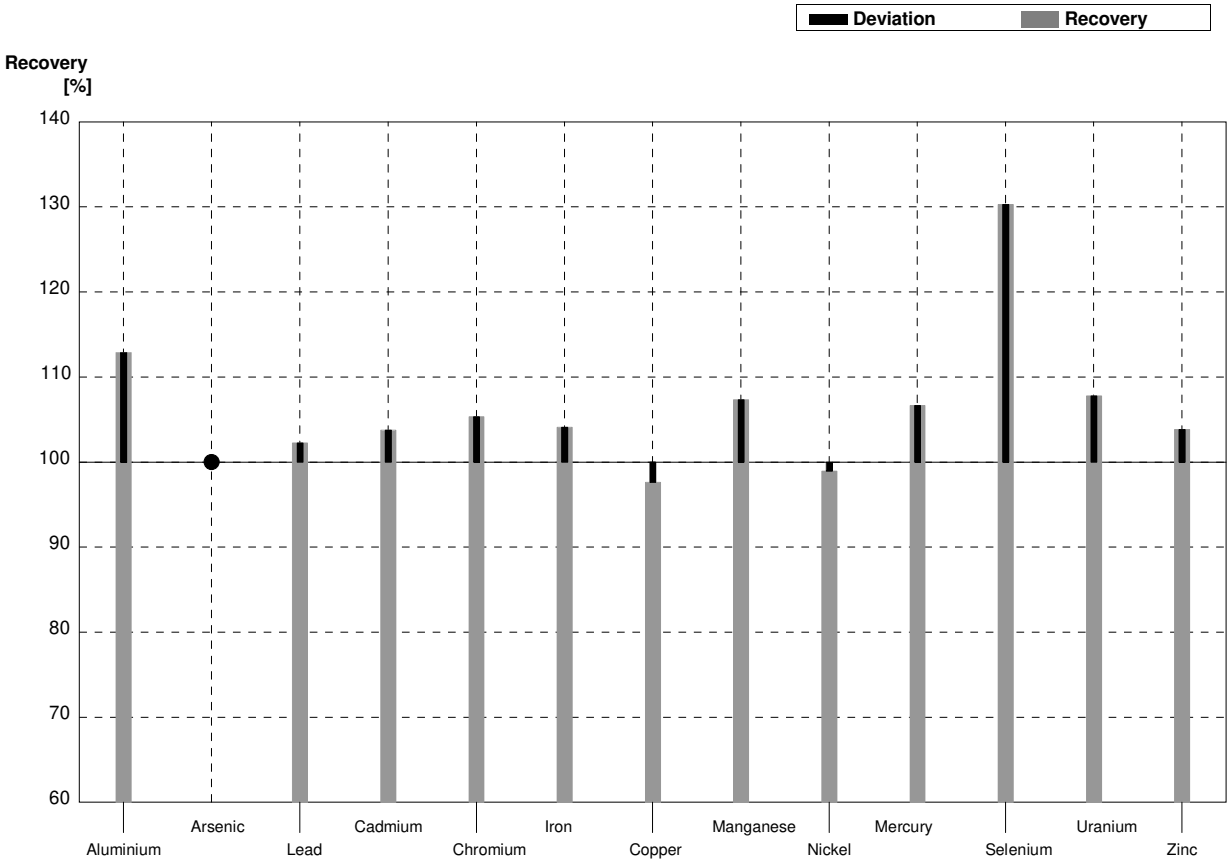
Sample M164B
Laboratory I

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	<150		µg/l	•
Arsenic	2,268	0,014	<70		µg/l	•
Lead	2,84	0,02	<10		µg/l	•
Cadmium	0,208	0,003	<40		µg/l	•
Chromium	2,83	0,02	<30		µg/l	•
Iron	92,0	0,4	75	9,20	µg/l	82%
Copper	4,02	0,05	<20		µg/l	•
Manganese	25,20	0,16	23,0	3,13	µg/l	91%
Nickel	6,26	0,06	<30		µg/l	•
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6	88	5,6	µg/l	94%



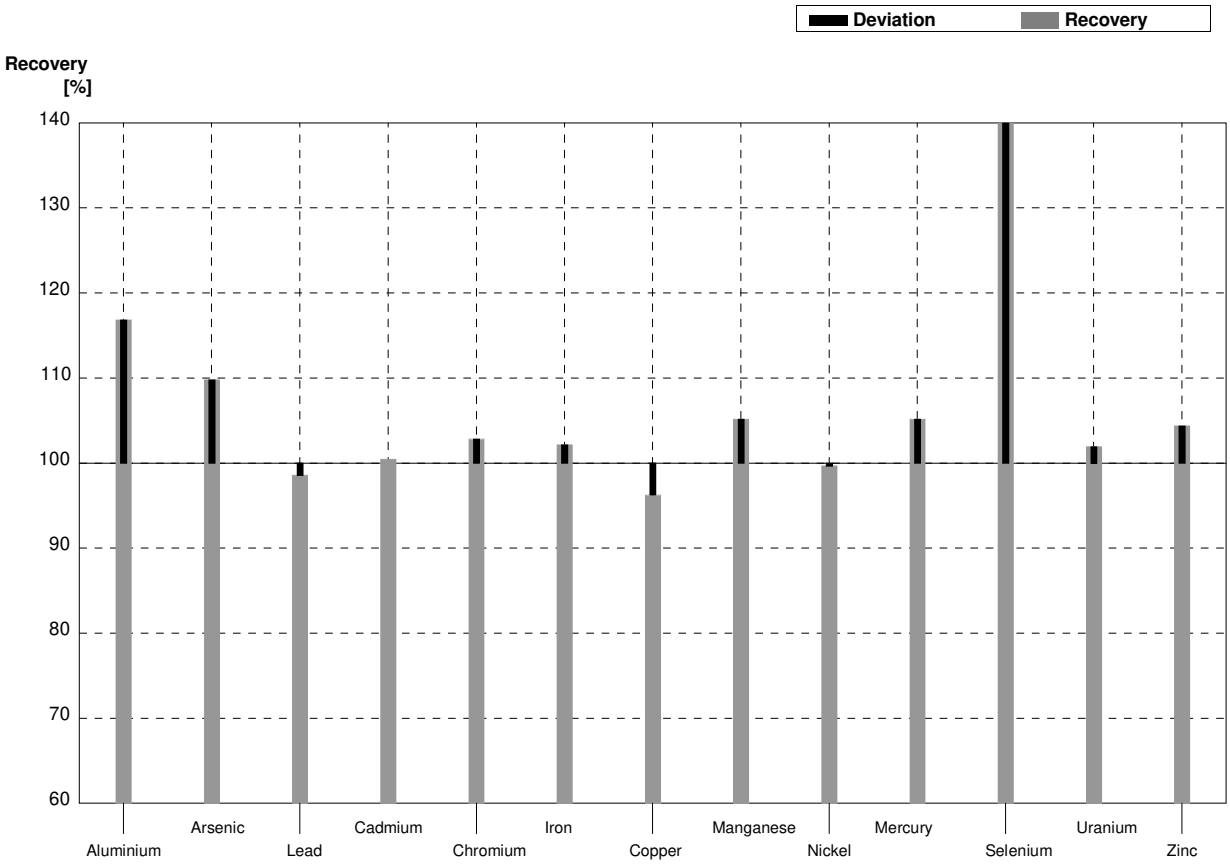
Sample **M164A**
Laboratory **J**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	51,7	7,75	µg/l	113%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,18	0,18	µg/l	102%
Cadmium	0,501	0,004	0,52	0,078	µg/l	104%
Chromium	1,158	0,012	1,22	0,18	µg/l	105%
Iron	34,00	0,18	35,4	5,3	µg/l	104%
Copper	1,70	0,05	1,66	0,25	µg/l	98%
Manganese	40,7	0,2	43,7	6,5	µg/l	107%
Nickel	1,93	0,05	1,91	0,29	µg/l	99%
Mercury	0,956	0,013	1,02	0,15	µg/l	107%
Selenium	2,11	0,02	2,75	0,41	µg/l	130%
Uranium	2,82	0,02	3,04	0,46	µg/l	108%
Zinc	12,9	1,6	13,4	2,02	µg/l	104%



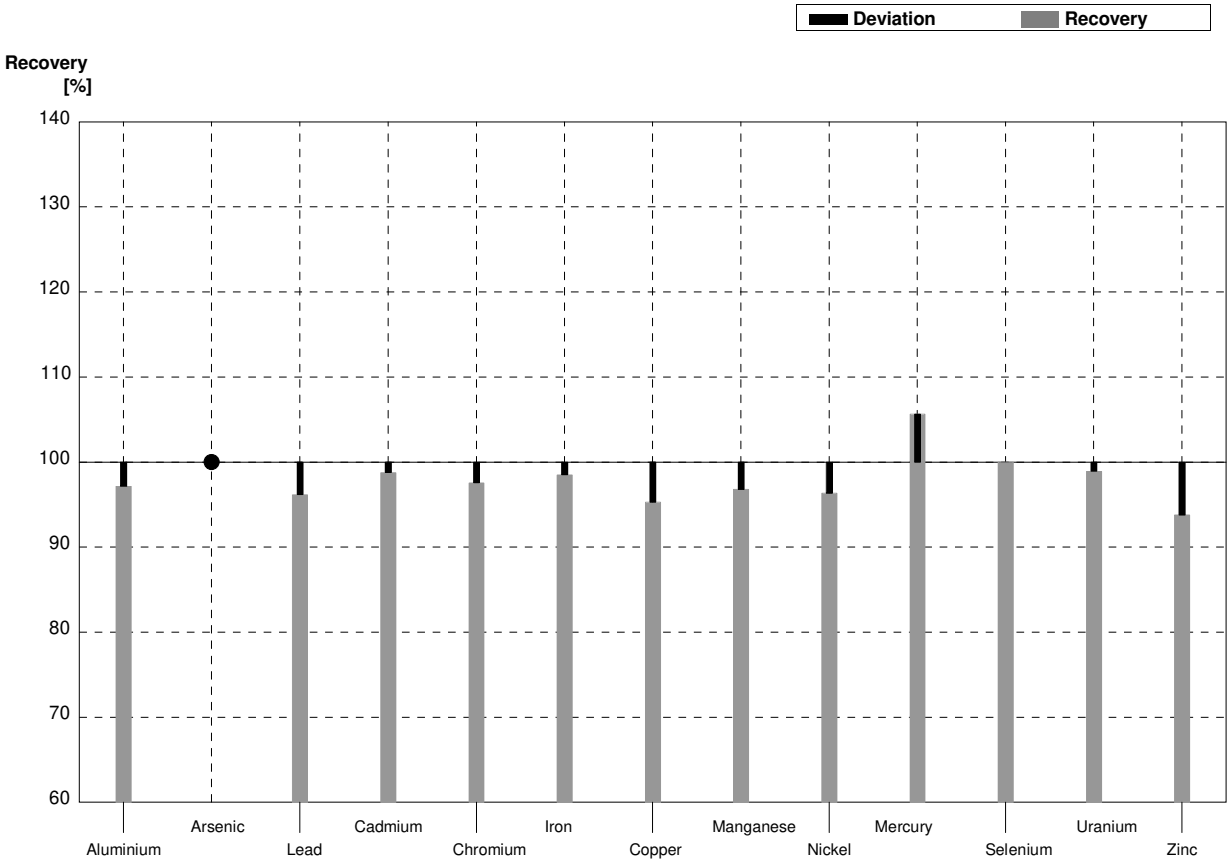
Sample M164B
Laboratory J

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	20,1	3,02	µg/l	117%
Arsenic	2,268	0,014	2,49	0,38	µg/l	110%
Lead	2,84	0,02	2,80	0,42	µg/l	99%
Cadmium	0,208	0,003	0,209	0,031	µg/l	100%
Chromium	2,83	0,02	2,91	0,44	µg/l	103%
Iron	92,0	0,4	94,0	14,1	µg/l	102%
Copper	4,02	0,05	3,87	0,58	µg/l	96%
Manganese	25,20	0,16	26,5	3,98	µg/l	105%
Nickel	6,26	0,06	6,24	0,94	µg/l	100%
Mercury	1,502	0,016	1,58	0,24	µg/l	105%
Selenium	1,002	0,017	1,76	0,26	µg/l	176%
Uranium	7,25	0,05	7,39	1,11	µg/l	102%
Zinc	93,2	1,6	97,3	14,6	µg/l	104%



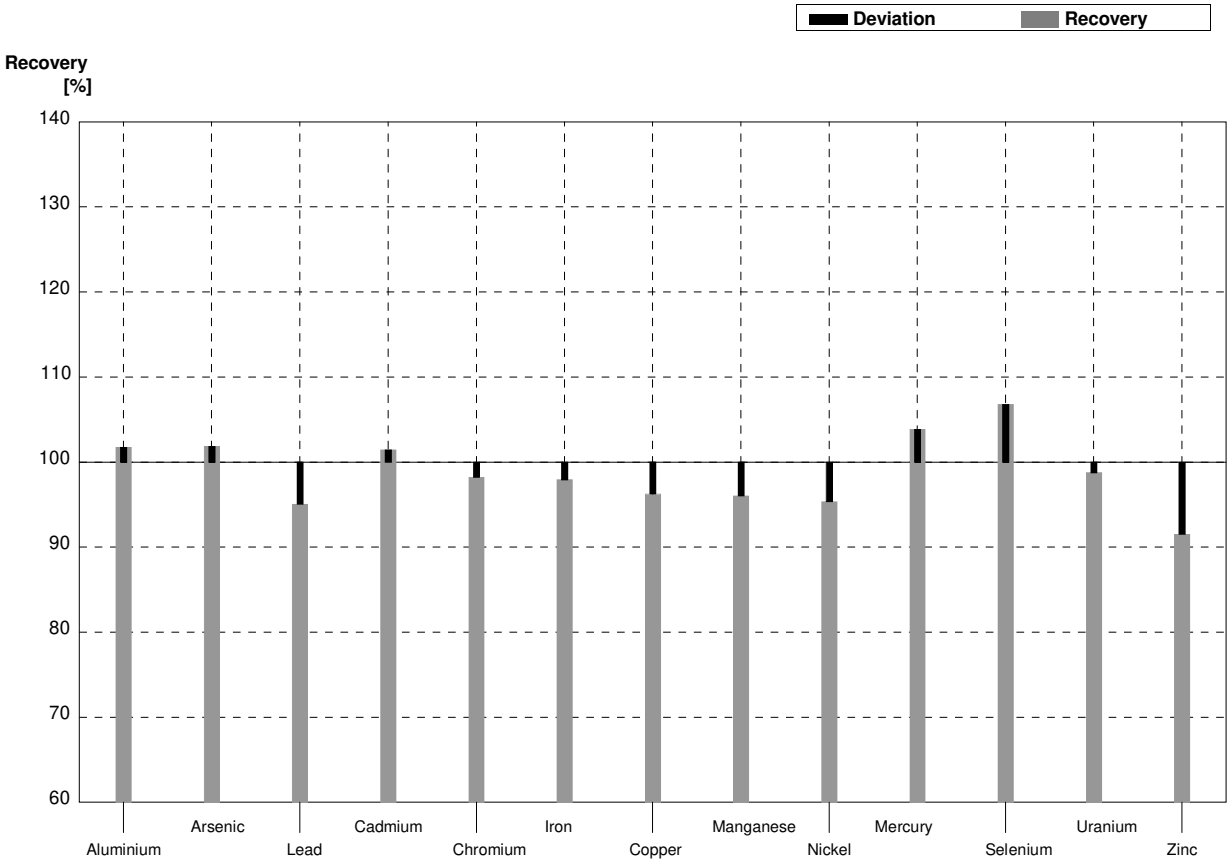
Sample **M164A**
Laboratory **K**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	44,5	8,9	µg/l	97%
Arsenic	<0,5		<0,2		µg/l	•
Lead	1,154	0,013	1,11	0,2	µg/l	96%
Cadmium	0,501	0,004	0,495	0,1	µg/l	99%
Chromium	1,158	0,012	1,13	0,2	µg/l	98%
Iron	34,00	0,18	33,5	6,7	µg/l	99%
Copper	1,70	0,05	1,62	0,3	µg/l	95%
Manganese	40,7	0,2	39,4	7,3	µg/l	97%
Nickel	1,93	0,05	1,86	0,4	µg/l	96%
Mercury	0,956	0,013	1,01	0,2	µg/l	106%
Selenium	2,11	0,02	2,11	0,4	µg/l	100%
Uranium	2,82	0,02	2,79	0,6	µg/l	99%
Zinc	12,9	1,6	12,1	2,4	µg/l	94%



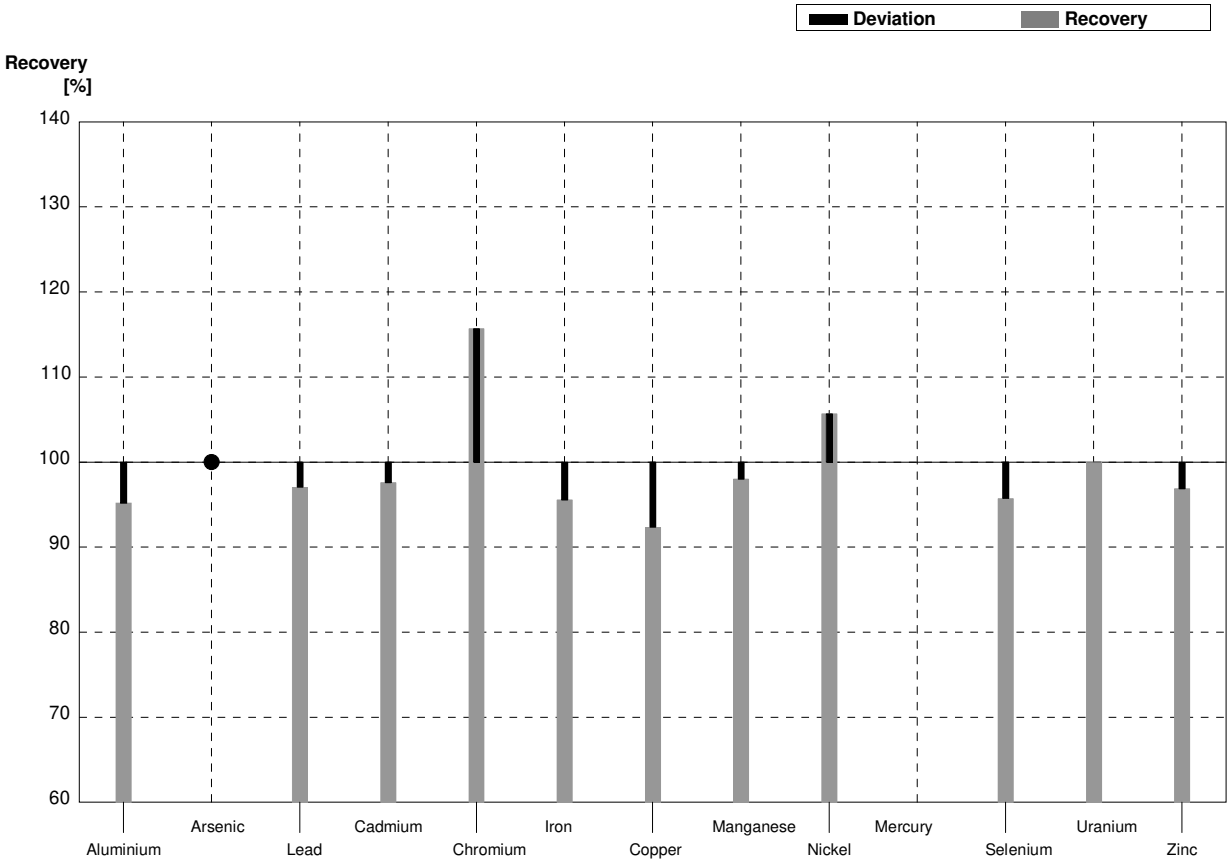
Sample **M164B**
Laboratory **K**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	17,5	3,5	µg/l	102%
Arsenic	2,268	0,014	2,31	0,5	µg/l	102%
Lead	2,84	0,02	2,70	0,5	µg/l	95%
Cadmium	0,208	0,003	0,211	0,04	µg/l	101%
Chromium	2,83	0,02	2,78	0,6	µg/l	98%
Iron	92,0	0,4	90,1	17,9	µg/l	98%
Copper	4,02	0,05	3,87	0,8	µg/l	96%
Manganese	25,20	0,16	24,2	4,8	µg/l	96%
Nickel	6,26	0,06	5,97	1,2	µg/l	95%
Mercury	1,502	0,016	1,56	0,3	µg/l	104%
Selenium	1,002	0,017	1,07	0,2	µg/l	107%
Uranium	7,25	0,05	7,16	1,4	µg/l	99%
Zinc	93,2	1,6	85,3	17,1	µg/l	92%



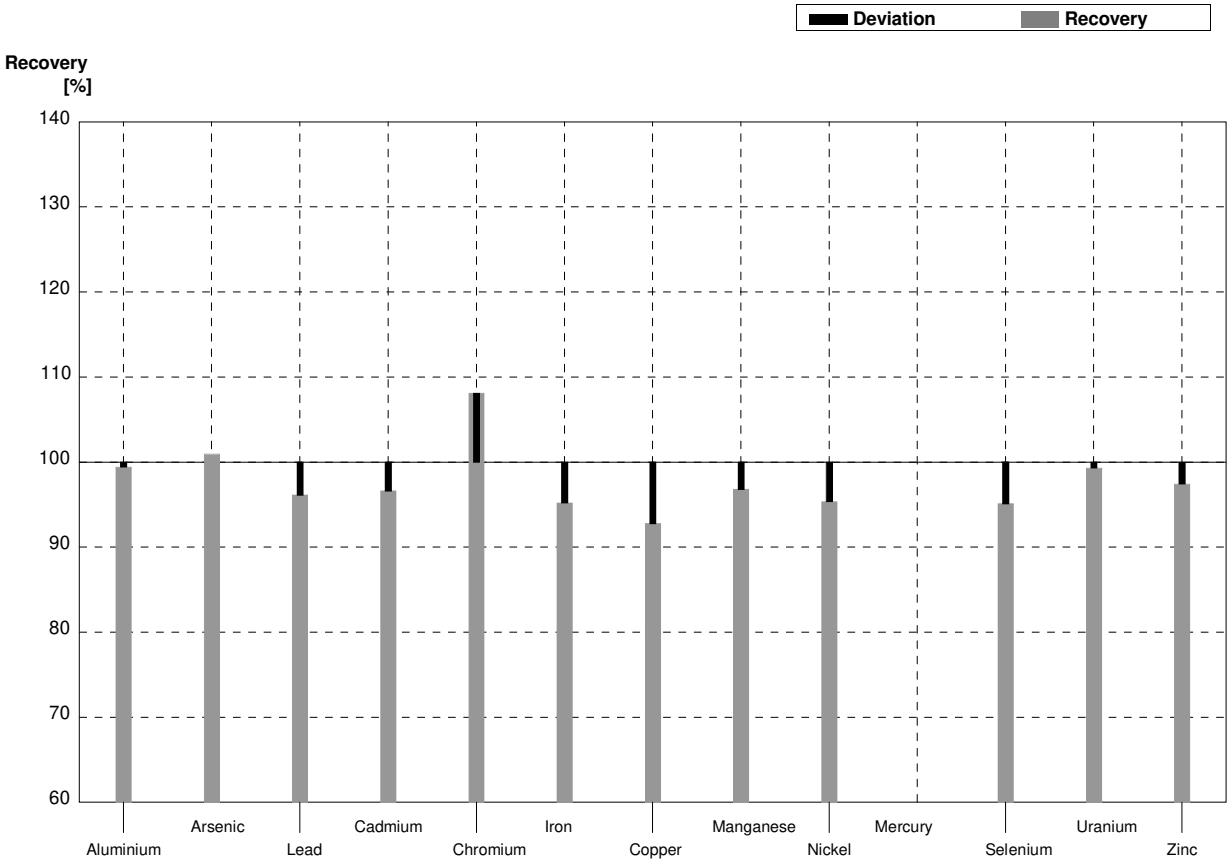
Sample **M164A**
Laboratory **L**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	43,6	13,1	µg/l	95%
Arsenic	<0,5		<0,1		µg/l	•
Lead	1,154	0,013	1,12	0,17	µg/l	97%
Cadmium	0,501	0,004	0,489	0,073	µg/l	98%
Chromium	1,158	0,012	1,34	0,40	µg/l	116%
Iron	34,00	0,18	32,5	4,9	µg/l	96%
Copper	1,70	0,05	1,57	0,47	µg/l	92%
Manganese	40,7	0,2	39,9	6,0	µg/l	98%
Nickel	1,93	0,05	2,04	1,02	µg/l	106%
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02	2,02	0,61	µg/l	96%
Uranium	2,82	0,02	2,82	0,42	µg/l	100%
Zinc	12,9	1,6	12,5	1,9	µg/l	97%



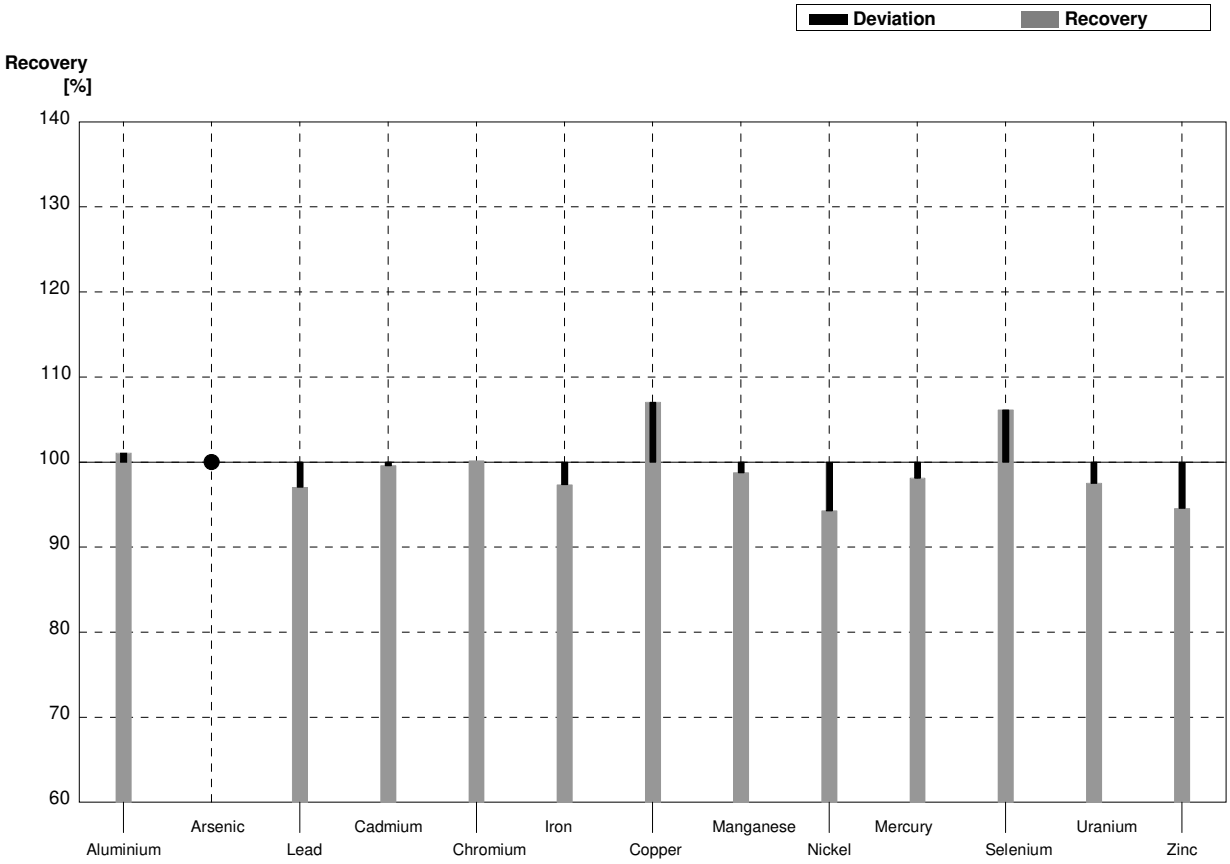
Sample M164B
Laboratory L

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	17,1	5,1	µg/l	99%
Arsenic	2,268	0,014	2,29	0,69	µg/l	101%
Lead	2,84	0,02	2,73	0,41	µg/l	96%
Cadmium	0,208	0,003	0,201	0,030	µg/l	97%
Chromium	2,83	0,02	3,06	0,92	µg/l	108%
Iron	92,0	0,4	87,6	13,1	µg/l	95%
Copper	4,02	0,05	3,73	1,12	µg/l	93%
Manganese	25,20	0,16	24,4	3,7	µg/l	97%
Nickel	6,26	0,06	5,97	1,79	µg/l	95%
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017	0,953	0,286	µg/l	95%
Uranium	7,25	0,05	7,20	1,08	µg/l	99%
Zinc	93,2	1,6	90,8	13,6	µg/l	97%



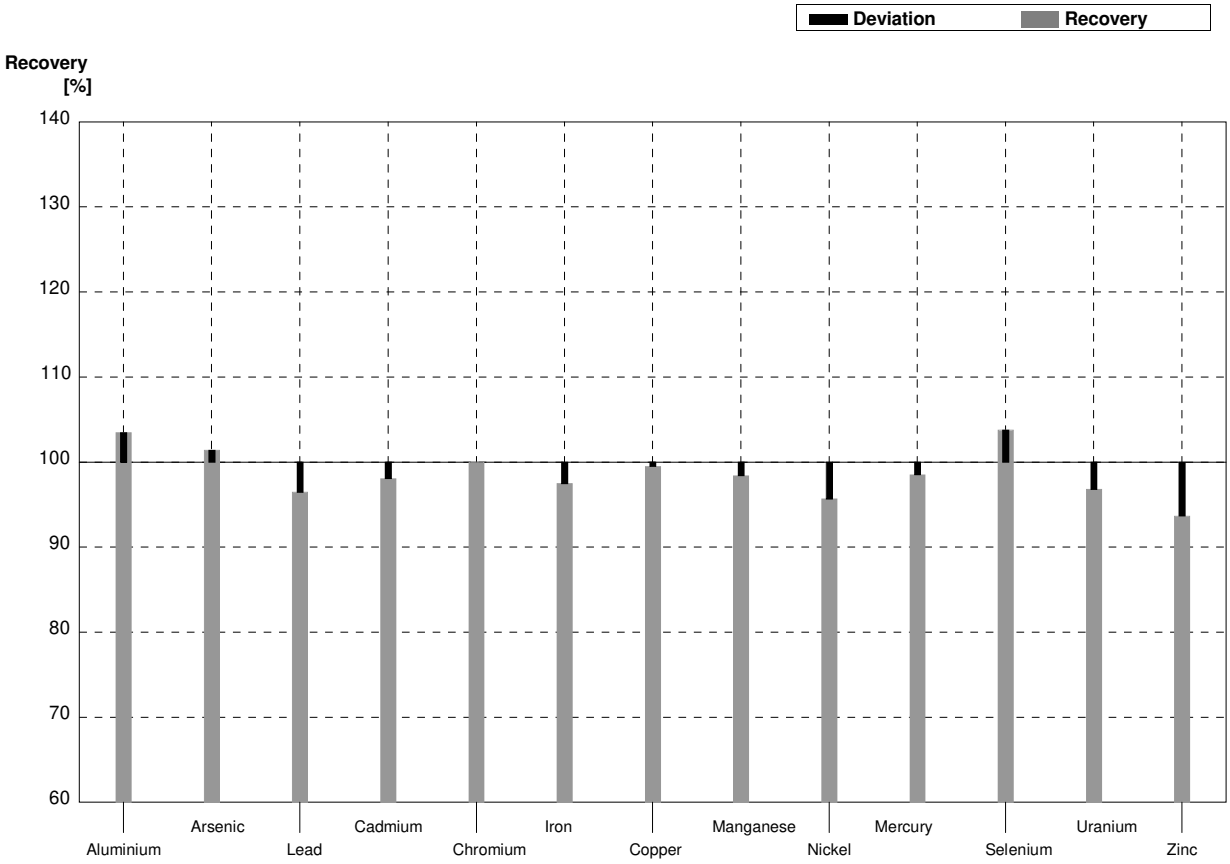
Sample **M164A**
Laboratory **M**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	46,3	5,6	µg/l	101%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,12	0,13	µg/l	97%
Cadmium	0,501	0,004	0,499	0,060	µg/l	100%
Chromium	1,158	0,012	1,16	0,22	µg/l	100%
Iron	34,00	0,18	33,1	6,0	µg/l	97%
Copper	1,70	0,05	1,82	0,20	µg/l	107%
Manganese	40,7	0,2	40,2	4,4	µg/l	99%
Nickel	1,93	0,05	1,82	0,42	µg/l	94%
Mercury	0,956	0,013	0,938	0,169	µg/l	98%
Selenium	2,11	0,02	2,24	0,76	µg/l	106%
Uranium	2,82	0,02	2,75	0,28	µg/l	98%
Zinc	12,9	1,6	12,2	2,0	µg/l	95%



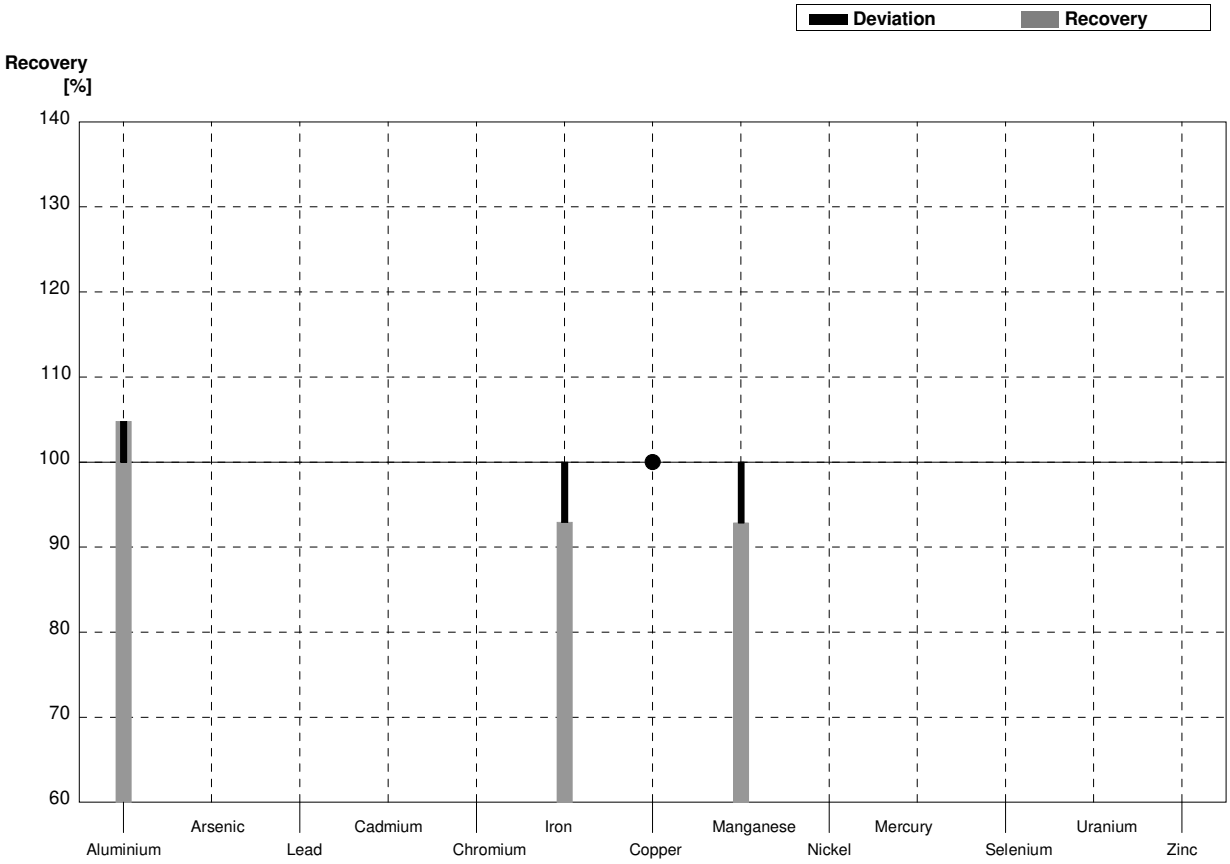
Sample **M164B**
Laboratory **M**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	17,8	3,0	µg/l	103%
Arsenic	2,268	0,014	2,30	0,39	µg/l	101%
Lead	2,84	0,02	2,74	0,33	µg/l	96%
Cadmium	0,208	0,003	0,204	0,024	µg/l	98%
Chromium	2,83	0,02	2,83	0,54	µg/l	100%
Iron	92,0	0,4	89,7	16,1	µg/l	98%
Copper	4,02	0,05	4,00	0,44	µg/l	100%
Manganese	25,20	0,16	24,8	3,7	µg/l	98%
Nickel	6,26	0,06	5,99	1,38	µg/l	96%
Mercury	1,502	0,016	1,48	0,27	µg/l	99%
Selenium	1,002	0,017	1,04	0,35	µg/l	104%
Uranium	7,25	0,05	7,02	0,70	µg/l	97%
Zinc	93,2	1,6	87,3	11,3	µg/l	94%



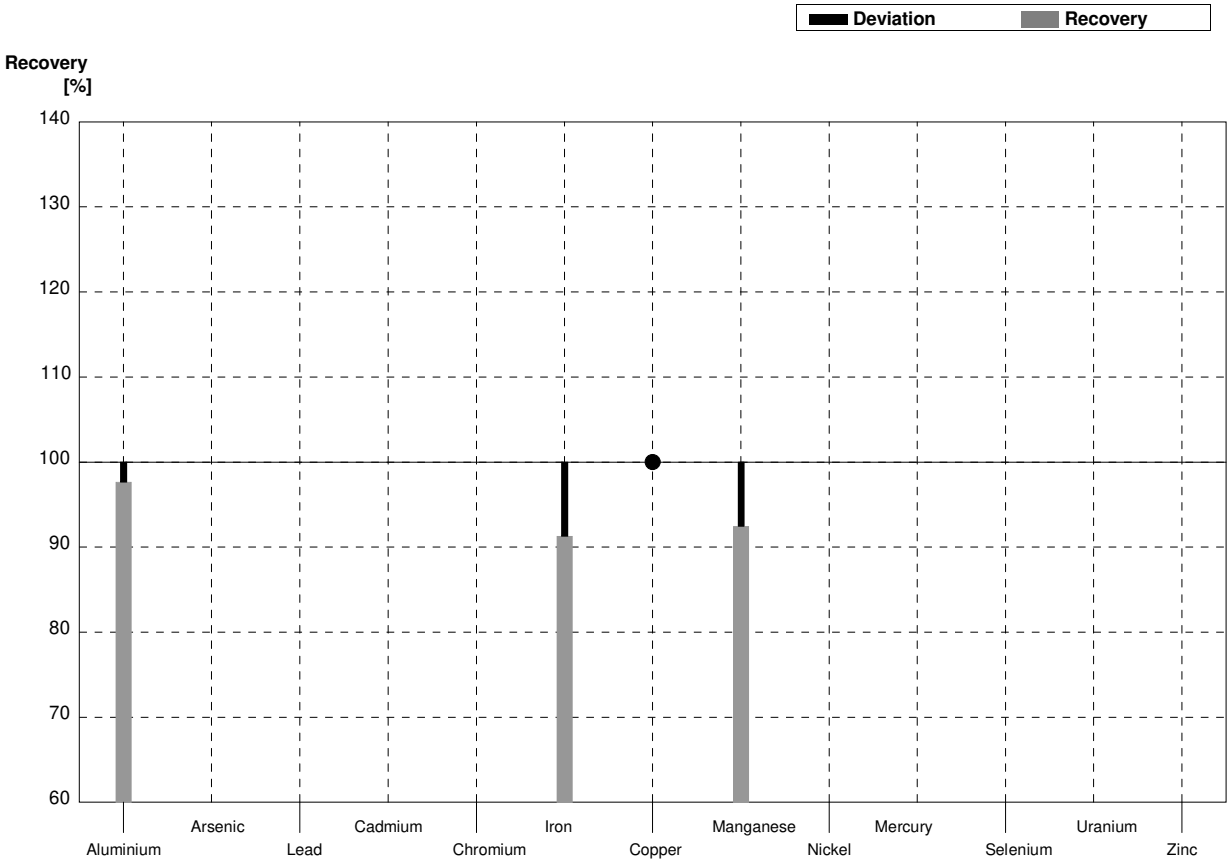
Sample **M164A**
Laboratory **N**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	48,0	8,2	µg/l	105%
Arsenic	<0,5				µg/l	
Lead	1,154	0,013			µg/l	
Cadmium	0,501	0,004			µg/l	
Chromium	1,158	0,012			µg/l	
Iron	34,00	0,18	31,6	5,7	µg/l	93%
Copper	1,70	0,05	<10		µg/l	•
Manganese	40,7	0,2	37,8	6,8	µg/l	93%
Nickel	1,93	0,05			µg/l	
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6			µg/l	



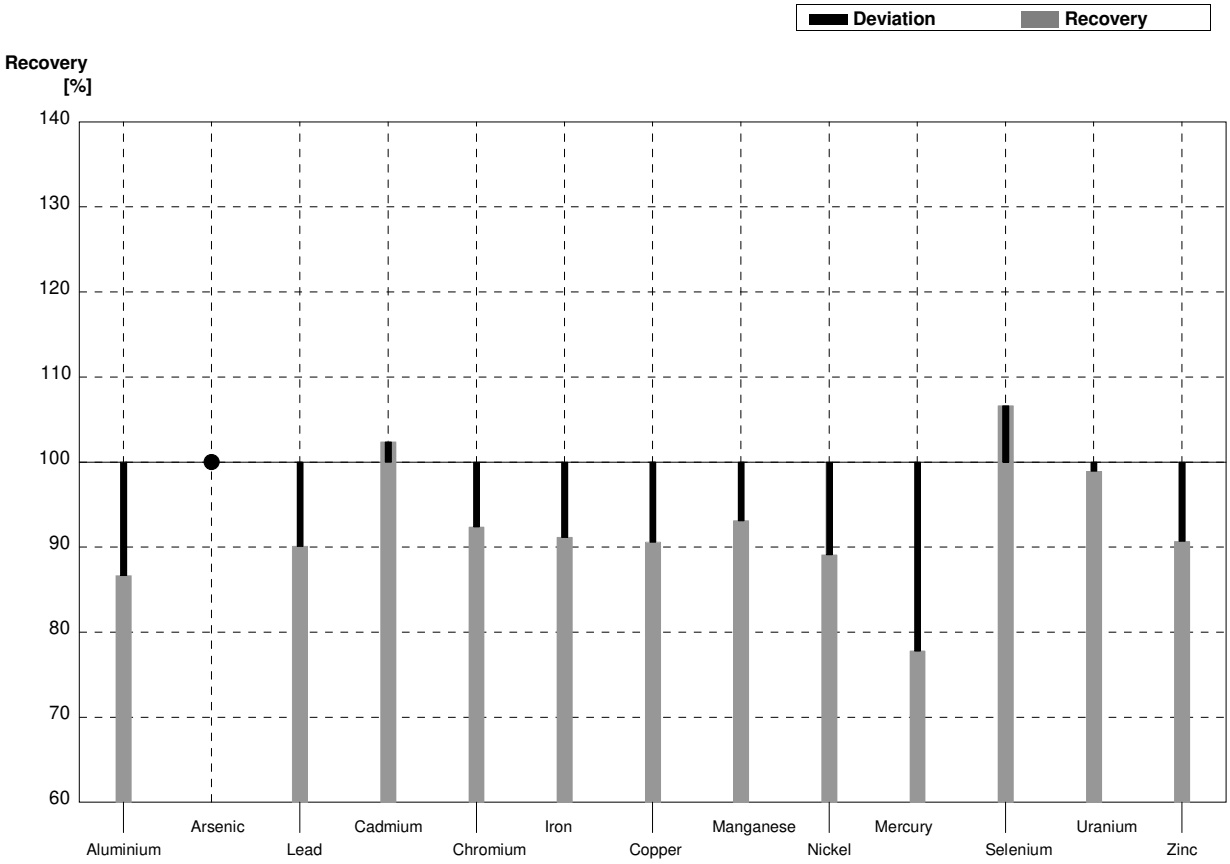
Sample **M164B**
Laboratory **N**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	16,8	2,90	µg/l	98%
Arsenic	2,268	0,014			µg/l	
Lead	2,84	0,02			µg/l	
Cadmium	0,208	0,003			µg/l	
Chromium	2,83	0,02			µg/l	
Iron	92,0	0,4	84	15,2	µg/l	91%
Copper	4,02	0,05	<10		µg/l	•
Manganese	25,20	0,16	23,3	4,20	µg/l	92%
Nickel	6,26	0,06			µg/l	
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6			µg/l	



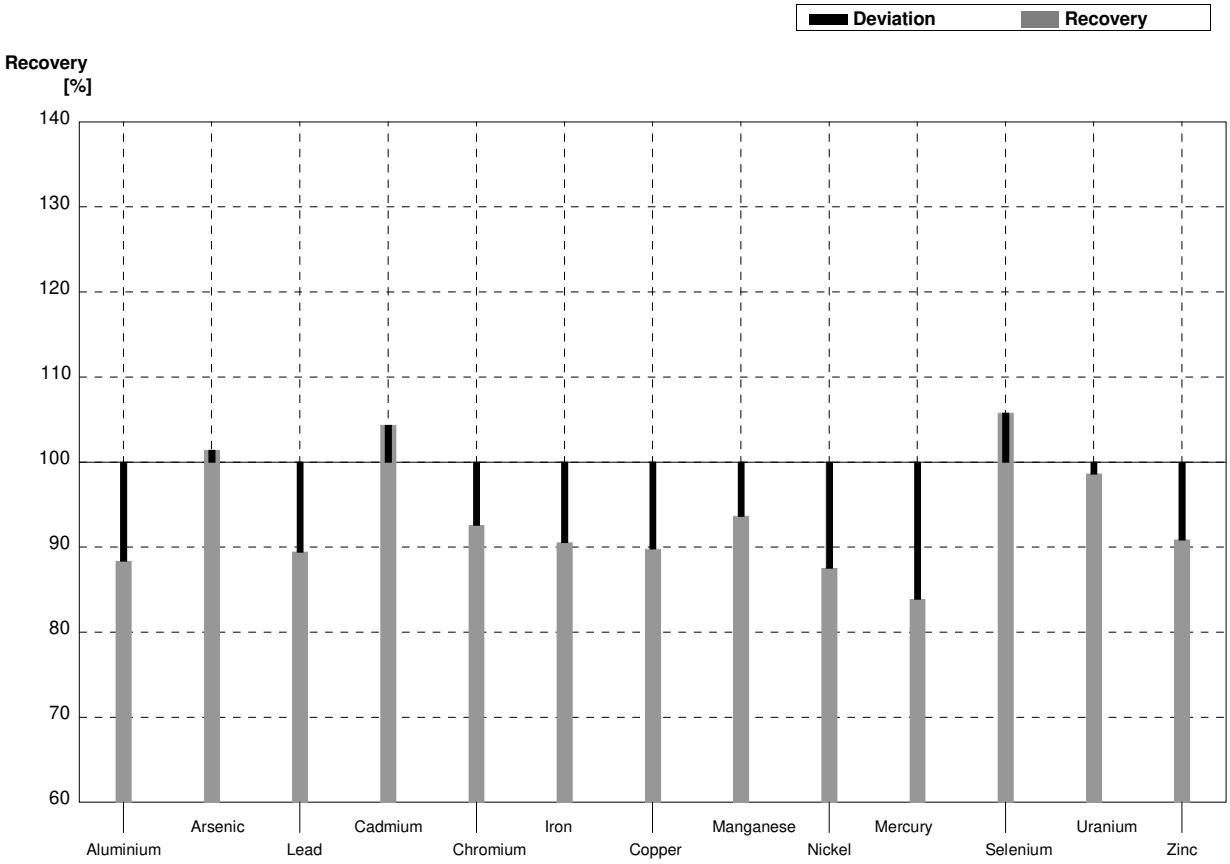
Sample **M164A**
Laboratory **O**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	39,7	9,5	µg/l	87%
Arsenic	<0,5		<1,0		µg/l	•
Lead	1,154	0,013	1,04	0,25	µg/l	90%
Cadmium	0,501	0,004	0,513	0,123	µg/l	102%
Chromium	1,158	0,012	1,07	0,26	µg/l	92%
Iron	34,00	0,18	31,0	7,4	µg/l	91%
Copper	1,70	0,05	1,54	0,37	µg/l	91%
Manganese	40,7	0,2	37,9	9,1	µg/l	93%
Nickel	1,93	0,05	1,72	0,41	µg/l	89%
Mercury	0,956	0,013	0,744	0,179	µg/l	78%
Selenium	2,11	0,02	2,25	0,58	µg/l	107%
Uranium	2,82	0,02	2,79	0,67	µg/l	99%
Zinc	12,9	1,6	11,7	2,8	µg/l	91%



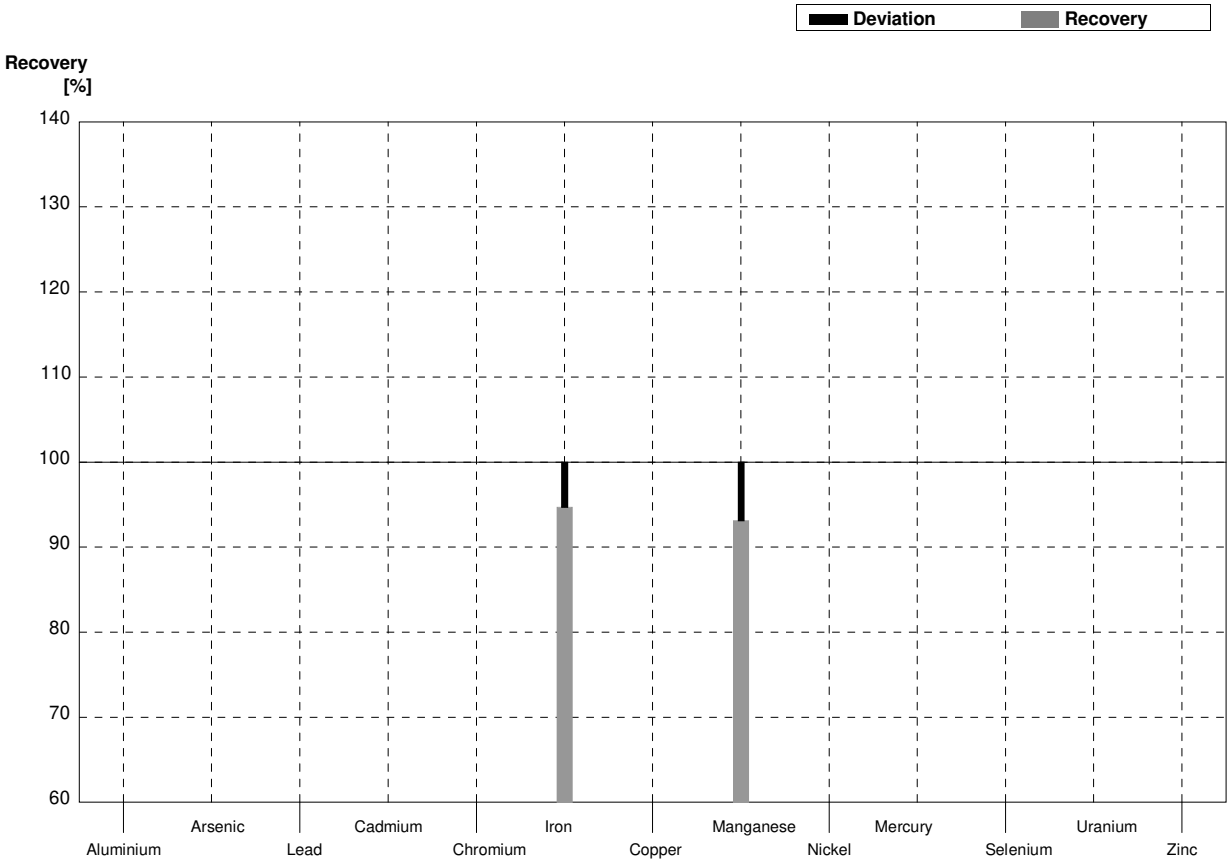
Sample **M164B**
Laboratory **O**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	15,2	3,6	µg/l	88%
Arsenic	2,268	0,014	2,30	0,55	µg/l	101%
Lead	2,84	0,02	2,54	0,61	µg/l	89%
Cadmium	0,208	0,003	0,217	0,052	µg/l	104%
Chromium	2,83	0,02	2,62	0,63	µg/l	93%
Iron	92,0	0,4	83,3	20,0	µg/l	91%
Copper	4,02	0,05	3,61	0,87	µg/l	90%
Manganese	25,20	0,16	23,6	5,7	µg/l	94%
Nickel	6,26	0,06	5,48	1,32	µg/l	88%
Mercury	1,502	0,016	1,26	0,30	µg/l	84%
Selenium	1,002	0,017	1,06	0,25	µg/l	106%
Uranium	7,25	0,05	7,15	1,72	µg/l	99%
Zinc	93,2	1,6	84,7	20,3	µg/l	91%



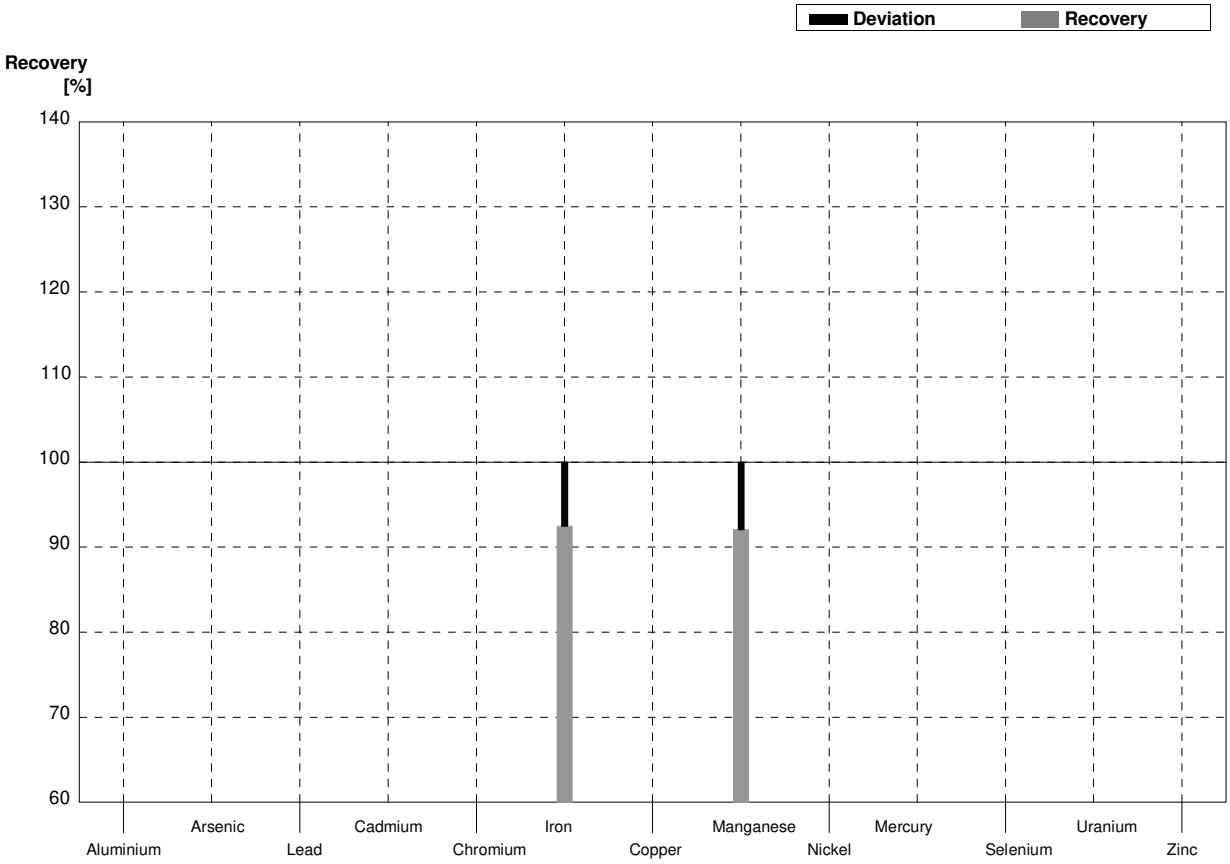
Sample **M164A**
Laboratory **P**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4			µg/l	
Arsenic	<0,5				µg/l	
Lead	1,154	0,013			µg/l	
Cadmium	0,501	0,004			µg/l	
Chromium	1,158	0,012			µg/l	
Iron	34,00	0,18	32,2	9,7	µg/l	95%
Copper	1,70	0,05			µg/l	
Manganese	40,7	0,2	37,9	3,8	µg/l	93%
Nickel	1,93	0,05			µg/l	
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6			µg/l	



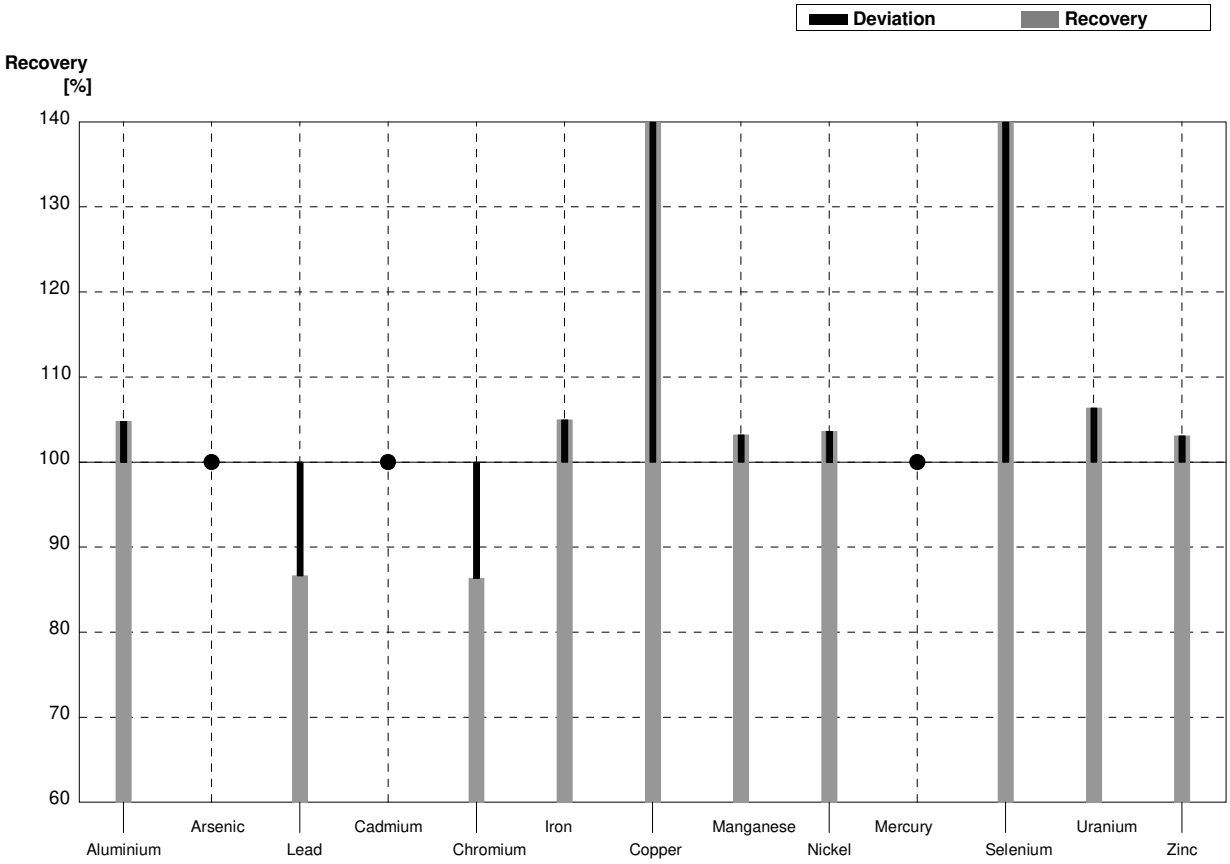
Sample **M164B**
Laboratory **P**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3			µg/l	
Arsenic	2,268	0,014			µg/l	
Lead	2,84	0,02			µg/l	
Cadmium	0,208	0,003			µg/l	
Chromium	2,83	0,02			µg/l	
Iron	92,0	0,4	85,1	4,3	µg/l	93%
Copper	4,02	0,05			µg/l	
Manganese	25,20	0,16	23,2	2,3	µg/l	92%
Nickel	6,26	0,06			µg/l	
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6			µg/l	



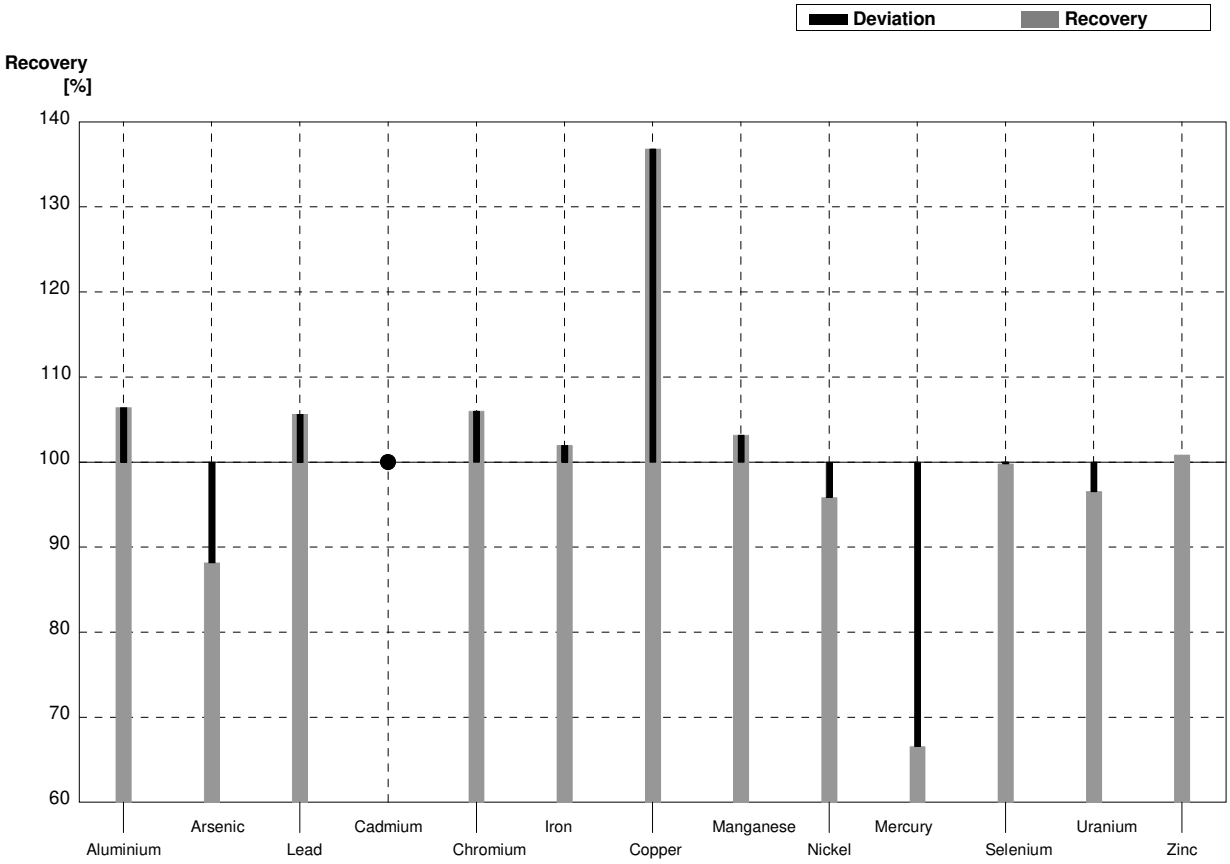
Sample **M164A**
Laboratory **Q**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	48,0	7,0	µg/l	105%
Arsenic	<0,5		<1,00	1,00	µg/l	•
Lead	1,154	0,013	1,00	1,00	µg/l	87%
Cadmium	0,501	0,004	<1,00	1,00	µg/l	•
Chromium	1,158	0,012	1,00	1,00	µg/l	86%
Iron	34,00	0,18	35,7	4,96	µg/l	105%
Copper	1,70	0,05	3,00	1,00	µg/l	176%
Manganese	40,7	0,2	42,0	6,0	µg/l	103%
Nickel	1,93	0,05	2,00	1,00	µg/l	104%
Mercury	0,956	0,013	<1,00	1,00	µg/l	•
Selenium	2,11	0,02	3,00	1,00	µg/l	142%
Uranium	2,82	0,02	3,00	1,00	µg/l	106%
Zinc	12,9	1,6	13,3	2,34	µg/l	103%



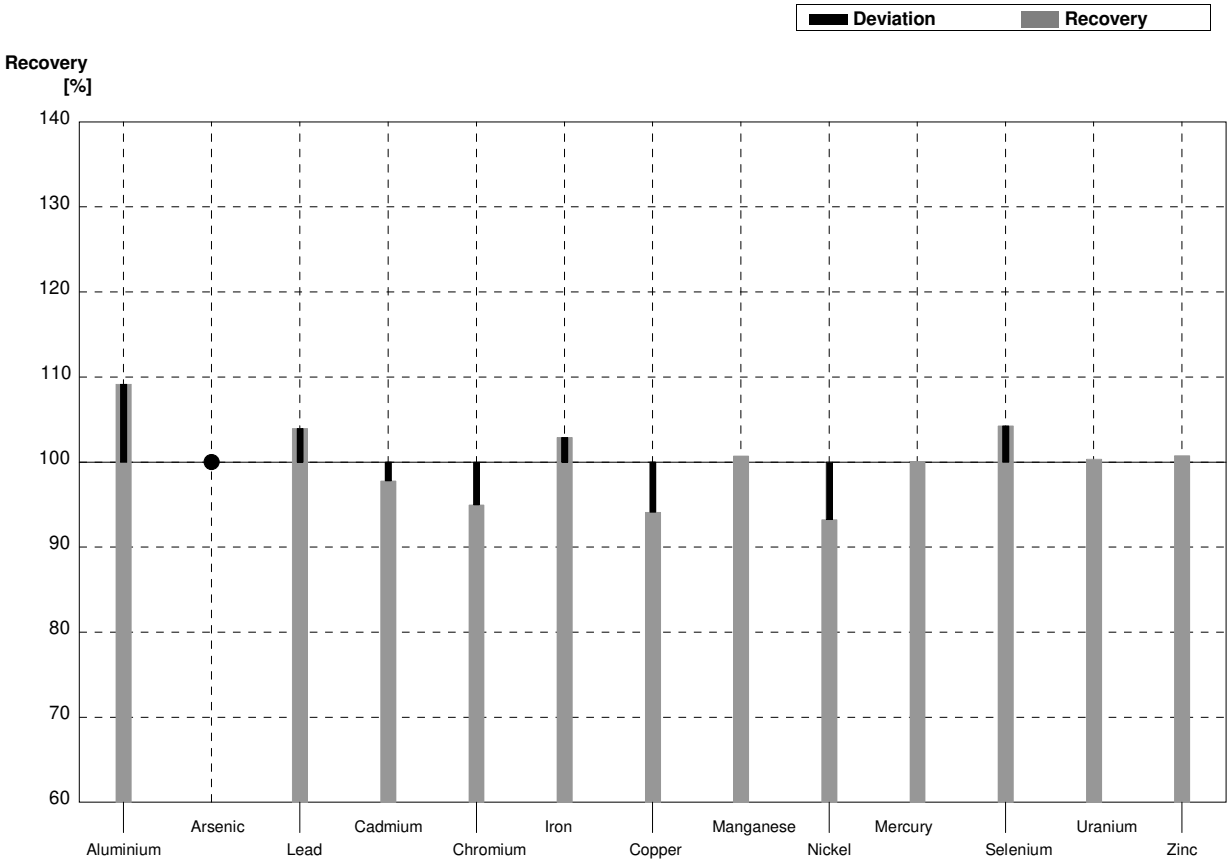
Sample **M164B**
Laboratory **Q**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	18,3	3,05	µg/l	106%
Arsenic	2,268	0,014	2,00	1,00	µg/l	88%
Lead	2,84	0,02	3,00	1,00	µg/l	106%
Cadmium	0,208	0,003	<1,00	1,00	µg/l	•
Chromium	2,83	0,02	3,00	1,00	µg/l	106%
Iron	92,0	0,4	93,8	9,00	µg/l	102%
Copper	4,02	0,05	5,5	2,00	µg/l	137%
Manganese	25,20	0,16	26,0	4,00	µg/l	103%
Nickel	6,26	0,06	6,0	1,50	µg/l	96%
Mercury	1,502	0,016	1,00	1,00	µg/l	67%
Selenium	1,002	0,017	1,00	1,00	µg/l	100%
Uranium	7,25	0,05	7,0	3,00	µg/l	97%
Zinc	93,2	1,6	94,0	8,0	µg/l	101%



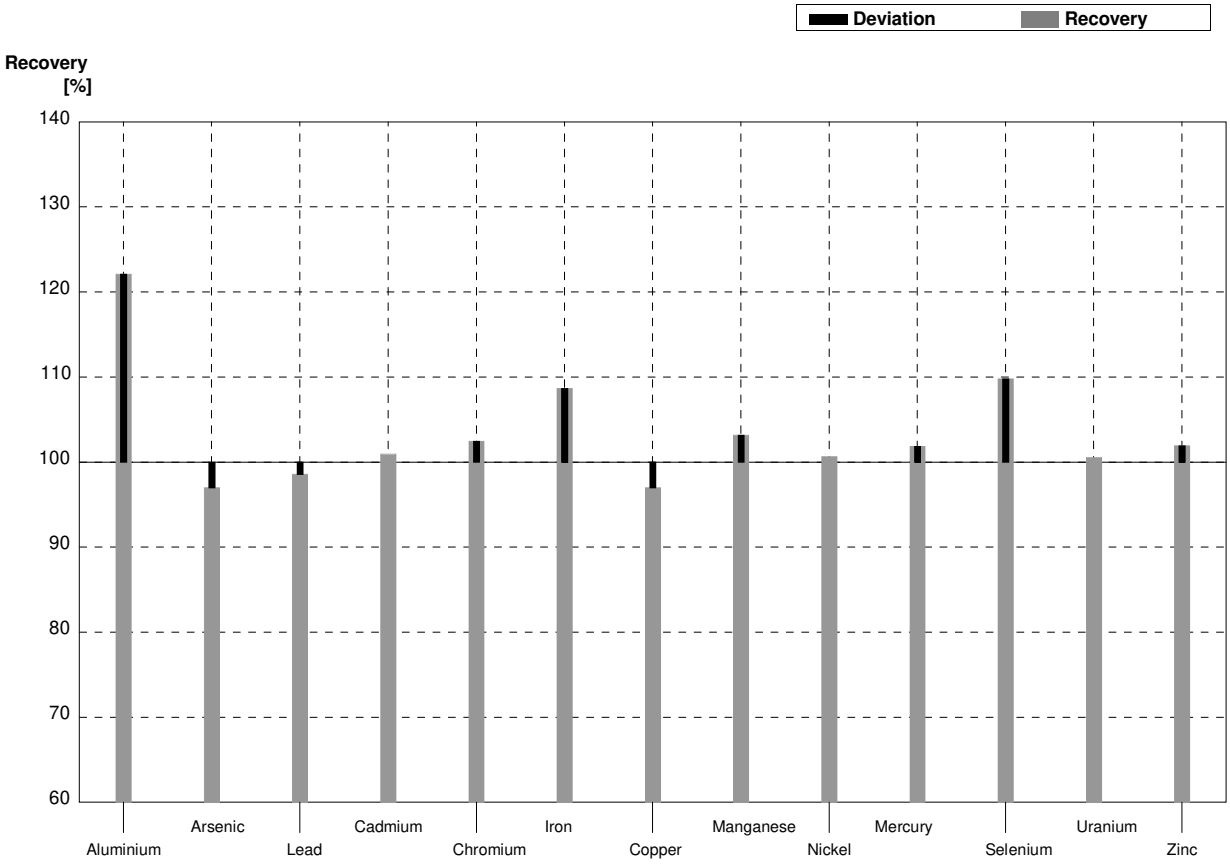
Sample **M164A**
Laboratory **R**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	50,0	5,00	µg/l	109%
Arsenic	<0,5		<0,50		µg/l	•
Lead	1,154	0,013	1,20	0,096	µg/l	104%
Cadmium	0,501	0,004	0,490	0,0392	µg/l	98%
Chromium	1,158	0,012	1,10	0,132	µg/l	95%
Iron	34,00	0,18	35,0	9,10	µg/l	103%
Copper	1,70	0,05	1,60	0,128	µg/l	94%
Manganese	40,7	0,2	41,0	4,10	µg/l	101%
Nickel	1,93	0,05	1,80	0,180	µg/l	93%
Mercury	0,956	0,013	0,957	0,144	µg/l	100%
Selenium	2,11	0,02	2,20	0,330	µg/l	104%
Uranium	2,82	0,02	2,83	0,142	µg/l	100%
Zinc	12,9	1,6	13,0	1,30	µg/l	101%



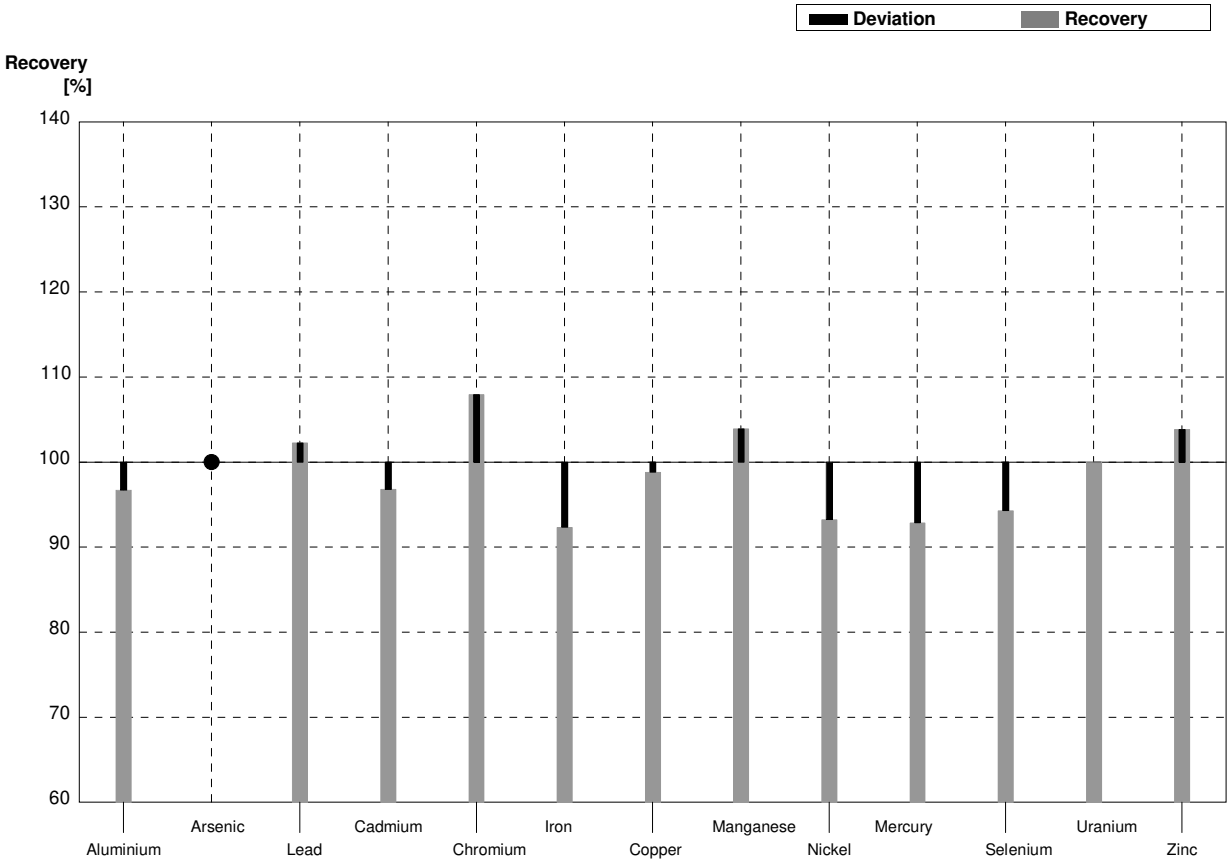
Sample **M164B**
Laboratory **R**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	21,0	2,10	µg/l	122%
Arsenic	2,268	0,014	2,20	0,264	µg/l	97%
Lead	2,84	0,02	2,80	0,224	µg/l	99%
Cadmium	0,208	0,003	0,210	0,0168	µg/l	101%
Chromium	2,83	0,02	2,90	0,384	µg/l	102%
Iron	92,0	0,4	100	26,0	µg/l	109%
Copper	4,02	0,05	3,90	0,312	µg/l	97%
Manganese	25,20	0,16	26,0	2,60	µg/l	103%
Nickel	6,26	0,06	6,30	0,63	µg/l	101%
Mercury	1,502	0,016	1,53	0,229	µg/l	102%
Selenium	1,002	0,017	1,10	0,165	µg/l	110%
Uranium	7,25	0,05	7,29	0,365	µg/l	101%
Zinc	93,2	1,6	95,0	9,50	µg/l	102%



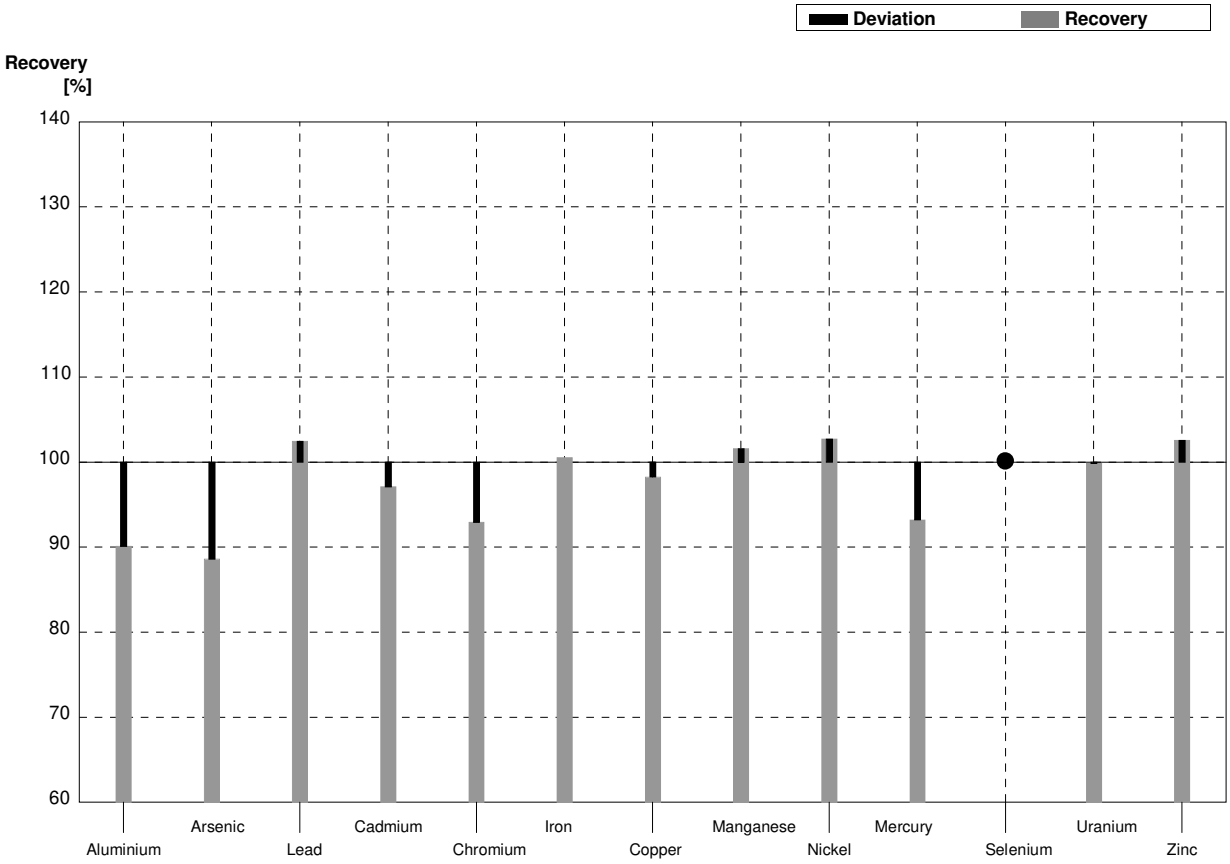
Sample **M164A**
Laboratory **S**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	44,3	0,545	µg/l	97%
Arsenic	<0,5		[0,14]		µg/l	•
Lead	1,154	0,013	1,18	0,0842	µg/l	102%
Cadmium	0,501	0,004	0,485	0,0123	µg/l	97%
Chromium	1,158	0,012	1,25	0,088	µg/l	108%
Iron	34,00	0,18	31,4	0,572	µg/l	92%
Copper	1,70	0,05	1,68	0,0578	µg/l	99%
Manganese	40,7	0,2	42,3	1,06	µg/l	104%
Nickel	1,93	0,05	1,80	0,201	µg/l	93%
Mercury	0,956	0,013	0,888	0,0474	µg/l	93%
Selenium	2,11	0,02	1,99	0,153	µg/l	94%
Uranium	2,82	0,02	2,82	0,0368	µg/l	100%
Zinc	12,9	1,6	13,4	0,362	µg/l	104%



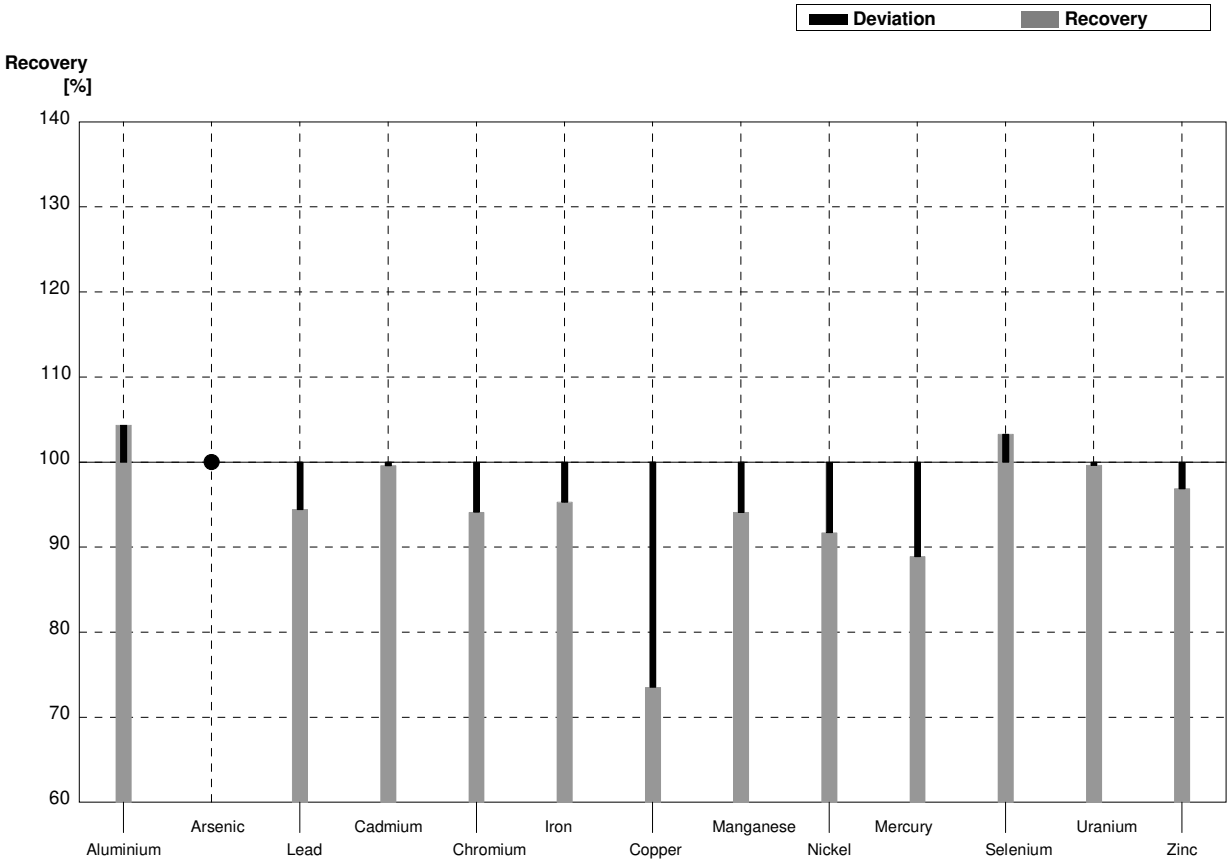
Sample **M164B**
Laboratory **S**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	15,5	0,593	µg/l	90%
Arsenic	2,268	0,014	2,01	0,128	µg/l	89%
Lead	2,84	0,02	2,91	0,0765	µg/l	102%
Cadmium	0,208	0,003	0,202	0,0137	µg/l	97%
Chromium	2,83	0,02	2,63	0,081	µg/l	93%
Iron	92,0	0,4	92,5	0,703	µg/l	101%
Copper	4,02	0,05	3,95	0,0520	µg/l	98%
Manganese	25,20	0,16	25,6	1,13	µg/l	102%
Nickel	6,26	0,06	6,43	0,171	µg/l	103%
Mercury	1,502	0,016	1,40	0,0475	µg/l	93%
Selenium	1,002	0,017	<1		µg/l	•
Uranium	7,25	0,05	7,24	0,0359	µg/l	100%
Zinc	93,2	1,6	95,6	3,48	µg/l	103%



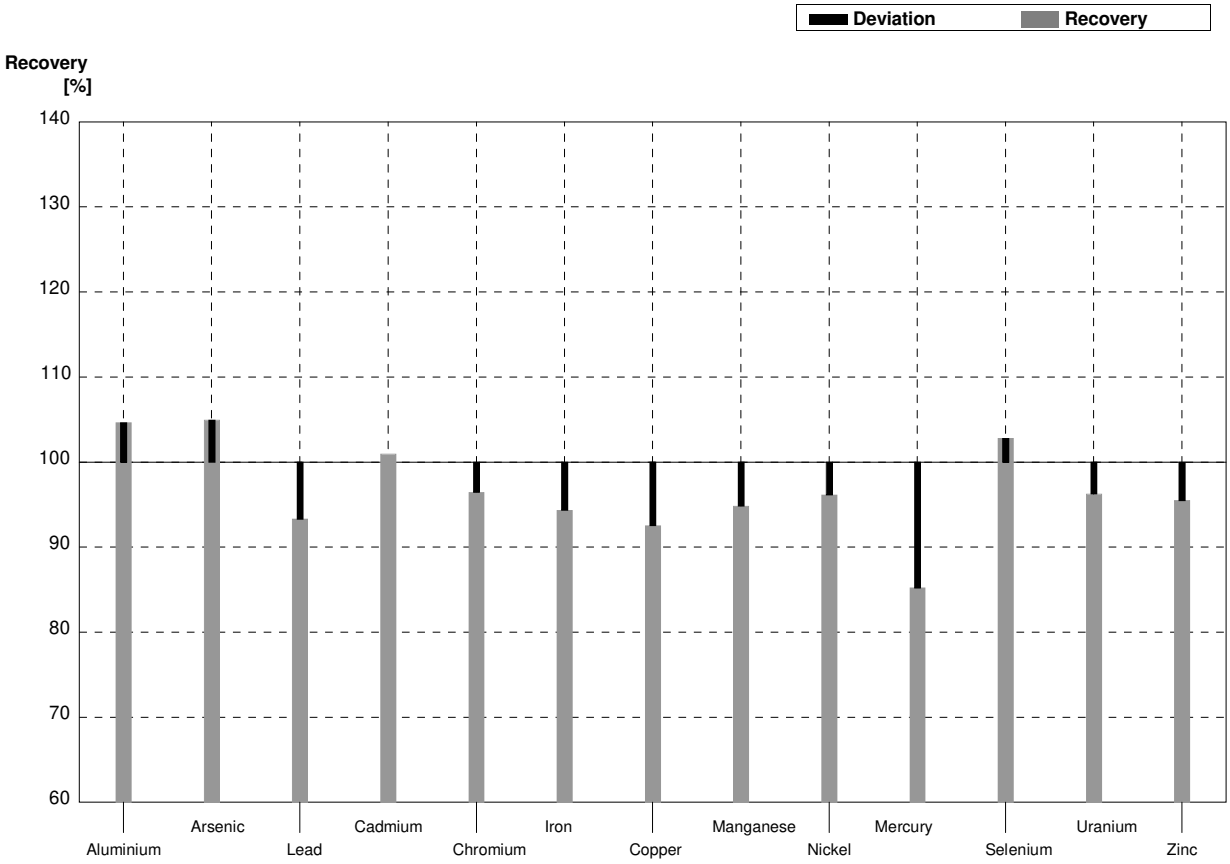
Sample **M164A**
Laboratory **T**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	47,8	5,5	µg/l	104%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,09	0,14	µg/l	94%
Cadmium	0,501	0,004	0,499	0,1	µg/l	100%
Chromium	1,158	0,012	1,09	0,22	µg/l	94%
Iron	34,00	0,18	32,4	2,2	µg/l	95%
Copper	1,70	0,05	1,25	0,24	µg/l	74%
Manganese	40,7	0,2	38,3	2,4	µg/l	94%
Nickel	1,93	0,05	1,77	0,2	µg/l	92%
Mercury	0,956	0,013	0,85	0,01	µg/l	89%
Selenium	2,11	0,02	2,18	0,35	µg/l	103%
Uranium	2,82	0,02	2,81	0,18	µg/l	100%
Zinc	12,9	1,6	12,5	1,87	µg/l	97%



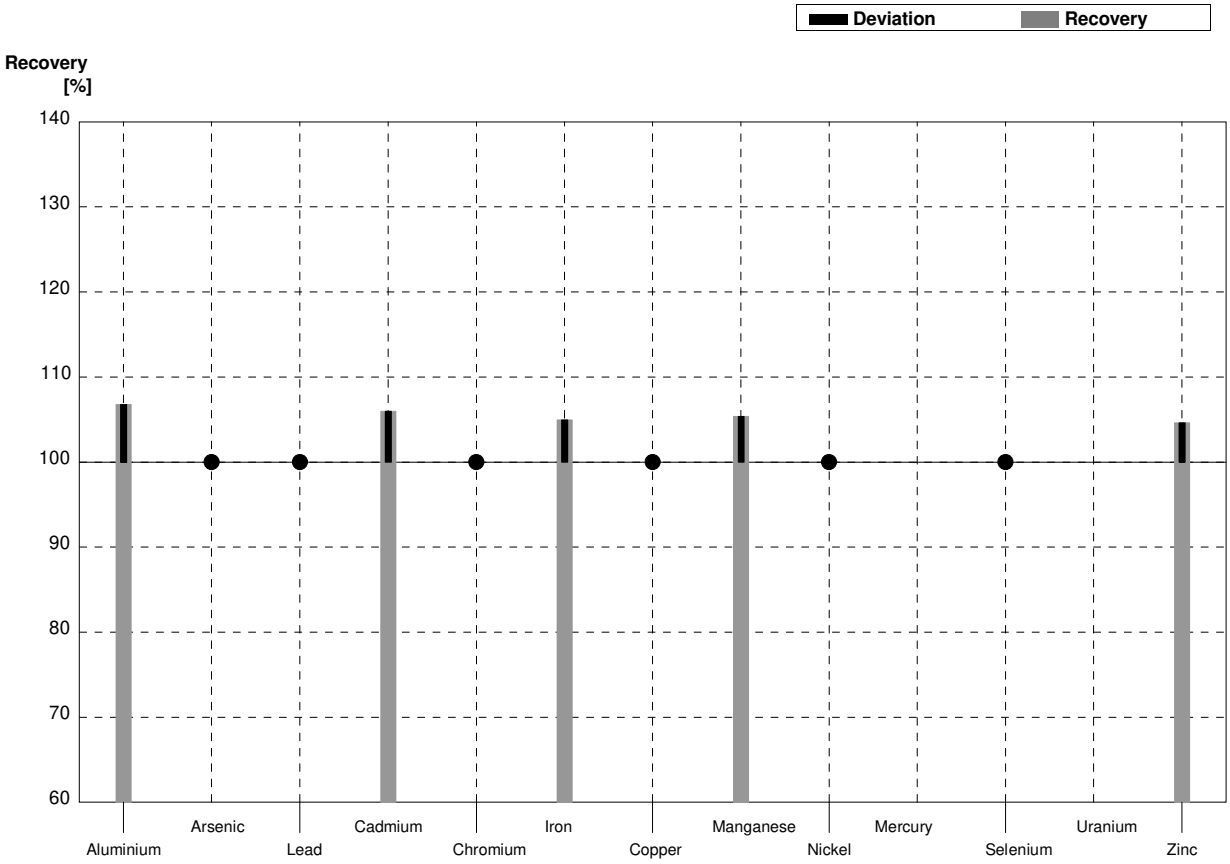
Sample **M164B**
Laboratory **T**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	18,0	2,1	µg/l	105%
Arsenic	2,268	0,014	2,38	0,20	µg/l	105%
Lead	2,84	0,02	2,65	0,28	µg/l	93%
Cadmium	0,208	0,003	0,210	0,03	µg/l	101%
Chromium	2,83	0,02	2,73	0,22	µg/l	96%
Iron	92,0	0,4	86,8	6,13	µg/l	94%
Copper	4,02	0,05	3,72	0,24	µg/l	93%
Manganese	25,20	0,16	23,9	1,64	µg/l	95%
Nickel	6,26	0,06	6,02	0,69	µg/l	96%
Mercury	1,502	0,016	1,28	0,26	µg/l	85%
Selenium	1,002	0,017	1,03	0,17	µg/l	103%
Uranium	7,25	0,05	6,98	0,54	µg/l	96%
Zinc	93,2	1,6	89,0	23,5	µg/l	95%



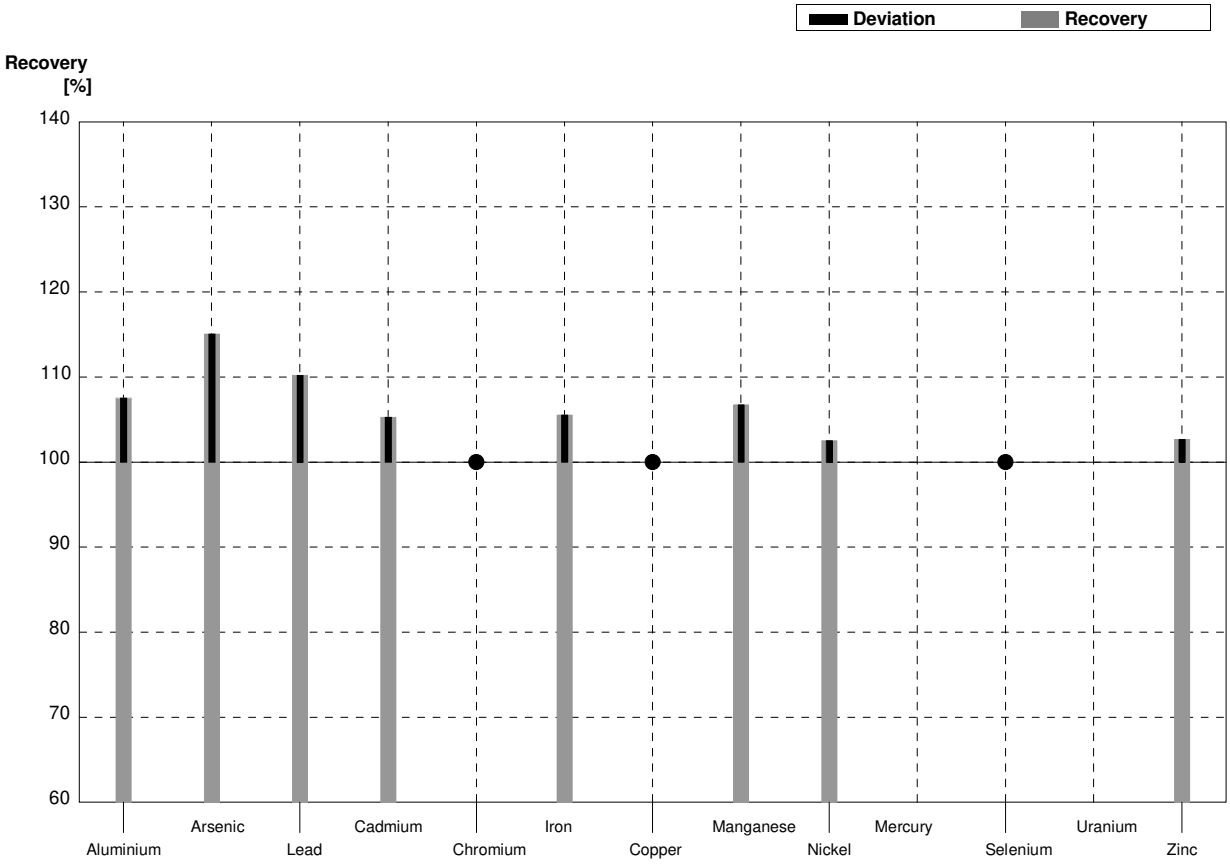
Sample **M164A**
Laboratory **U**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	48,9	7,53	µg/l	107%
Arsenic	<0,5		<2		µg/l	•
Lead	1,154	0,013	<2		µg/l	•
Cadmium	0,501	0,004	0,531	0,037	µg/l	106%
Chromium	1,158	0,012	<5		µg/l	•
Iron	34,00	0,18	35,7	2,9	µg/l	105%
Copper	1,70	0,05	<10		µg/l	•
Manganese	40,7	0,2	42,9	3,1	µg/l	105%
Nickel	1,93	0,05	<2		µg/l	•
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02	<5		µg/l	•
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6	13,5	1,89	µg/l	105%



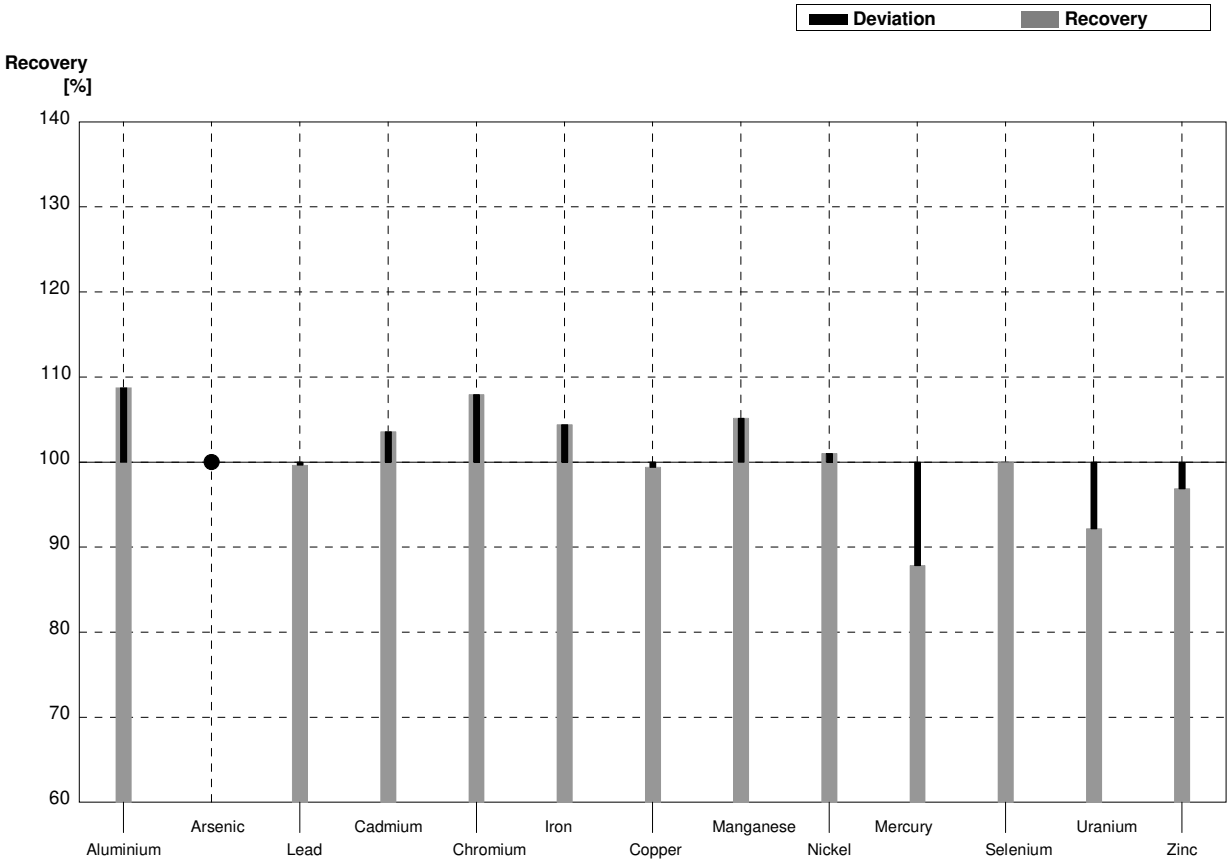
Sample **M164B**
Laboratory **U**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	18,5	2,85	µg/l	108%
Arsenic	2,268	0,014	2,61	0,39	µg/l	115%
Lead	2,84	0,02	3,13	0,54	µg/l	110%
Cadmium	0,208	0,003	0,219	0,015	µg/l	105%
Chromium	2,83	0,02	<5		µg/l	•
Iron	92,0	0,4	97,1	8,0	µg/l	106%
Copper	4,02	0,05	<10		µg/l	•
Manganese	25,20	0,16	26,9	1,9	µg/l	107%
Nickel	6,26	0,06	6,42	0,79	µg/l	103%
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017	<5		µg/l	•
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6	95,7	13,4	µg/l	103%



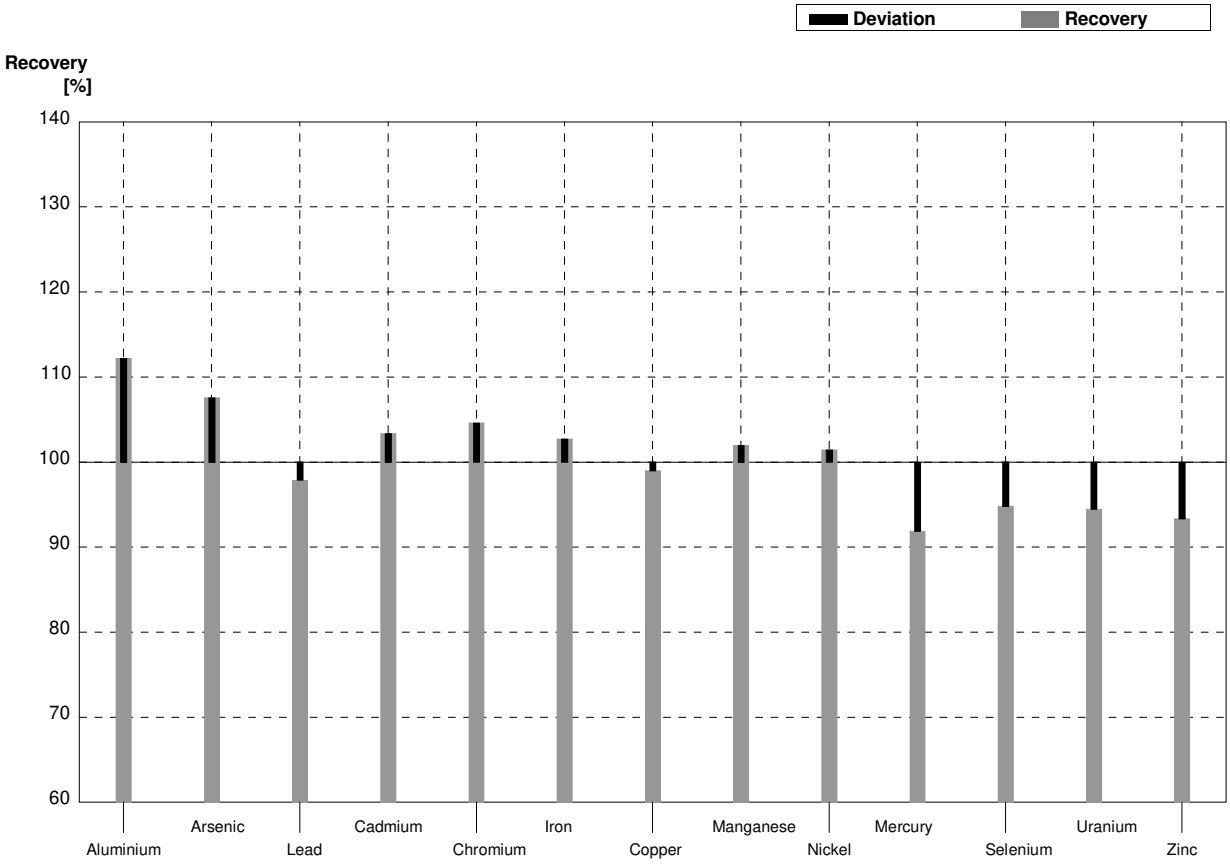
Sample M164A
Laboratory V

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	49,8	4,25	µg/l	109%
Arsenic	<0,5		<0,01		µg/l	•
Lead	1,154	0,013	1,15	0,13	µg/l	100%
Cadmium	0,501	0,004	0,519	0,25	µg/l	104%
Chromium	1,158	0,012	1,25	0,21	µg/l	108%
Iron	34,00	0,18	35,5	4,43	µg/l	104%
Copper	1,70	0,05	1,69	0,23	µg/l	99%
Manganese	40,7	0,2	42,8	5,62	µg/l	105%
Nickel	1,93	0,05	1,95	0,18	µg/l	101%
Mercury	0,956	0,013	0,84	0,14	µg/l	88%
Selenium	2,11	0,02	2,11	0,35	µg/l	100%
Uranium	2,82	0,02	2,60	0,29	µg/l	92%
Zinc	12,9	1,6	12,5	0,83	µg/l	97%



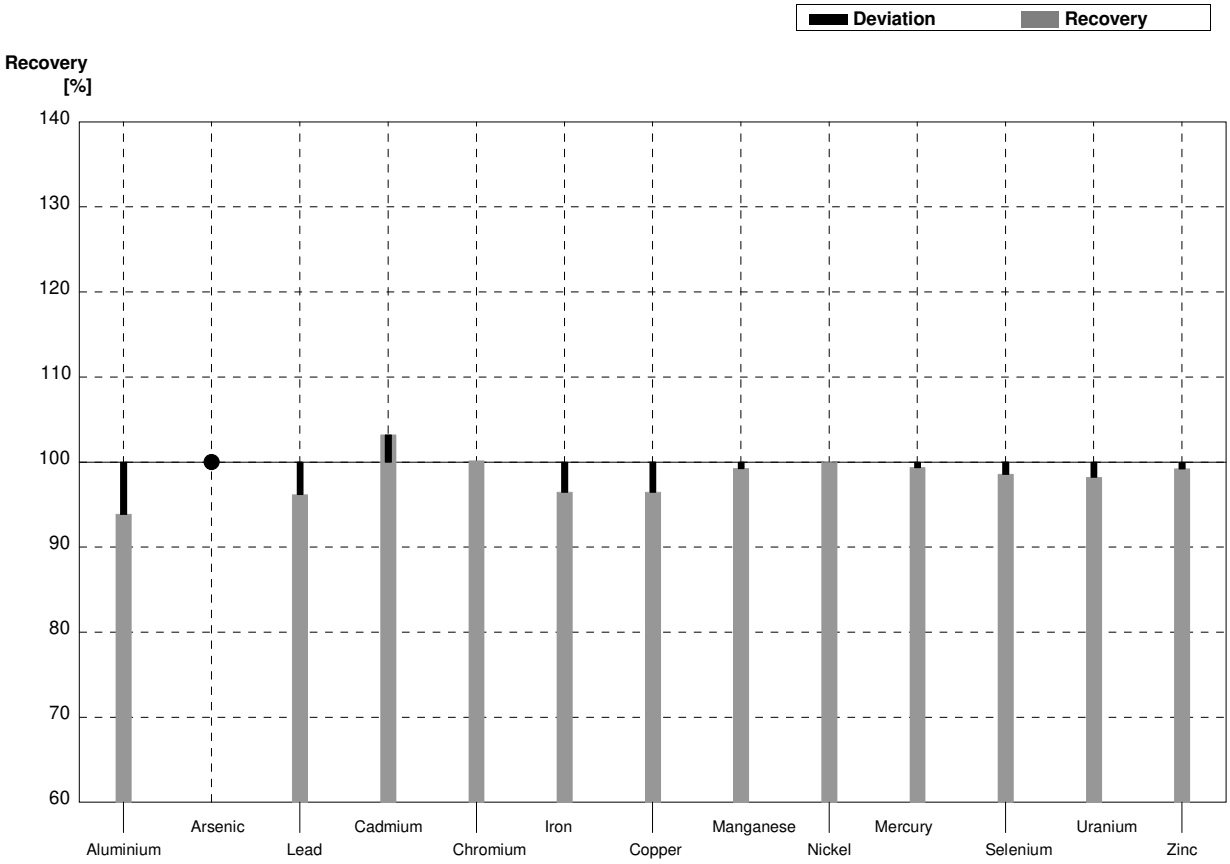
Sample M164B
Laboratory V

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	19,3	2,4	µg/l	112%
Arsenic	2,268	0,014	2,44	0,31	µg/l	108%
Lead	2,84	0,02	2,78	0,22	µg/l	98%
Cadmium	0,208	0,003	0,215	0,18	µg/l	103%
Chromium	2,83	0,02	2,96	0,39	µg/l	105%
Iron	92,0	0,4	94,5	7,1	µg/l	103%
Copper	4,02	0,05	3,98	0,51	µg/l	99%
Manganese	25,20	0,16	25,7	3,4	µg/l	102%
Nickel	6,26	0,06	6,35	2,45	µg/l	101%
Mercury	1,502	0,016	1,38	0,27	µg/l	92%
Selenium	1,002	0,017	0,95	0,21	µg/l	95%
Uranium	7,25	0,05	6,85	0,67	µg/l	94%
Zinc	93,2	1,6	87	1,21	µg/l	93%



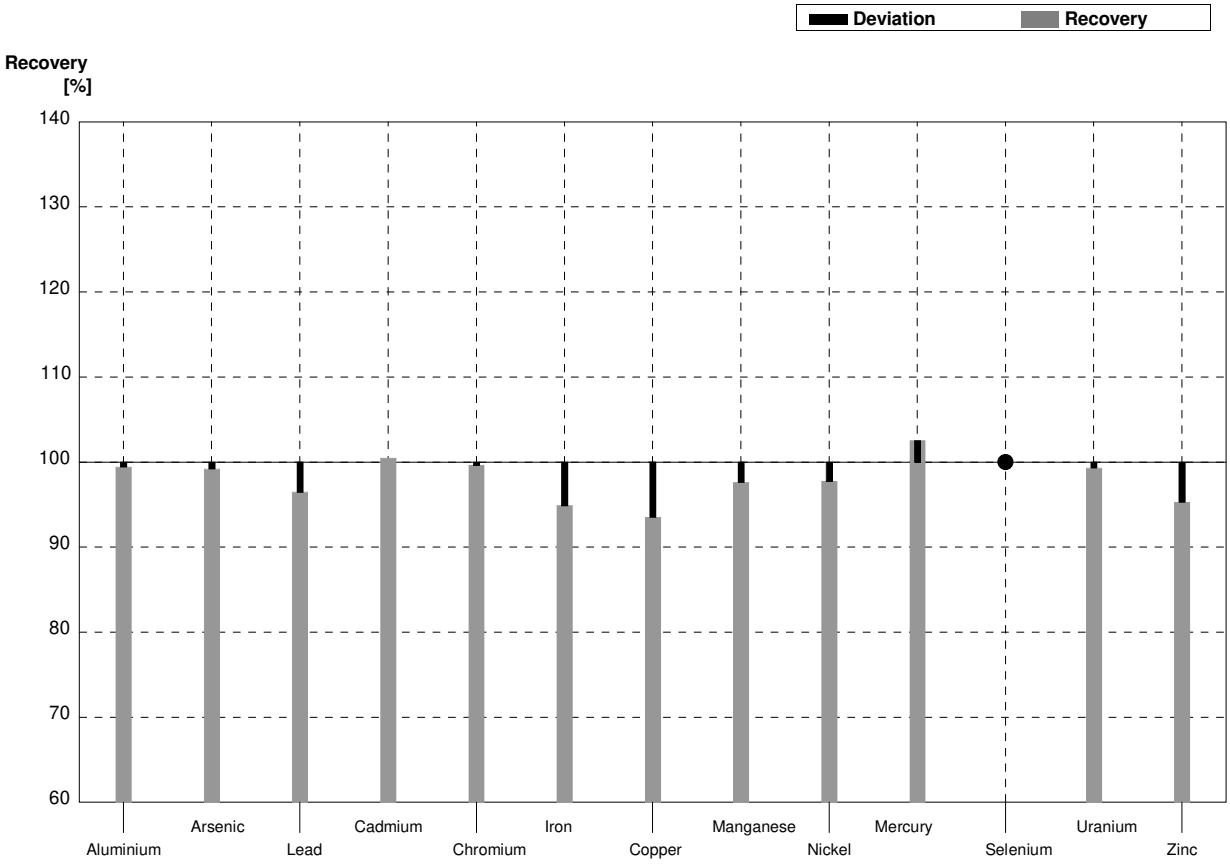
Sample **M164A**
Laboratory **W**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	43,0	5,7	µg/l	94%
Arsenic	<0,5		<1,0		µg/l	•
Lead	1,154	0,013	1,11	0,13	µg/l	96%
Cadmium	0,501	0,004	0,517	0,07	µg/l	103%
Chromium	1,158	0,012	1,16	0,24	µg/l	100%
Iron	34,00	0,18	32,8	3,6	µg/l	96%
Copper	1,70	0,05	1,64	0,27	µg/l	96%
Manganese	40,7	0,2	40,4	4,0	µg/l	99%
Nickel	1,93	0,05	1,93	0,42	µg/l	100%
Mercury	0,956	0,013	0,95	0,13	µg/l	99%
Selenium	2,11	0,02	2,08	0,31	µg/l	99%
Uranium	2,82	0,02	2,77	0,28	µg/l	98%
Zinc	12,9	1,6	12,8	1,8	µg/l	99%



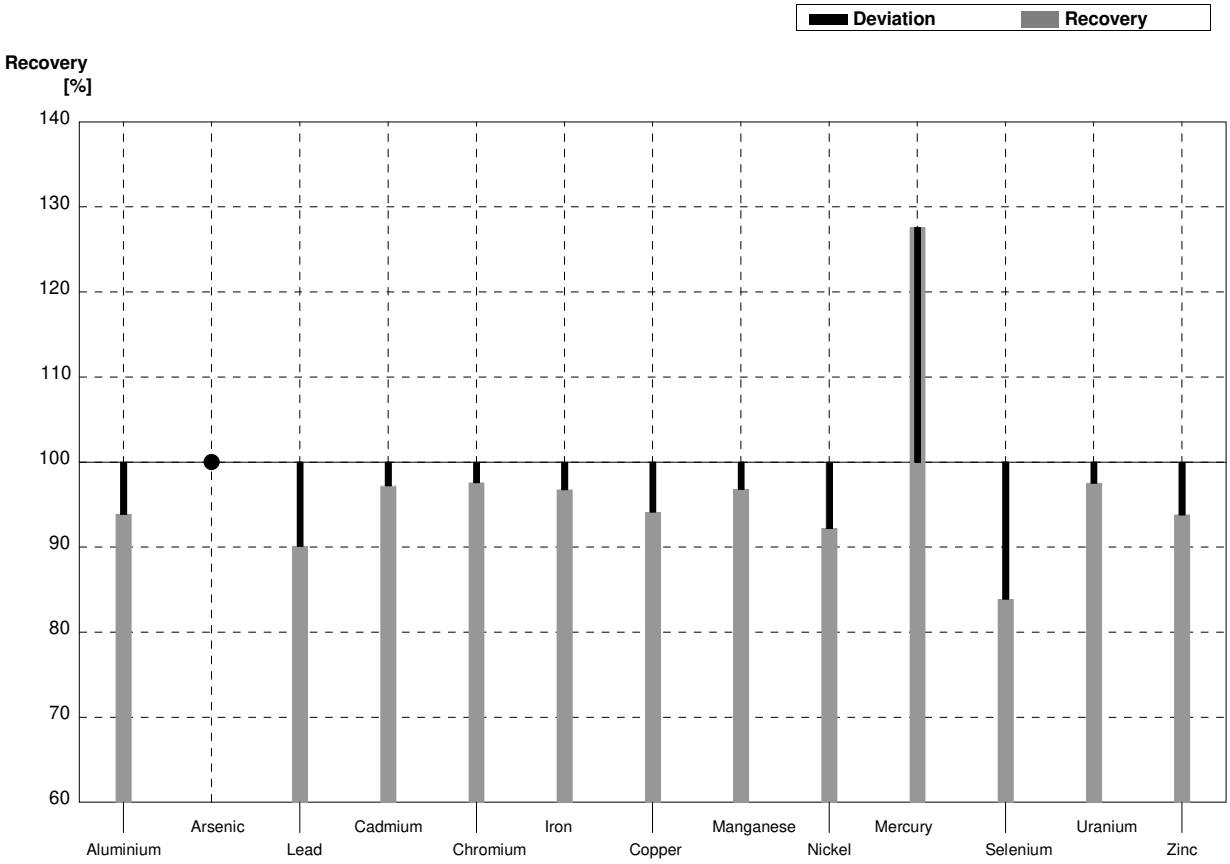
Sample **M164B**
Laboratory **W**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	17,1	2,7	µg/l	99%
Arsenic	2,268	0,014	2,25	0,36	µg/l	99%
Lead	2,84	0,02	2,74	0,33	µg/l	96%
Cadmium	0,208	0,003	0,209	0,027	µg/l	100%
Chromium	2,83	0,02	2,82	0,47	µg/l	100%
Iron	92,0	0,4	87,3	8,8	µg/l	95%
Copper	4,02	0,05	3,76	0,50	µg/l	94%
Manganese	25,20	0,16	24,6	2,6	µg/l	98%
Nickel	6,26	0,06	6,12	0,92	µg/l	98%
Mercury	1,502	0,016	1,54	0,22	µg/l	103%
Selenium	1,002	0,017	<2,0		µg/l	•
Uranium	7,25	0,05	7,2	0,7	µg/l	99%
Zinc	93,2	1,6	88,8	10,5	µg/l	95%



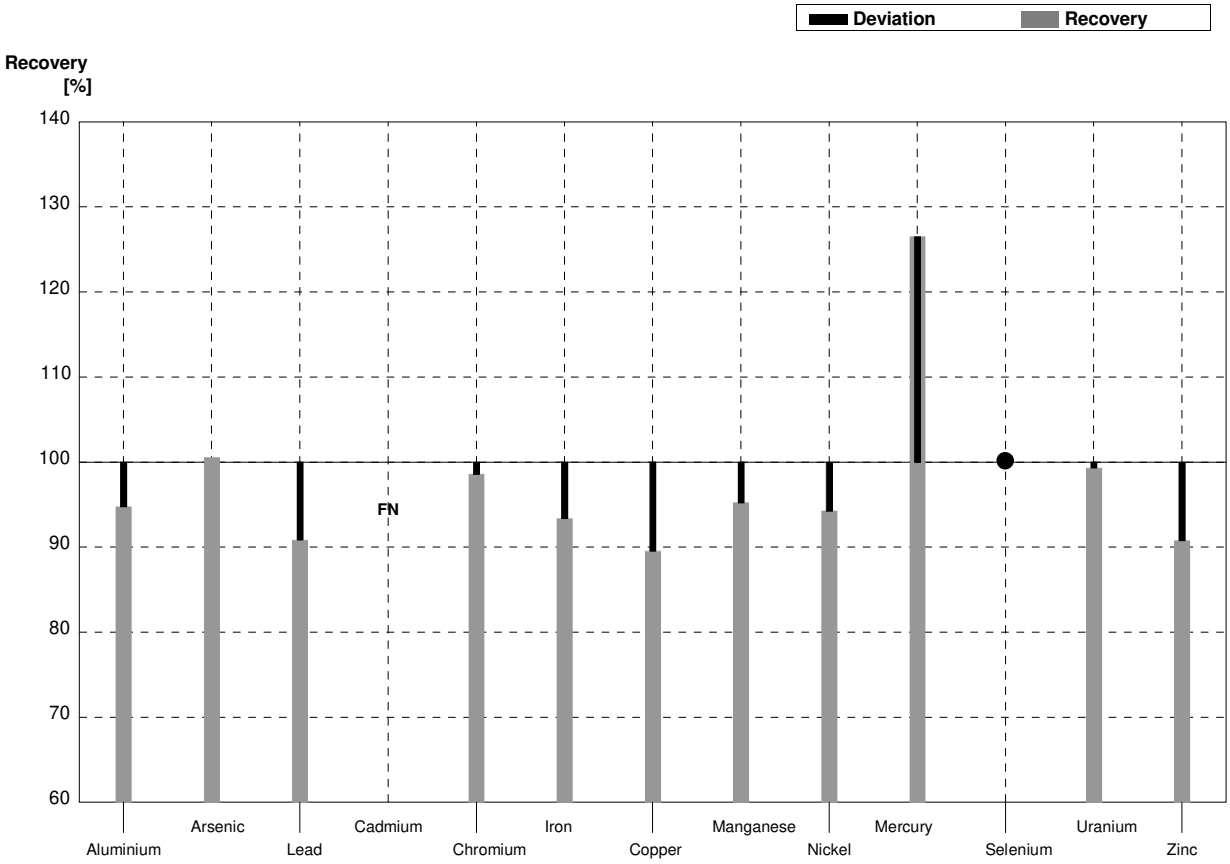
Sample **M164A**
Laboratory **X**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	43,0	4,30	µg/l	94%
Arsenic	<0,5		<0,4		µg/l	•
Lead	1,154	0,013	1,04	0,104	µg/l	90%
Cadmium	0,501	0,004	0,487	0,0487	µg/l	97%
Chromium	1,158	0,012	1,13	0,113	µg/l	98%
Iron	34,00	0,18	32,9	3,29	µg/l	97%
Copper	1,70	0,05	1,60	0,16	µg/l	94%
Manganese	40,7	0,2	39,4	3,94	µg/l	97%
Nickel	1,93	0,05	1,78	0,178	µg/l	92%
Mercury	0,956	0,013	1,22	0,122	µg/l	128%
Selenium	2,11	0,02	1,77	0,266	µg/l	84%
Uranium	2,82	0,02	2,75	0,275	µg/l	98%
Zinc	12,9	1,6	12,1	1,21	µg/l	94%



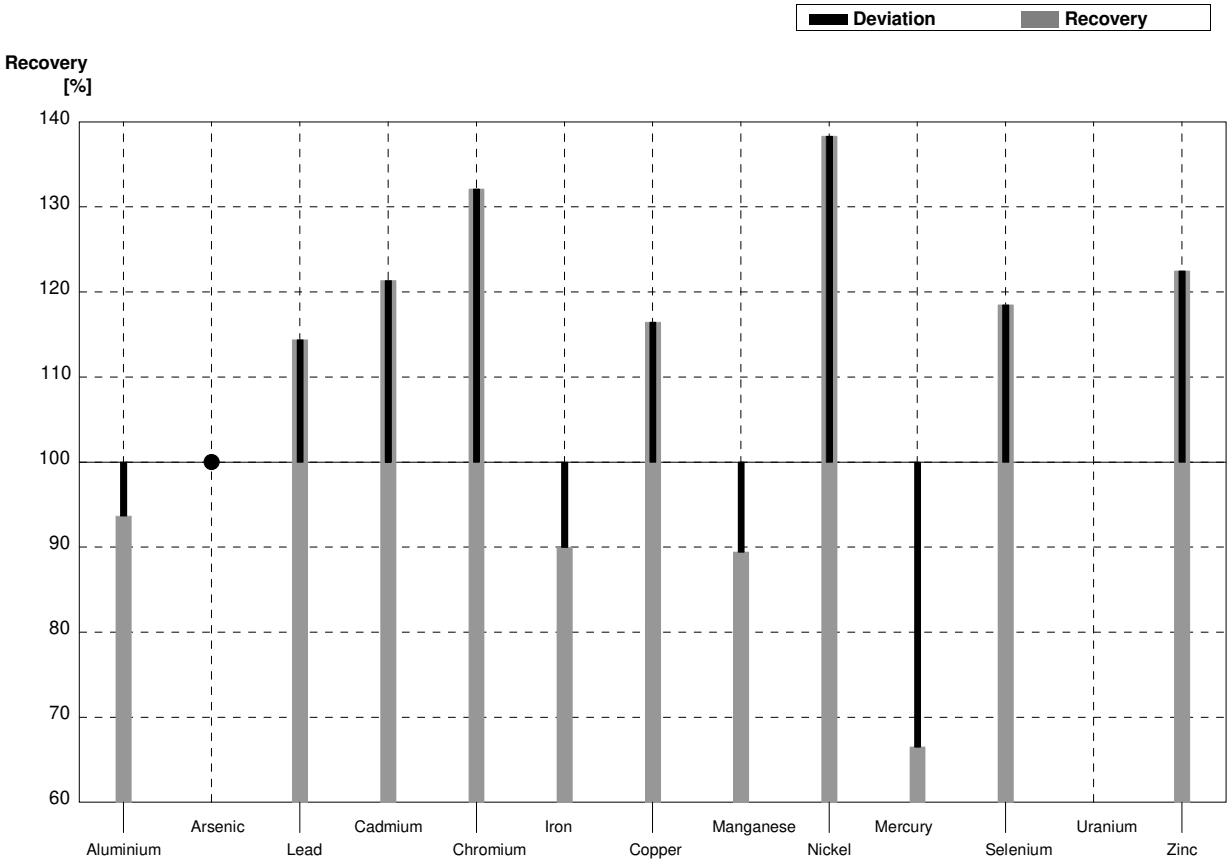
Sample **M164B**
Laboratory **X**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	16,3	1,63	µg/l	95%
Arsenic	2,268	0,014	2,28	0,342	µg/l	101%
Lead	2,84	0,02	2,58	0,258	µg/l	91%
Cadmium	0,208	0,003	<0,2		µg/l	FN
Chromium	2,83	0,02	2,79	0,279	µg/l	99%
Iron	92,0	0,4	85,9	8,59	µg/l	93%
Copper	4,02	0,05	3,60	0,36	µg/l	90%
Manganese	25,20	0,16	24,0	2,4	µg/l	95%
Nickel	6,26	0,06	5,90	0,59	µg/l	94%
Mercury	1,502	0,016	1,90	0,19	µg/l	126%
Selenium	1,002	0,017	<1,0		µg/l	•
Uranium	7,25	0,05	7,2	0,72	µg/l	99%
Zinc	93,2	1,6	84,6	8,46	µg/l	91%



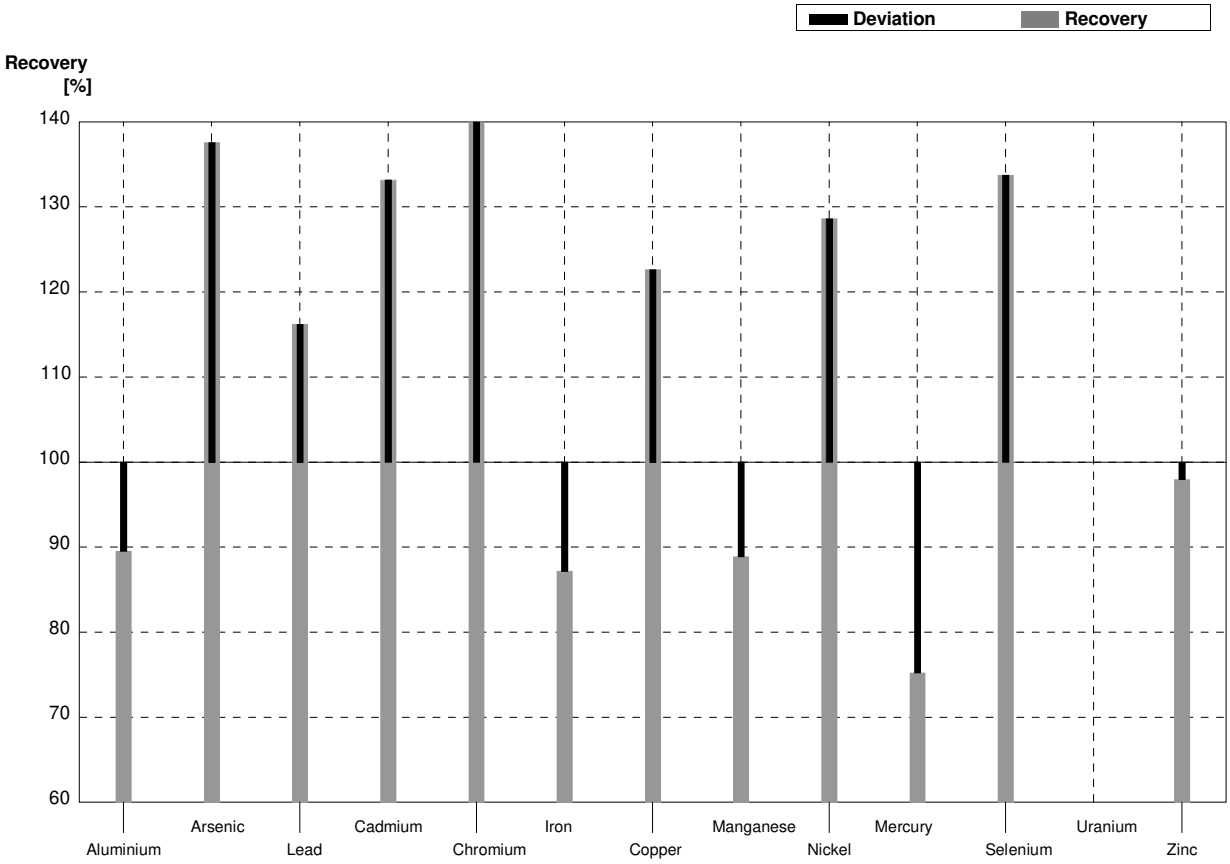
Sample **M164A**
Laboratory **Y**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	42,9	8,6	µg/l	94%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,32	0,50	µg/l	114%
Cadmium	0,501	0,004	0,608	0,122	µg/l	121%
Chromium	1,158	0,012	1,53	0,50	µg/l	132%
Iron	34,00	0,18	30,6	6,1	µg/l	90%
Copper	1,70	0,05	1,98	0,50	µg/l	116%
Manganese	40,7	0,2	36,4	7,3	µg/l	89%
Nickel	1,93	0,05	2,67	0,53	µg/l	138%
Mercury	0,956	0,013	0,636	0,095	µg/l	67%
Selenium	2,11	0,02	2,50	0,50	µg/l	118%
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6	15,8	3,16	µg/l	122%



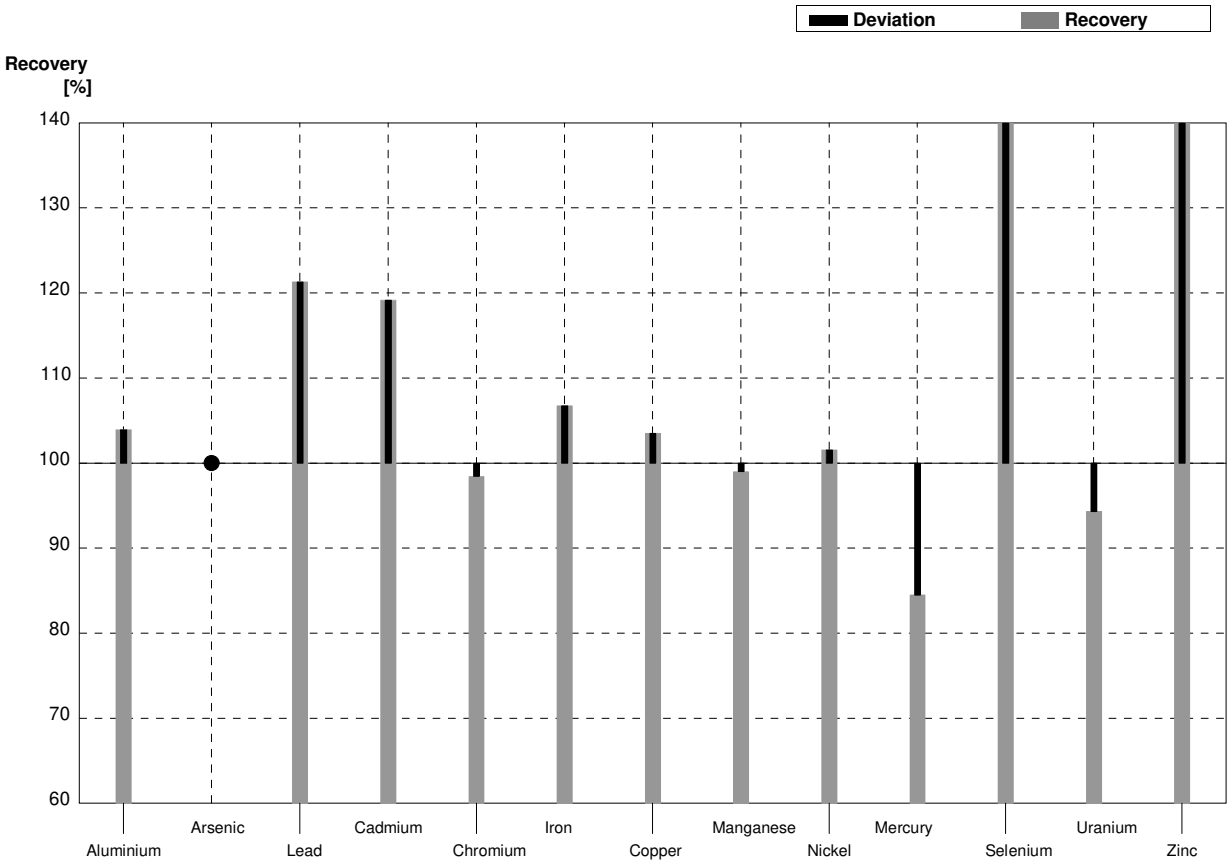
Sample M164B
Laboratory Y

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	15,4	5,0	µg/l	90%
Arsenic	2,268	0,014	3,12	0,62	µg/l	138%
Lead	2,84	0,02	3,30	0,66	µg/l	116%
Cadmium	0,208	0,003	0,277	0,055	µg/l	133%
Chromium	2,83	0,02	3,98	0,80	µg/l	141%
Iron	92,0	0,4	80,2	16,0	µg/l	87%
Copper	4,02	0,05	4,93	0,99	µg/l	123%
Manganese	25,20	0,16	22,4	4,5	µg/l	89%
Nickel	6,26	0,06	8,05	1,61	µg/l	129%
Mercury	1,502	0,016	1,13	0,17	µg/l	75%
Selenium	1,002	0,017	1,34	0,50	µg/l	134%
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6	91,3	18,3	µg/l	98%



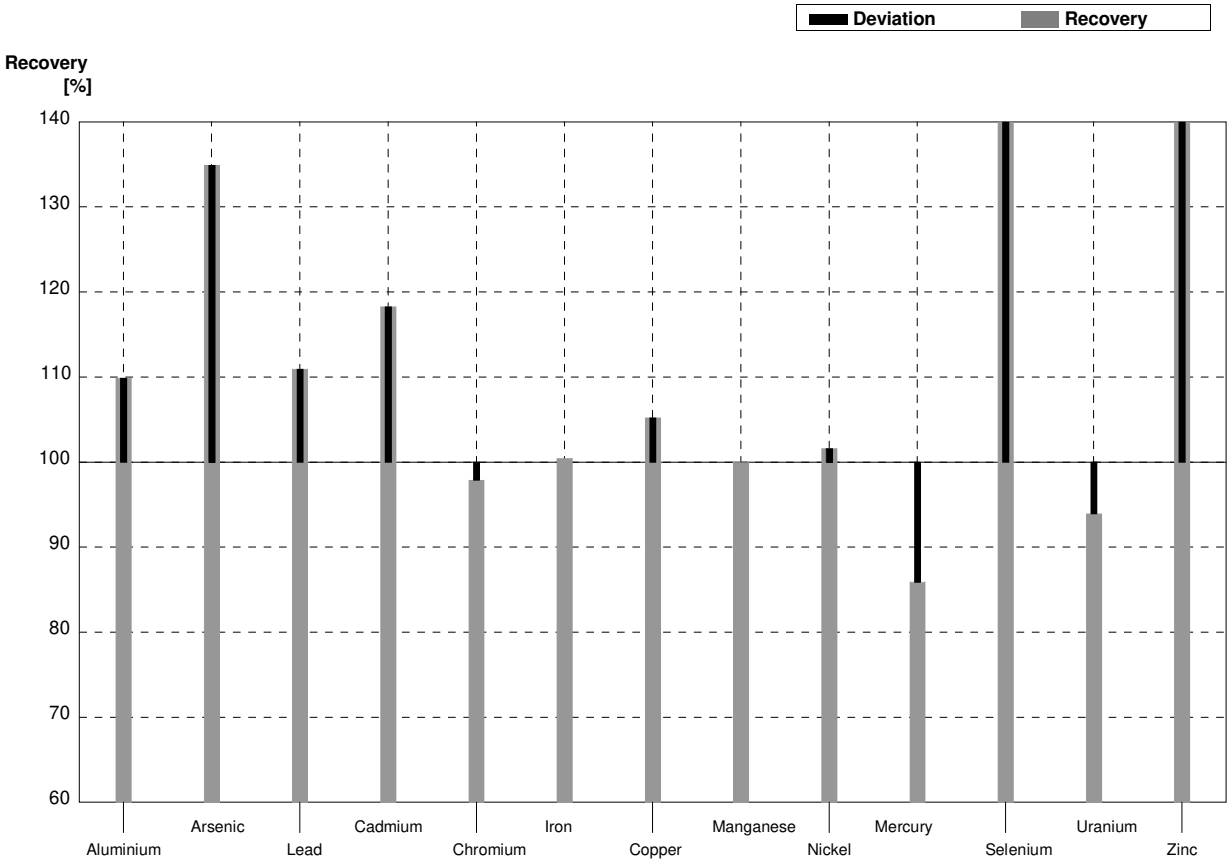
Sample **M164A**
Laboratory **Z**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	47,6	7,1	µg/l	104%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,40	0,21	µg/l	121%
Cadmium	0,501	0,004	0,597	0,09	µg/l	119%
Chromium	1,158	0,012	1,14	0,17	µg/l	98%
Iron	34,00	0,18	36,3	5,4	µg/l	107%
Copper	1,70	0,05	1,76	0,26	µg/l	104%
Manganese	40,7	0,2	40,3	6,04	µg/l	99%
Nickel	1,93	0,05	1,96	0,29	µg/l	102%
Mercury	0,956	0,013	0,808	0,12	µg/l	85%
Selenium	2,11	0,02	3,73	0,56	µg/l	177%
Uranium	2,82	0,02	2,66	0,4	µg/l	94%
Zinc	12,9	1,6	19,0	2,85	µg/l	147%



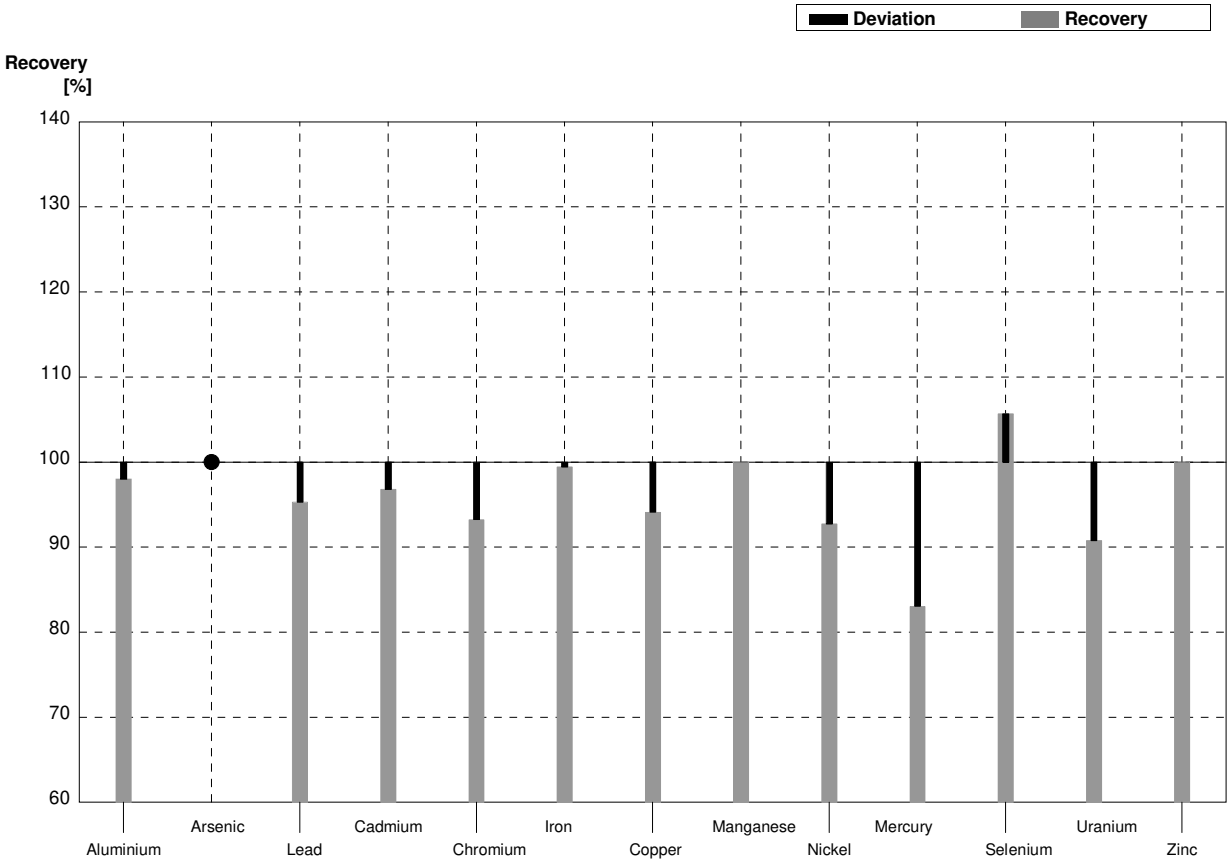
Sample M164B
Laboratory Z

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	18,9	2,8	µg/l	110%
Arsenic	2,268	0,014	3,06	0,46	µg/l	135%
Lead	2,84	0,02	3,15	0,47	µg/l	111%
Cadmium	0,208	0,003	0,246	0,04	µg/l	118%
Chromium	2,83	0,02	2,77	0,42	µg/l	98%
Iron	92,0	0,4	92,4	13,9	µg/l	100%
Copper	4,02	0,05	4,23	0,63	µg/l	105%
Manganese	25,20	0,16	25,2	3,78	µg/l	100%
Nickel	6,26	0,06	6,36	0,95	µg/l	102%
Mercury	1,502	0,016	1,29	0,19	µg/l	86%
Selenium	1,002	0,017	1,87	0,28	µg/l	187%
Uranium	7,25	0,05	6,81	1,02	µg/l	94%
Zinc	93,2	1,6	136	20,4	µg/l	146%



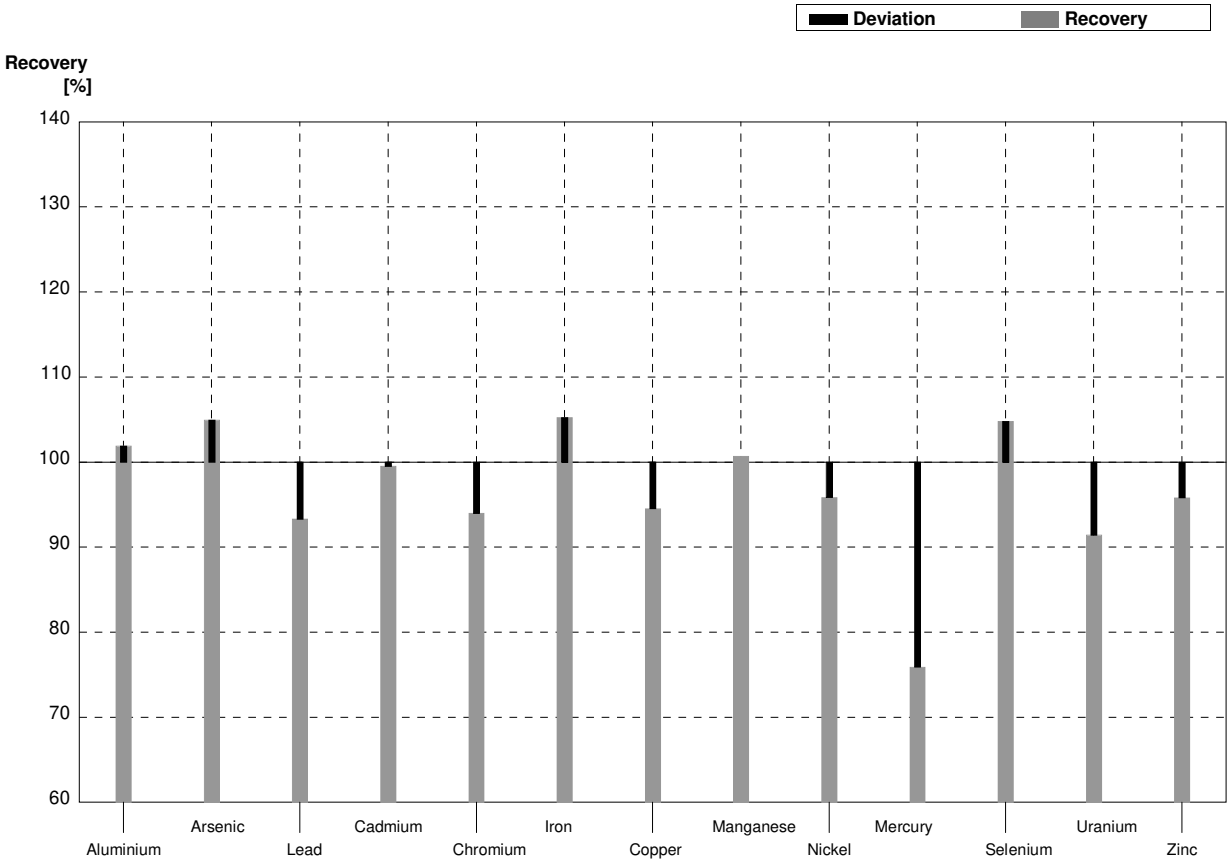
Sample **M164A**
Laboratory **AA**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	44,89	10,32	µg/l	98%
Arsenic	<0,5		<0,5		µg/l	•
Lead	1,154	0,013	1,10	0,11	µg/l	95%
Cadmium	0,501	0,004	0,485	0,107	µg/l	97%
Chromium	1,158	0,012	1,08	0,10	µg/l	93%
Iron	34,00	0,18	33,81	4,40	µg/l	99%
Copper	1,70	0,05	1,60	0,29	µg/l	94%
Manganese	40,7	0,2	40,71	5,70	µg/l	100%
Nickel	1,93	0,05	1,79	0,18	µg/l	93%
Mercury	0,956	0,013	0,794	0,199	µg/l	83%
Selenium	2,11	0,02	2,23	0,36	µg/l	106%
Uranium	2,82	0,02	2,56	0,28	µg/l	91%
Zinc	12,9	1,6	12,90	2,32	µg/l	100%



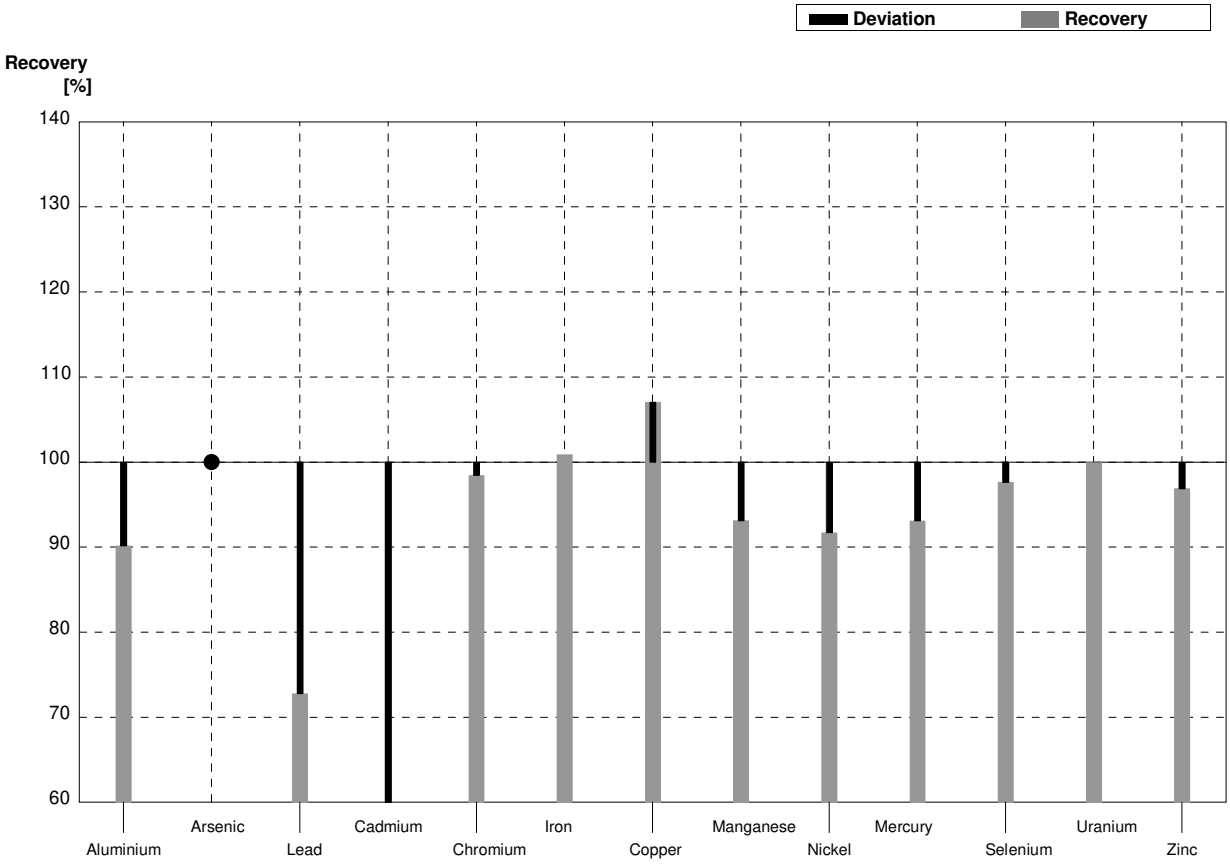
Sample **M164B**
Laboratory **AA**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	17,53	4,03	µg/l	102%
Arsenic	2,268	0,014	2,38	0,64	µg/l	105%
Lead	2,84	0,02	2,65	0,27	µg/l	93%
Cadmium	0,208	0,003	0,207	0,046	µg/l	100%
Chromium	2,83	0,02	2,66	0,24	µg/l	94%
Iron	92,0	0,4	96,83	12,59	µg/l	105%
Copper	4,02	0,05	3,80	0,68	µg/l	95%
Manganese	25,20	0,16	25,38	3,55	µg/l	101%
Nickel	6,26	0,06	6,00	0,60	µg/l	96%
Mercury	1,502	0,016	1,14	0,29	µg/l	76%
Selenium	1,002	0,017	1,05	0,17	µg/l	105%
Uranium	7,25	0,05	6,63	0,73	µg/l	91%
Zinc	93,2	1,6	89,30	16,07	µg/l	96%



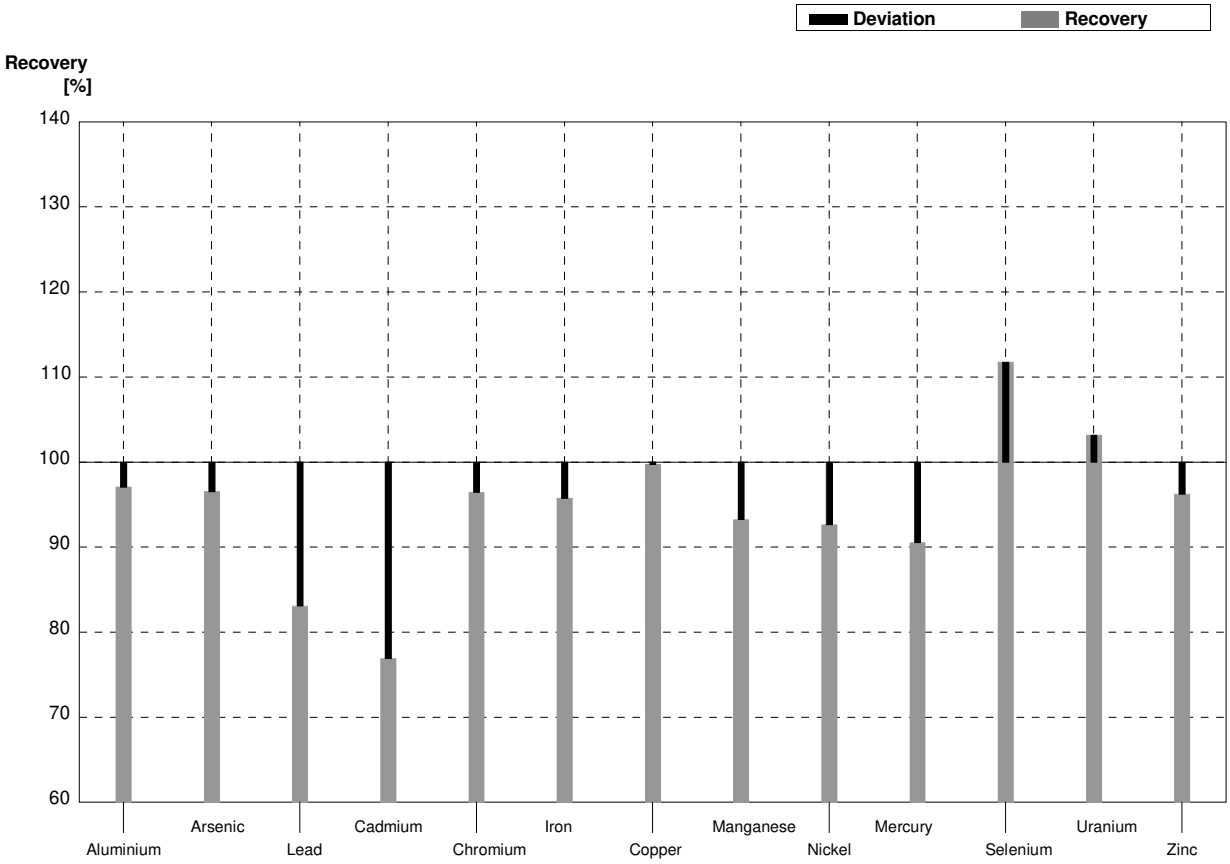
Sample **M164A**
Laboratory **AB**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	41,3	0,53	µg/l	90%
Arsenic	<0,5		0,100	0,05	µg/l	•
Lead	1,154	0,013	0,84	0,05	µg/l	73%
Cadmium	0,501	0,004	0,270	0,05	µg/l	54%
Chromium	1,158	0,012	1,14	0,05	µg/l	98%
Iron	34,00	0,18	34,3	1,7	µg/l	101%
Copper	1,70	0,05	1,82	0,06	µg/l	107%
Manganese	40,7	0,2	37,9	1,893	µg/l	93%
Nickel	1,93	0,05	1,77	0,14	µg/l	92%
Mercury	0,956	0,013	0,89	0,05	µg/l	93%
Selenium	2,11	0,02	2,06	0,07	µg/l	98%
Uranium	2,82	0,02	2,82	0,05	µg/l	100%
Zinc	12,9	1,6	12,5	0,88	µg/l	97%



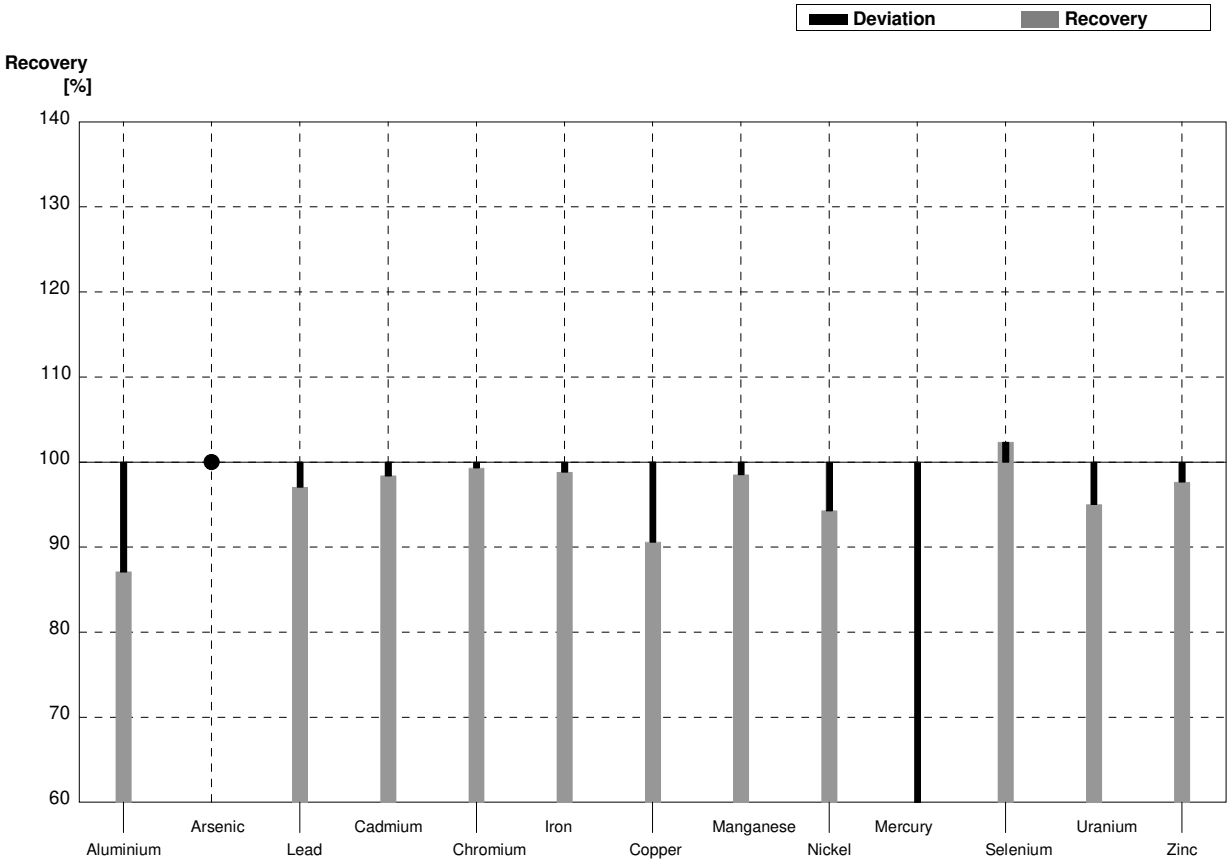
Sample **M164B**
Laboratory **AB**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	16,7	0,25	µg/l	97%
Arsenic	2,268	0,014	2,19	0,05	µg/l	97%
Lead	2,84	0,02	2,36	0,05	µg/l	83%
Cadmium	0,208	0,003	0,160	0,05	µg/l	77%
Chromium	2,83	0,02	2,73	0,05	µg/l	96%
Iron	92,0	0,4	88,1	1,34	µg/l	96%
Copper	4,02	0,05	4,01	0,06	µg/l	100%
Manganese	25,20	0,16	23,5	0,28	µg/l	93%
Nickel	6,26	0,06	5,8	0,37	µg/l	93%
Mercury	1,502	0,016	1,36	0,05	µg/l	91%
Selenium	1,002	0,017	1,12	0,06	µg/l	112%
Uranium	7,25	0,05	7,48	0,06	µg/l	103%
Zinc	93,2	1,6	89,7	4,89	µg/l	96%



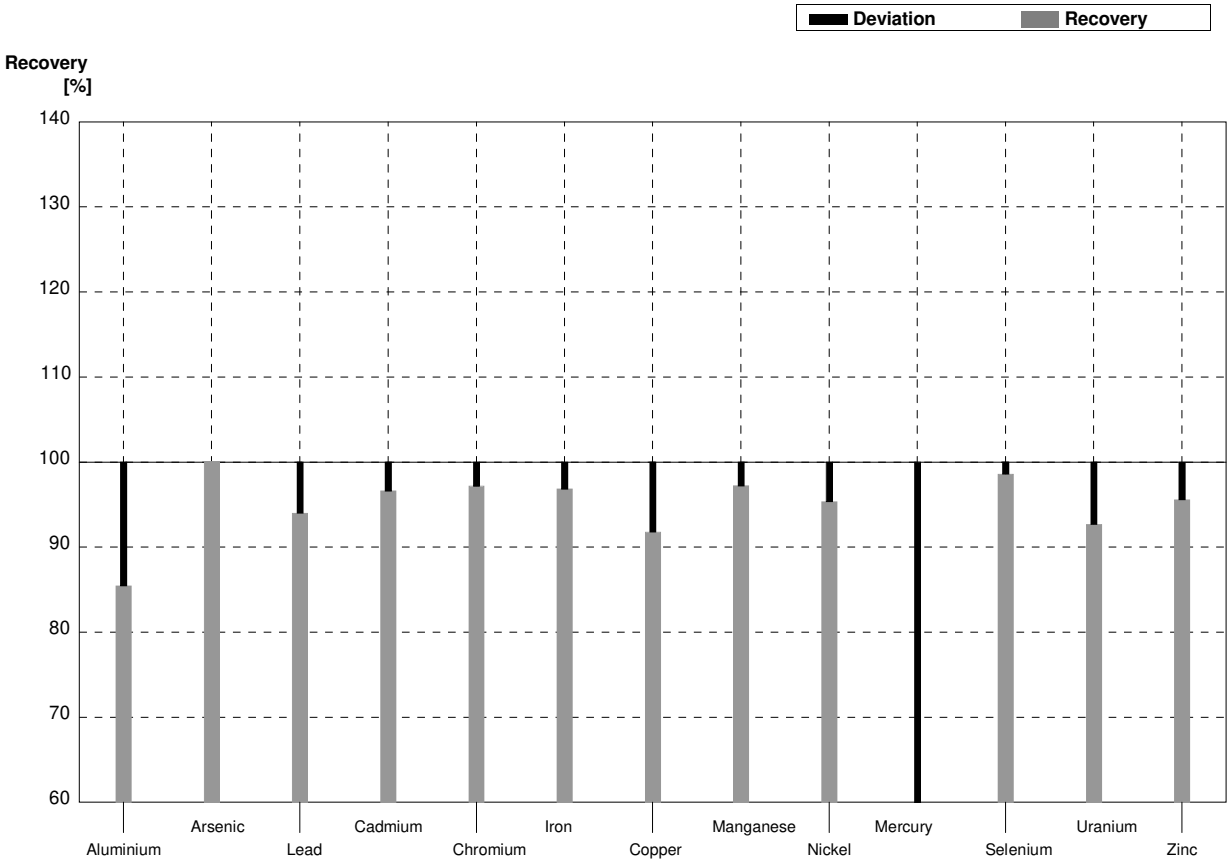
Sample **M164A**
Laboratory **AC**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	39,9		µg/l	87%
Arsenic	<0,5		<1,00		µg/l	•
Lead	1,154	0,013	1,12		µg/l	97%
Cadmium	0,501	0,004	0,493		µg/l	98%
Chromium	1,158	0,012	1,15		µg/l	99%
Iron	34,00	0,18	33,6		µg/l	99%
Copper	1,70	0,05	1,54		µg/l	91%
Manganese	40,7	0,2	40,1		µg/l	99%
Nickel	1,93	0,05	1,82		µg/l	94%
Mercury	0,956	0,013	0,513		µg/l	54%
Selenium	2,11	0,02	2,16		µg/l	102%
Uranium	2,82	0,02	2,68		µg/l	95%
Zinc	12,9	1,6	12,6		µg/l	98%



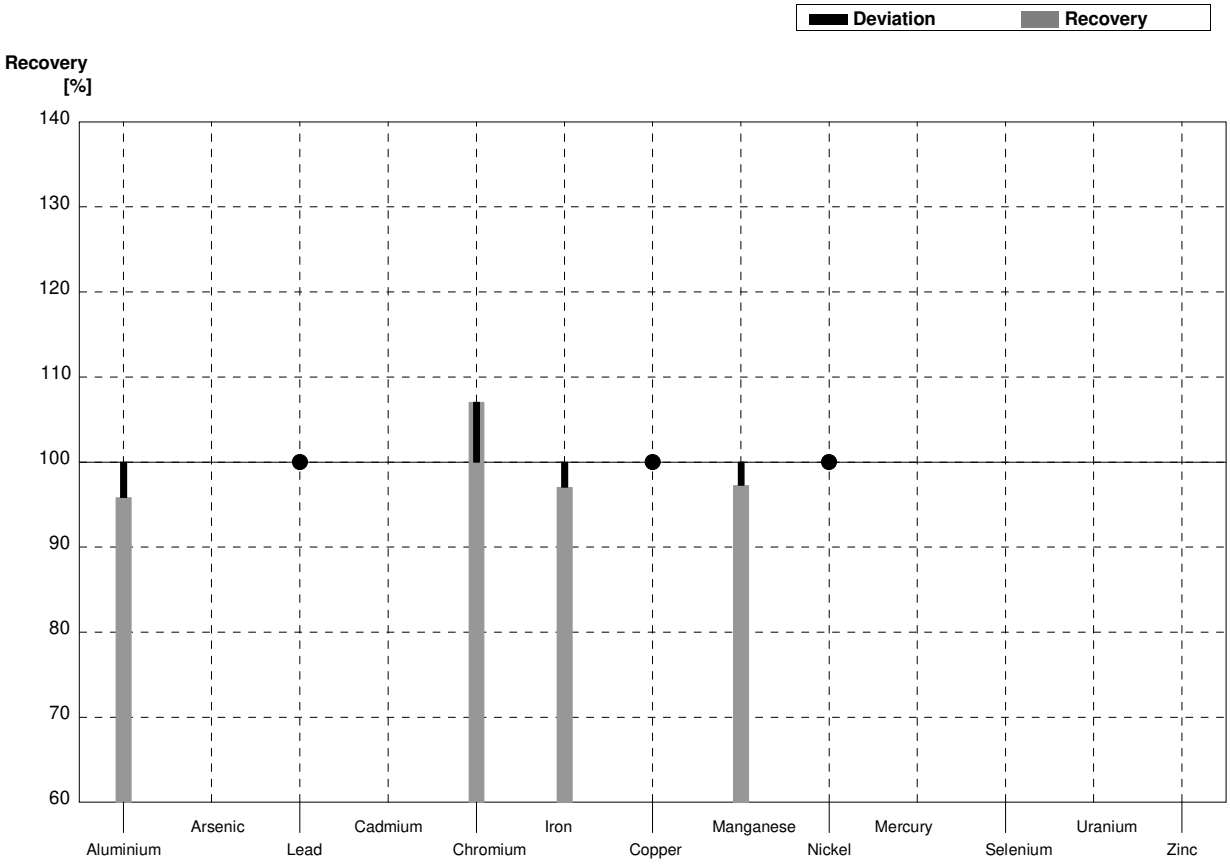
Sample **M164B**
Laboratory **AC**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	14,7		µg/l	85%
Arsenic	2,268	0,014	2,27		µg/l	100%
Lead	2,84	0,02	2,67		µg/l	94%
Cadmium	0,208	0,003	0,201		µg/l	97%
Chromium	2,83	0,02	2,75		µg/l	97%
Iron	92,0	0,4	89,1		µg/l	97%
Copper	4,02	0,05	3,69		µg/l	92%
Manganese	25,20	0,16	24,5		µg/l	97%
Nickel	6,26	0,06	5,97		µg/l	95%
Mercury	1,502	0,016	0,815		µg/l	54%
Selenium	1,002	0,017	0,988		µg/l	99%
Uranium	7,25	0,05	6,72		µg/l	93%
Zinc	93,2	1,6	89,1		µg/l	96%



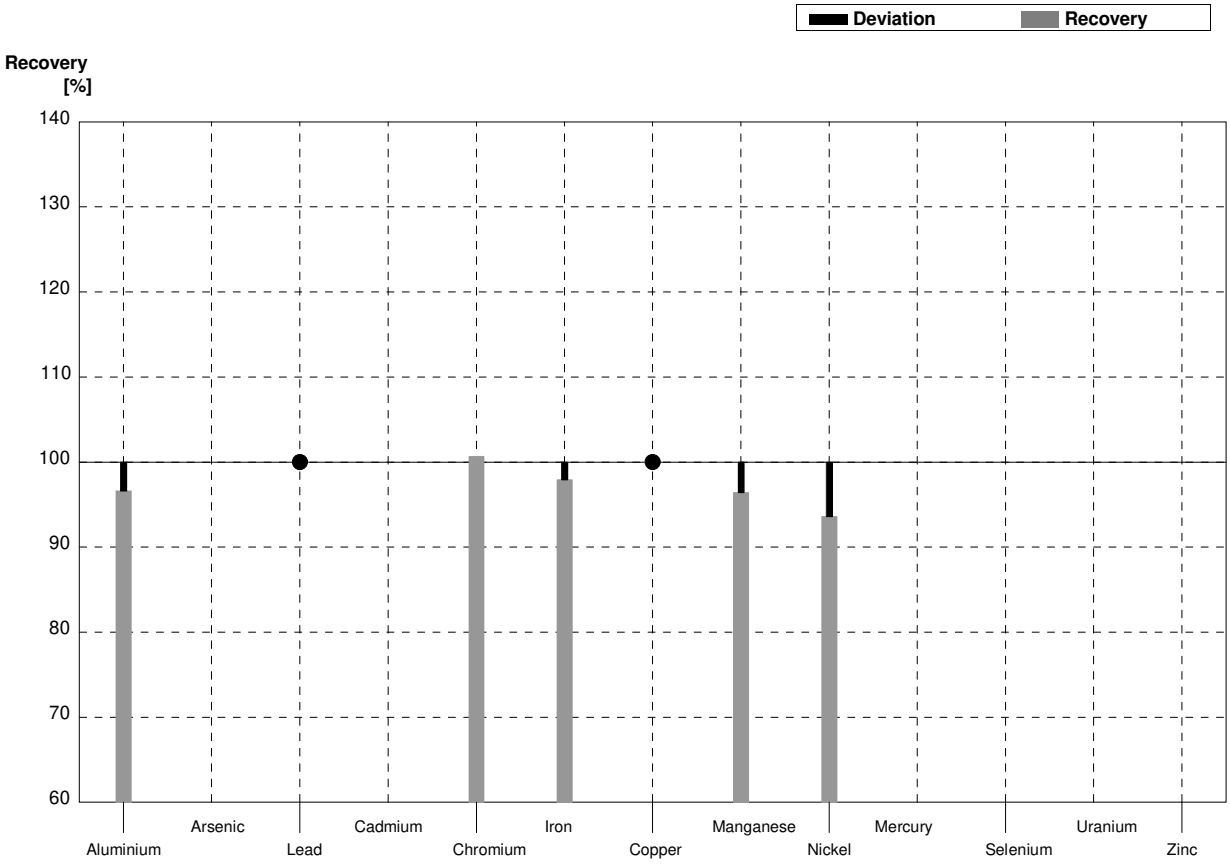
Sample **M164A**
Laboratory **AD**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	43,9	4,25	µg/l	96%
Arsenic	<0,5				µg/l	
Lead	1,154	0,013	<5		µg/l	•
Cadmium	0,501	0,004			µg/l	
Chromium	1,158	0,012	1,24	0,129	µg/l	107%
Iron	34,00	0,18	33,0	1,25	µg/l	97%
Copper	1,70	0,05	<100		µg/l	•
Manganese	40,7	0,2	39,6	1,77	µg/l	97%
Nickel	1,93	0,05	<5		µg/l	•
Mercury	0,956	0,013			µg/l	
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6			µg/l	



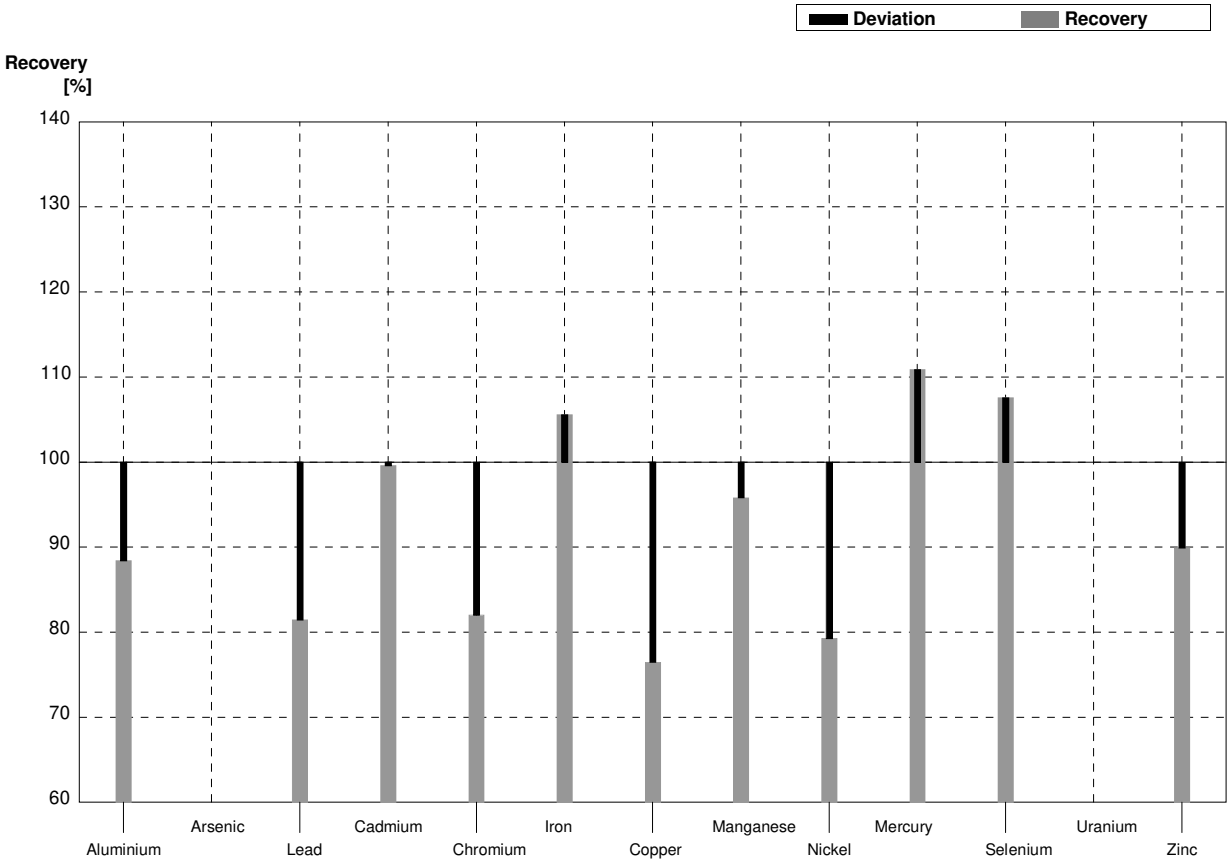
Sample **M164B**
Laboratory **AD**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	16,62	1,61	µg/l	97%
Arsenic	2,268	0,014			µg/l	
Lead	2,84	0,02	<5		µg/l	•
Cadmium	0,208	0,003			µg/l	
Chromium	2,83	0,02	2,85	0,296	µg/l	101%
Iron	92,0	0,4	90,1	3,42	µg/l	98%
Copper	4,02	0,05	<100		µg/l	•
Manganese	25,20	0,16	24,3	1,09	µg/l	96%
Nickel	6,26	0,06	5,86	0,44	µg/l	94%
Mercury	1,502	0,016			µg/l	
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6			µg/l	



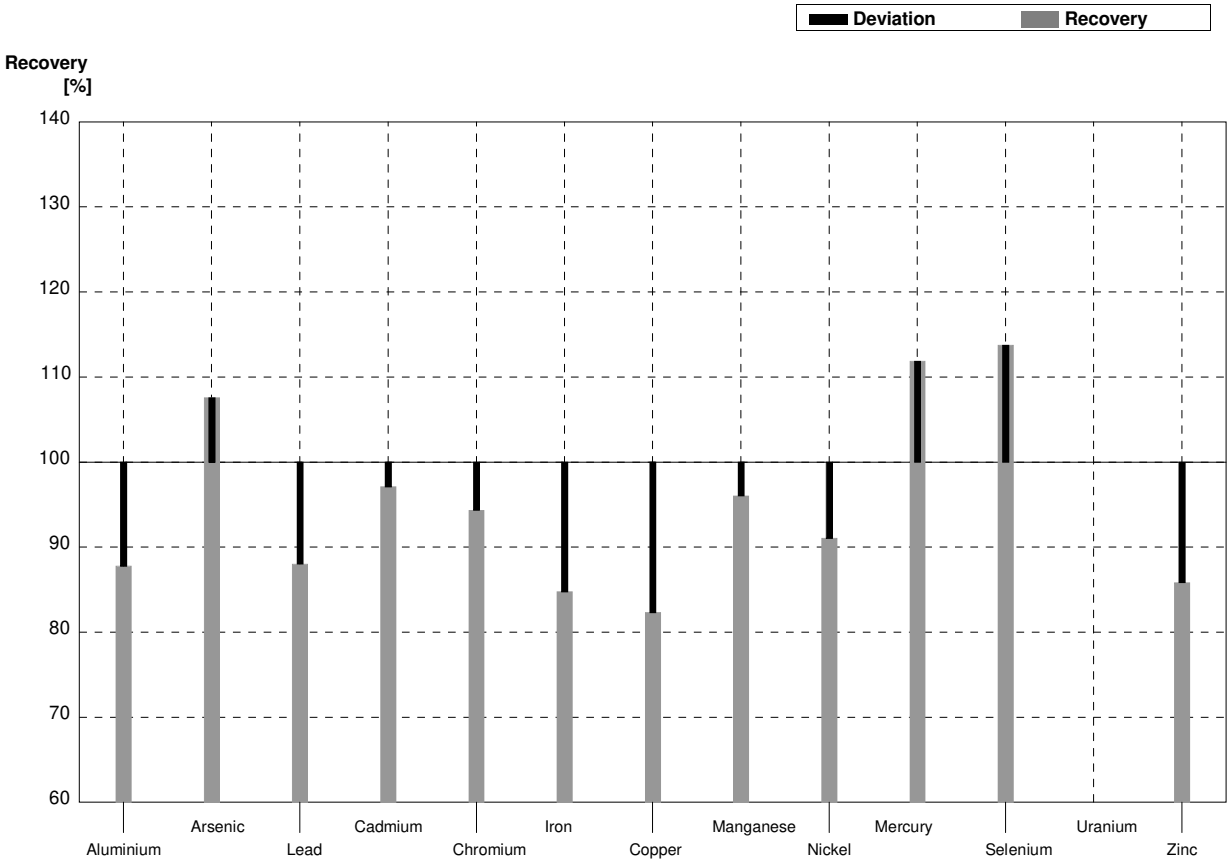
Sample **M164A**
Laboratory **AE**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	40,5	5,3	µg/l	88%
Arsenic	<0,5				µg/l	
Lead	1,154	0,013	0,94	0,25	µg/l	81%
Cadmium	0,501	0,004	0,499	0,059	µg/l	100%
Chromium	1,158	0,012	0,95	0,11	µg/l	82%
Iron	34,00	0,18	35,9	7,2	µg/l	106%
Copper	1,70	0,05	1,30	0,23	µg/l	76%
Manganese	40,7	0,2	39,0	5,1	µg/l	96%
Nickel	1,93	0,05	1,53	0,13	µg/l	79%
Mercury	0,956	0,013	1,06	0,20	µg/l	111%
Selenium	2,11	0,02	2,27	0,32	µg/l	108%
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6	11,6	2,1	µg/l	90%



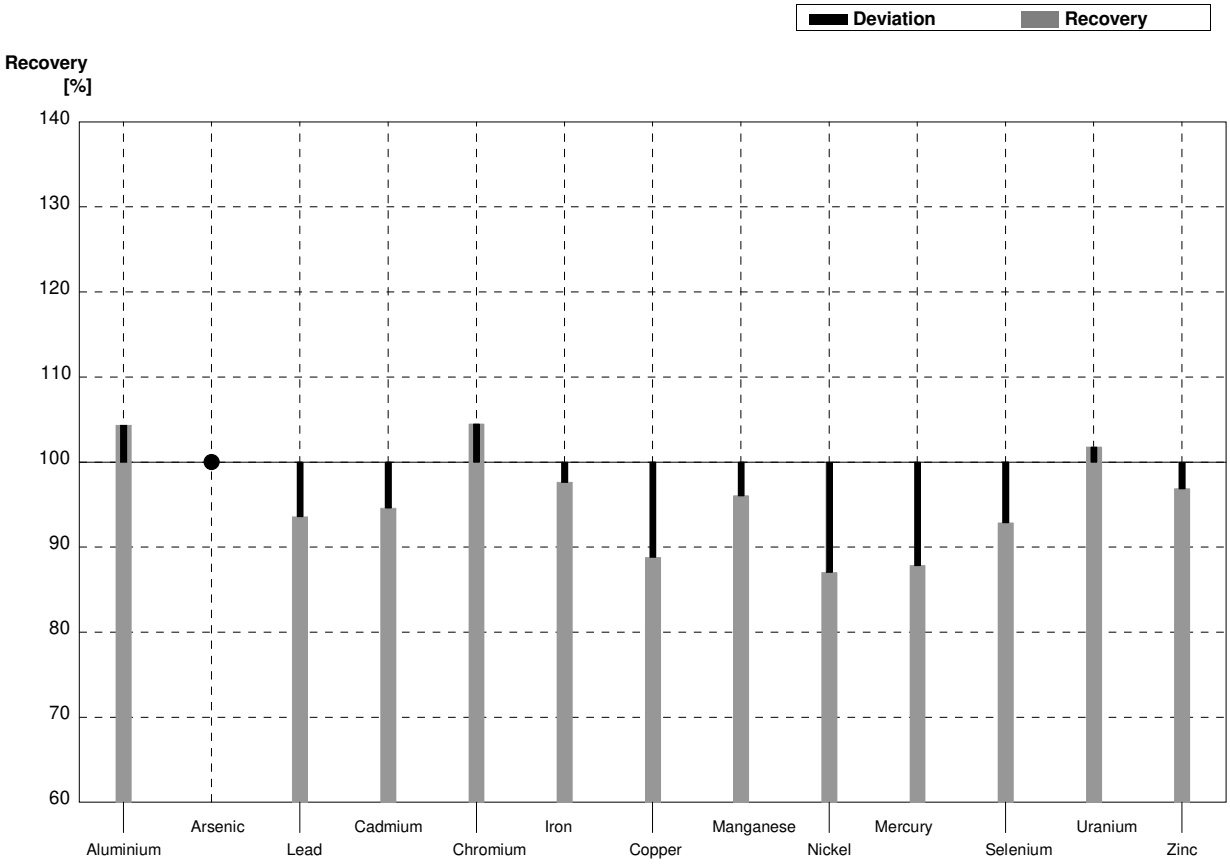
Sample **M164B**
Laboratory **AE**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	15,1	2,0	µg/l	88%
Arsenic	2,268	0,014	2,44	0,65	µg/l	108%
Lead	2,84	0,02	2,50	0,67	µg/l	88%
Cadmium	0,208	0,003	0,202	0,024	µg/l	97%
Chromium	2,83	0,02	2,67	0,30	µg/l	94%
Iron	92,0	0,4	78	16	µg/l	85%
Copper	4,02	0,05	3,31	0,59	µg/l	82%
Manganese	25,20	0,16	24,2	3,2	µg/l	96%
Nickel	6,26	0,06	5,7	0,5	µg/l	91%
Mercury	1,502	0,016	1,68	0,32	µg/l	112%
Selenium	1,002	0,017	1,14	0,16	µg/l	114%
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6	80	15	µg/l	86%



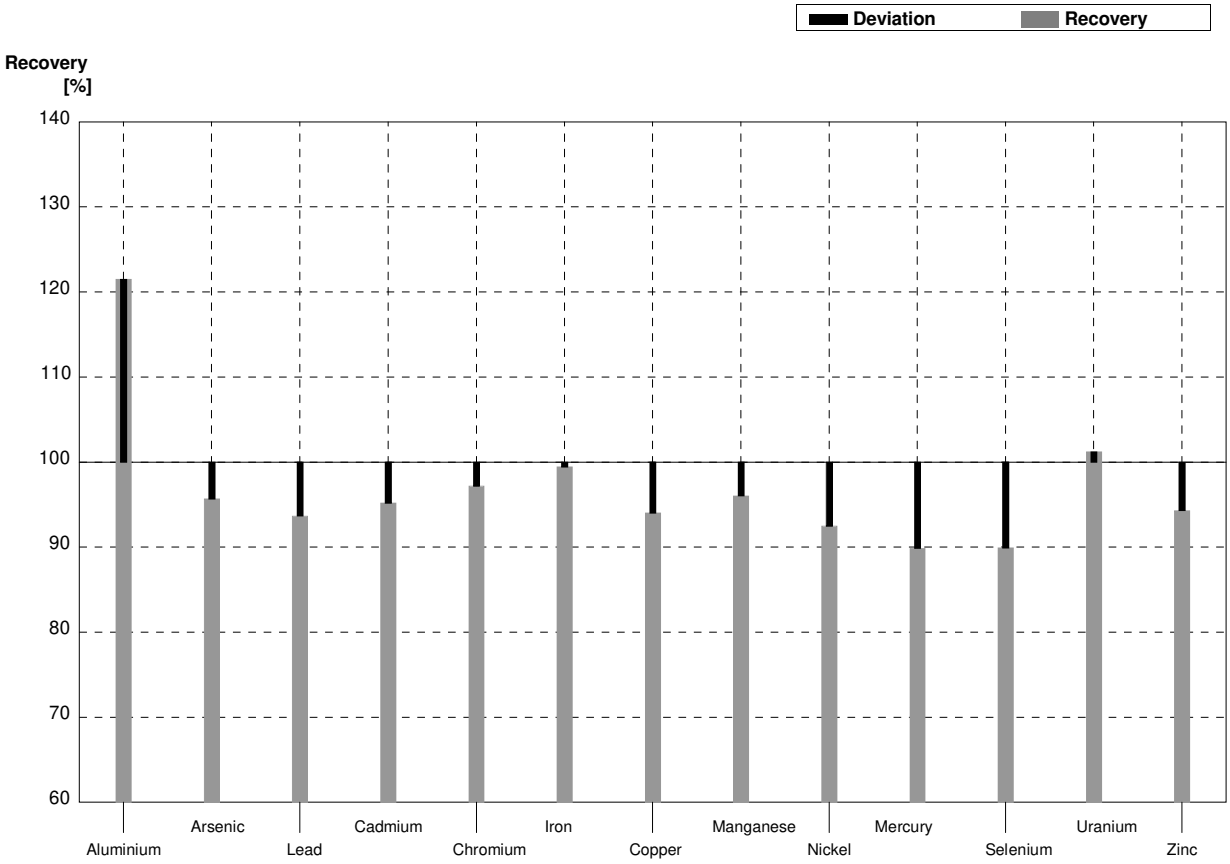
Sample **M164A**
Laboratory **AF**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	47,8	0,9	µg/l	104%
Arsenic	<0,5		<0,1		µg/l	•
Lead	1,154	0,013	1,08	0,05	µg/l	94%
Cadmium	0,501	0,004	0,474	0,011	µg/l	95%
Chromium	1,158	0,012	1,21	0,06	µg/l	104%
Iron	34,00	0,18	33,2	1,0	µg/l	98%
Copper	1,70	0,05	1,51	0,11	µg/l	89%
Manganese	40,7	0,2	39,1	1,4	µg/l	96%
Nickel	1,93	0,05	1,68	0,09	µg/l	87%
Mercury	0,956	0,013	0,840	0,037	µg/l	88%
Selenium	2,11	0,02	1,96	0,08	µg/l	93%
Uranium	2,82	0,02	2,87	0,05	µg/l	102%
Zinc	12,9	1,6	12,5	0,7	µg/l	97%



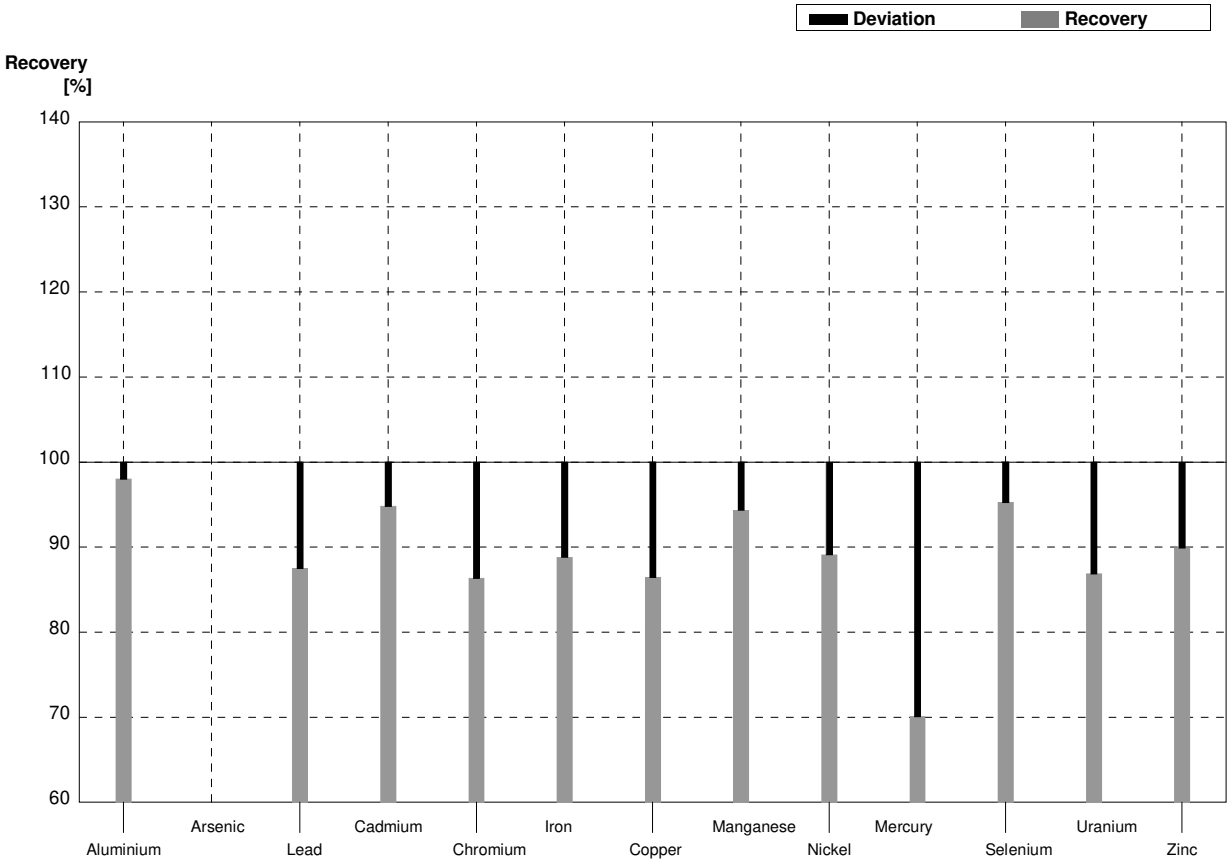
Sample **M164B**
Laboratory **AF**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	20,9	0,5	µg/l	122%
Arsenic	2,268	0,014	2,17	0,12	µg/l	96%
Lead	2,84	0,02	2,66	0,14	µg/l	94%
Cadmium	0,208	0,003	0,198	0,008	µg/l	95%
Chromium	2,83	0,02	2,75	0,14	µg/l	97%
Iron	92,0	0,4	91,5	2,2	µg/l	99%
Copper	4,02	0,05	3,78	0,12	µg/l	94%
Manganese	25,20	0,16	24,2	1,0	µg/l	96%
Nickel	6,26	0,06	5,79	0,30	µg/l	92%
Mercury	1,502	0,016	1,35	0,05	µg/l	90%
Selenium	1,002	0,017	0,901	0,049	µg/l	90%
Uranium	7,25	0,05	7,34	0,26	µg/l	101%
Zinc	93,2	1,6	87,9	3,6	µg/l	94%



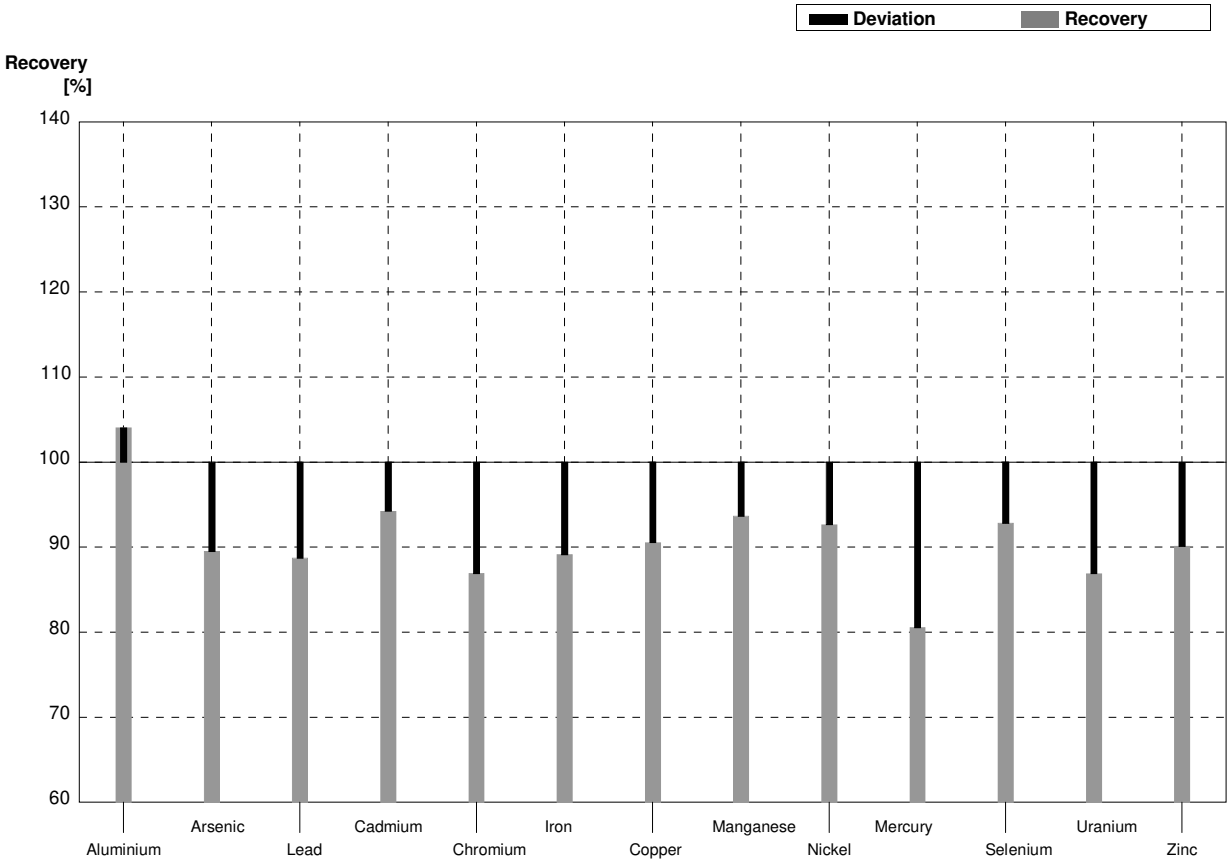
Sample **M164A**
Laboratory **AG**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	44,9	6,7	µg/l	98%
Arsenic	<0,5				µg/l	
Lead	1,154	0,013	1,01	0,151	µg/l	88%
Cadmium	0,501	0,004	0,475	0,062	µg/l	95%
Chromium	1,158	0,012	1,00	0,100	µg/l	86%
Iron	34,00	0,18	30,2	4,54	µg/l	89%
Copper	1,70	0,05	1,47	0,220	µg/l	86%
Manganese	40,7	0,2	38,4	3,84	µg/l	94%
Nickel	1,93	0,05	1,72	0,172	µg/l	89%
Mercury	0,956	0,013	0,67	0,133	µg/l	70%
Selenium	2,11	0,02	2,01	0,302	µg/l	95%
Uranium	2,82	0,02	2,45	0,245	µg/l	87%
Zinc	12,9	1,6	11,6	1,04	µg/l	90%



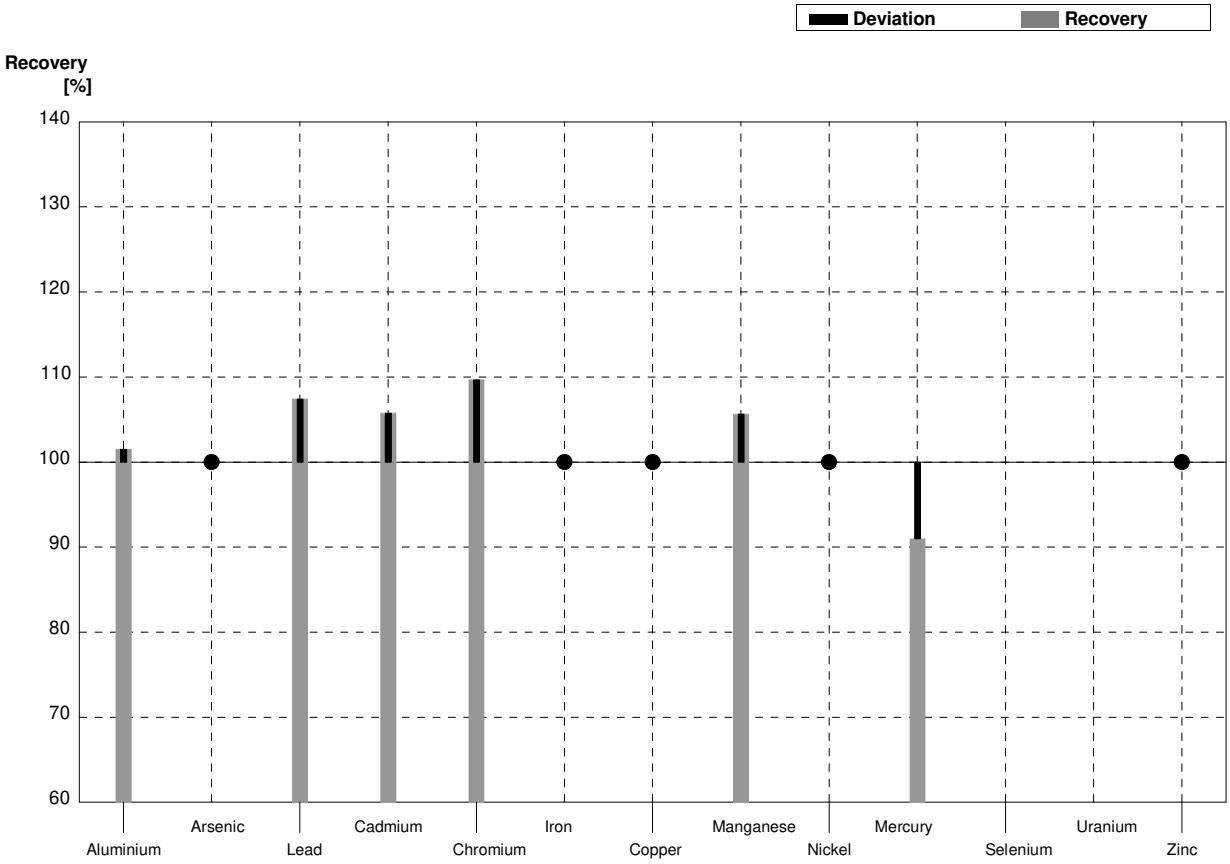
Sample **M164B**
Laboratory **AG**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	17,9	2,69	µg/l	104%
Arsenic	2,268	0,014	2,03	0,406	µg/l	90%
Lead	2,84	0,02	2,52	0,378	µg/l	89%
Cadmium	0,208	0,003	0,196	0,0254	µg/l	94%
Chromium	2,83	0,02	2,46	0,246	µg/l	87%
Iron	92,0	0,4	82	12,3	µg/l	89%
Copper	4,02	0,05	3,64	0,55	µg/l	91%
Manganese	25,20	0,16	23,6	2,36	µg/l	94%
Nickel	6,26	0,06	5,8	0,58	µg/l	93%
Mercury	1,502	0,016	1,21	0,242	µg/l	81%
Selenium	1,002	0,017	0,93	0,139	µg/l	93%
Uranium	7,25	0,05	6,3	0,63	µg/l	87%
Zinc	93,2	1,6	84	7,6	µg/l	90%



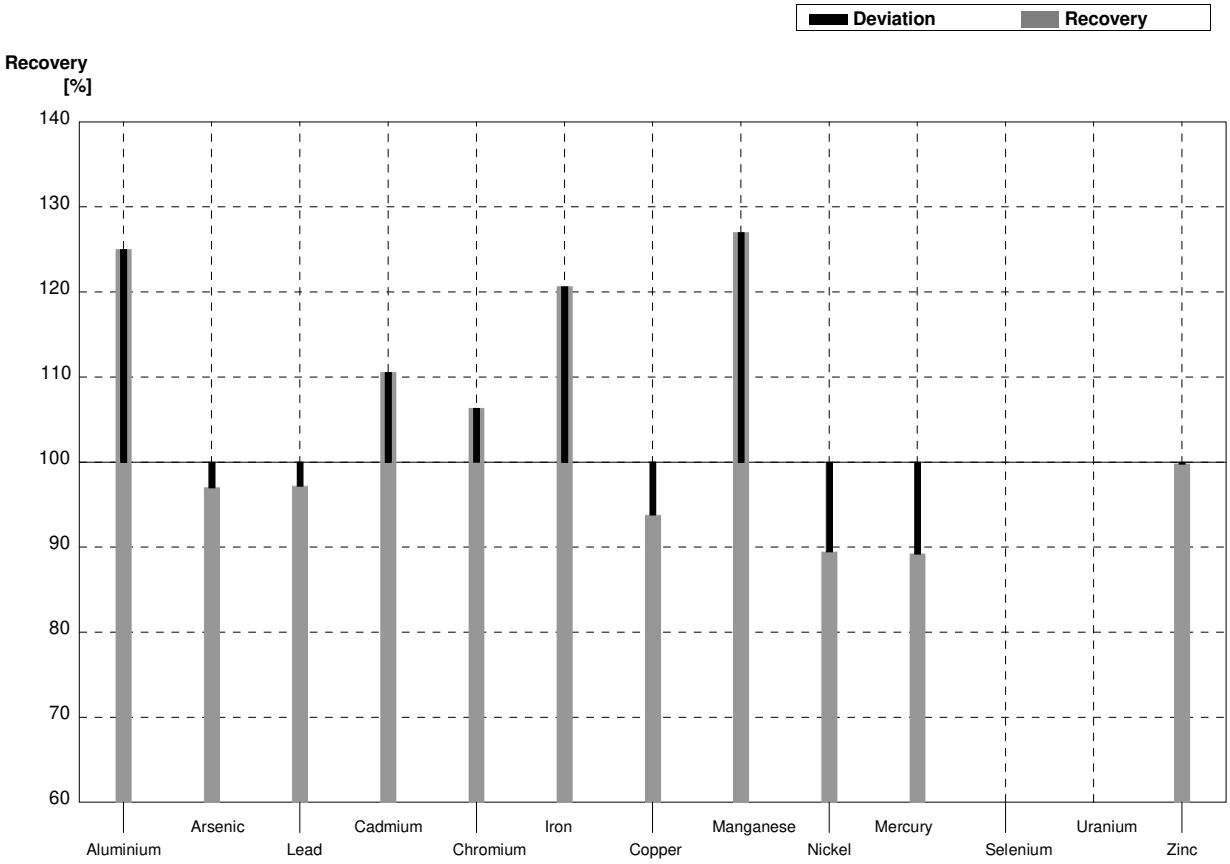
Sample **M164A**
Laboratory **AH**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	46,5	10	µg/l	102%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,24	1	µg/l	107%
Cadmium	0,501	0,004	0,53	0,1	µg/l	106%
Chromium	1,158	0,012	1,27	0,1	µg/l	110%
Iron	34,00	0,18	<50		µg/l	•
Copper	1,70	0,05	<2		µg/l	•
Manganese	40,7	0,2	43,0	20	µg/l	106%
Nickel	1,93	0,05	<2		µg/l	•
Mercury	0,956	0,013	0,87	0,1	µg/l	91%
Selenium	2,11	0,02			µg/l	
Uranium	2,82	0,02			µg/l	
Zinc	12,9	1,6	<20		µg/l	•



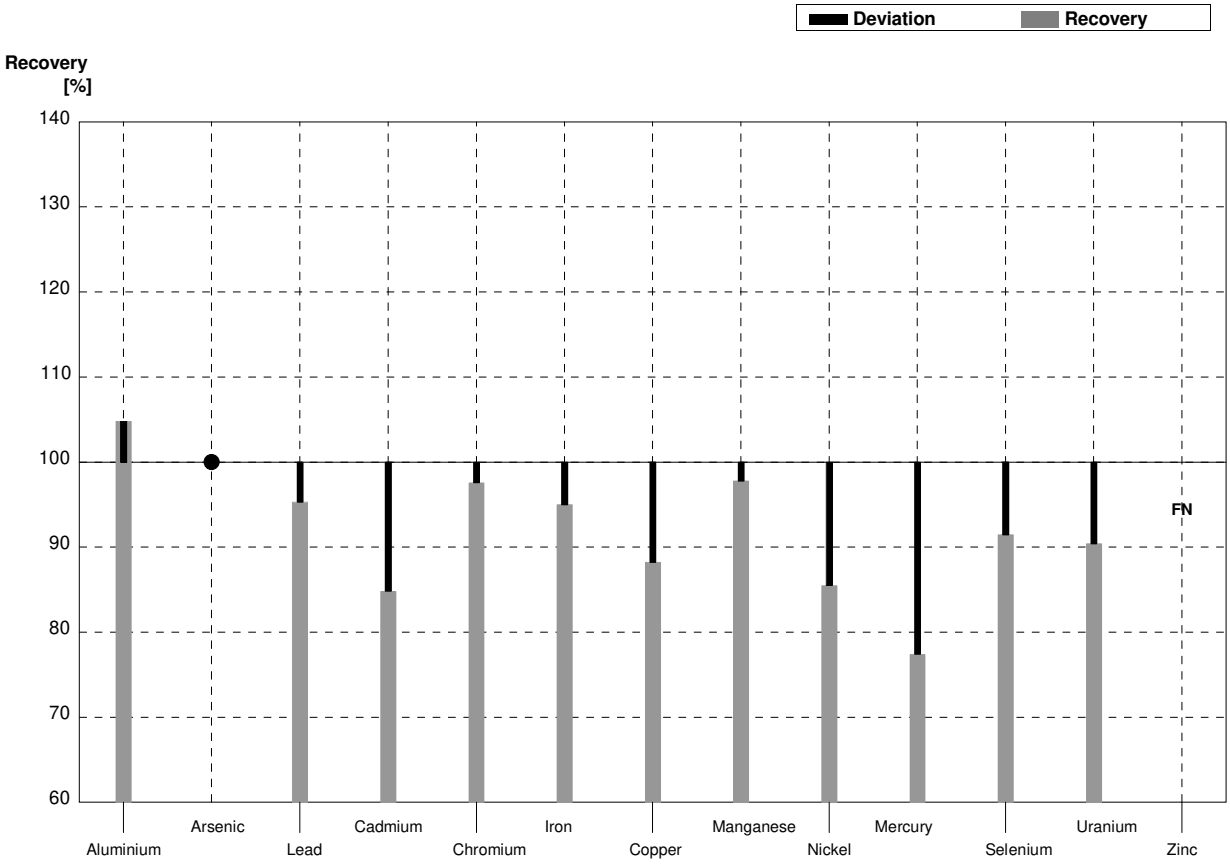
Sample **M164B**
Laboratory **AH**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	21,5	5	µg/l	125%
Arsenic	2,268	0,014	2,20	1	µg/l	97%
Lead	2,84	0,02	2,76	1	µg/l	97%
Cadmium	0,208	0,003	0,230	0,1	µg/l	111%
Chromium	2,83	0,02	3,01	1	µg/l	106%
Iron	92,0	0,4	111	30	µg/l	121%
Copper	4,02	0,05	3,77	1	µg/l	94%
Manganese	25,20	0,16	32,0	15	µg/l	127%
Nickel	6,26	0,06	5,6	1	µg/l	89%
Mercury	1,502	0,016	1,34	0,2	µg/l	89%
Selenium	1,002	0,017			µg/l	
Uranium	7,25	0,05			µg/l	
Zinc	93,2	1,6	93	20	µg/l	100%



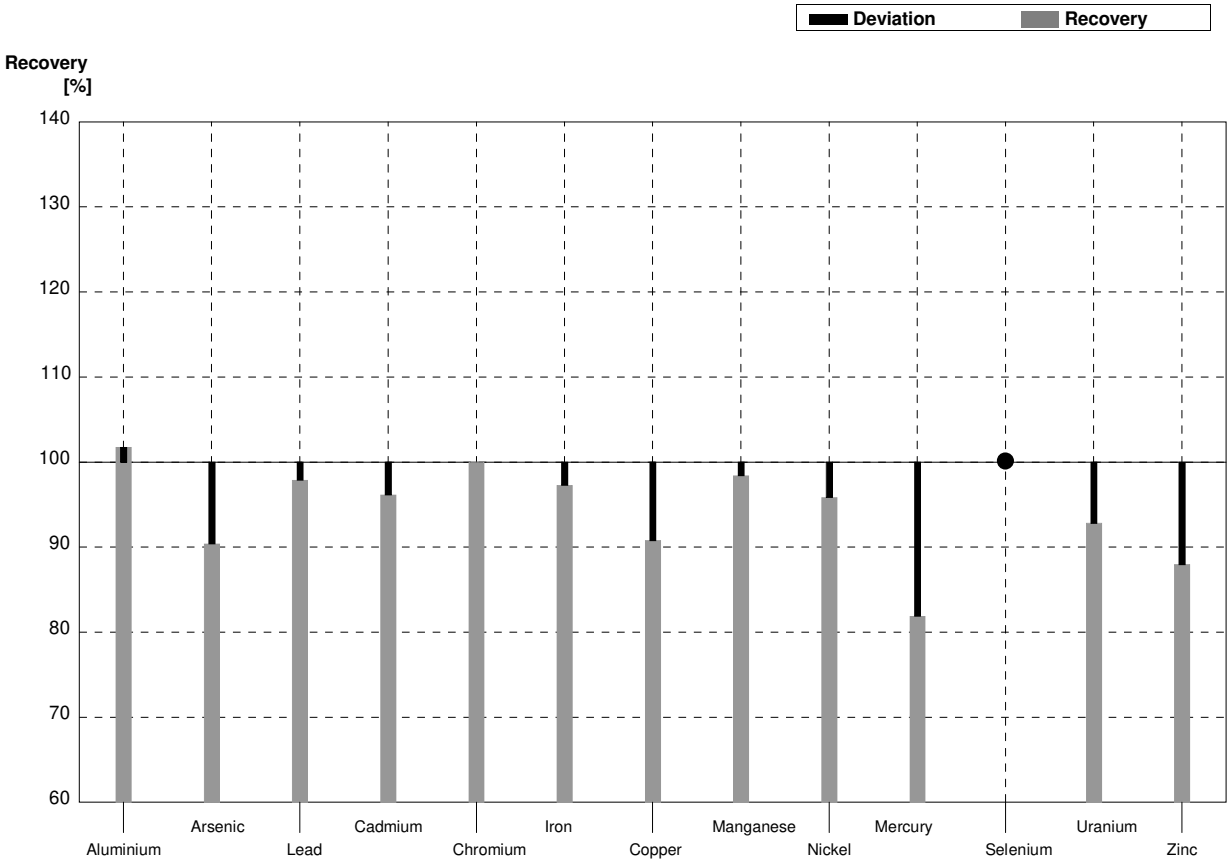
Sample **M164A**
Laboratory **AI**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	48,0	9,6	µg/l	105%
Arsenic	<0,5		<1		µg/l	•
Lead	1,154	0,013	1,10	0,22	µg/l	95%
Cadmium	0,501	0,004	0,425	0,085	µg/l	85%
Chromium	1,158	0,012	1,13	0,23	µg/l	98%
Iron	34,00	0,18	32,3	6,5	µg/l	95%
Copper	1,70	0,05	1,50	0,30	µg/l	88%
Manganese	40,7	0,2	39,8	8,0	µg/l	98%
Nickel	1,93	0,05	1,65	0,33	µg/l	85%
Mercury	0,956	0,013	0,740	0,15	µg/l	77%
Selenium	2,11	0,02	1,93	0,39	µg/l	91%
Uranium	2,82	0,02	2,55	0,51	µg/l	90%
Zinc	12,9	1,6	<10		µg/l	FN



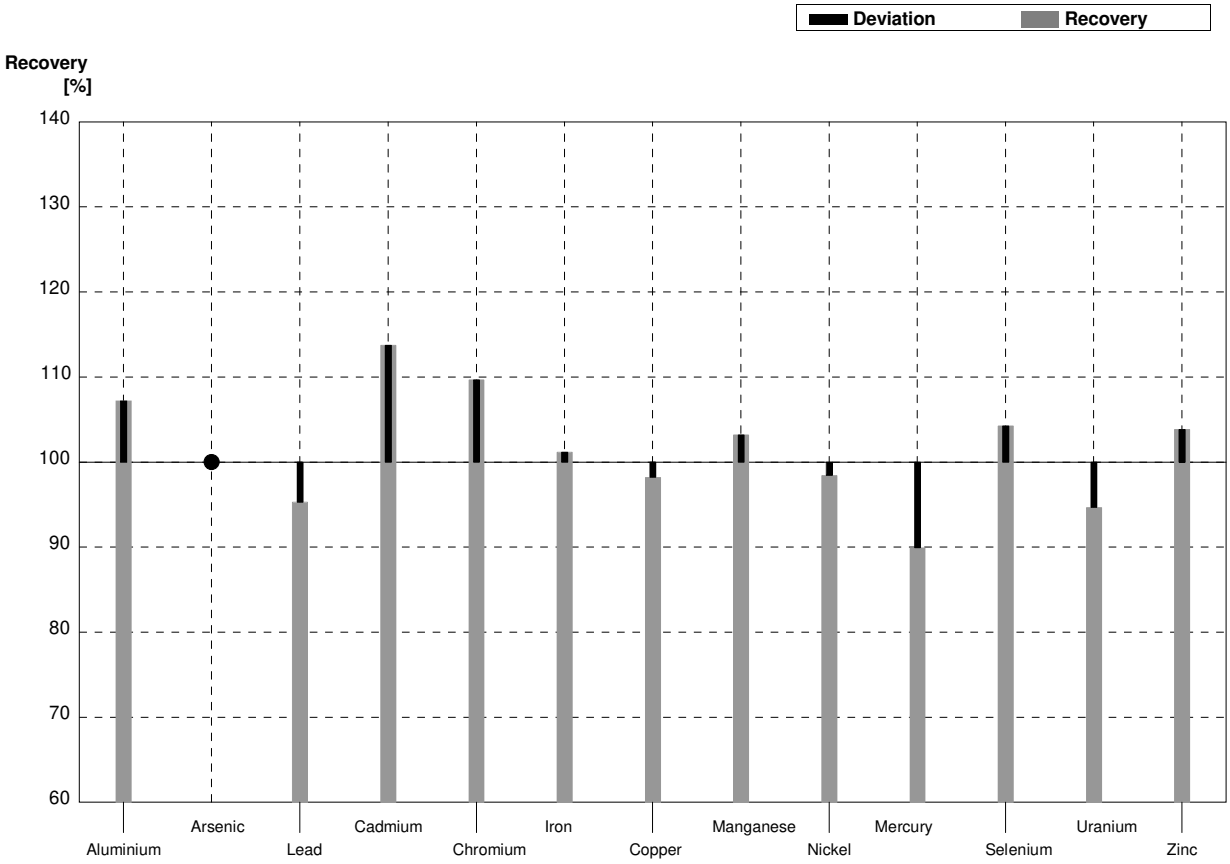
Sample **M164B**
Laboratory **AI**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	17,5	3,5	µg/l	102%
Arsenic	2,268	0,014	2,05	0,41	µg/l	90%
Lead	2,84	0,02	2,78	0,56	µg/l	98%
Cadmium	0,208	0,003	0,200	0,040	µg/l	96%
Chromium	2,83	0,02	2,83	0,57	µg/l	100%
Iron	92,0	0,4	89,5	18	µg/l	97%
Copper	4,02	0,05	3,65	0,73	µg/l	91%
Manganese	25,20	0,16	24,8	5,0	µg/l	98%
Nickel	6,26	0,06	6,00	1,2	µg/l	96%
Mercury	1,502	0,016	1,23	0,25	µg/l	82%
Selenium	1,002	0,017	<1		µg/l	•
Uranium	7,25	0,05	6,73	1,3	µg/l	93%
Zinc	93,2	1,6	82,0	16	µg/l	88%



Sample **M164A**
Laboratory **AJ**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	45,8	0,4	49,1	3,9	µg/l	107%
Arsenic	<0,5		<0,50	0,085	µg/l	•
Lead	1,154	0,013	1,10	0,22	µg/l	95%
Cadmium	0,501	0,004	0,57	0,09	µg/l	114%
Chromium	1,158	0,012	1,27	0,19	µg/l	110%
Iron	34,00	0,18	34,4	5,2	µg/l	101%
Copper	1,70	0,05	1,67	0,25	µg/l	98%
Manganese	40,7	0,2	42,0	6,3	µg/l	103%
Nickel	1,93	0,05	1,90	0,29	µg/l	98%
Mercury	0,956	0,013	0,86	0,22	µg/l	90%
Selenium	2,11	0,02	2,20	0,55	µg/l	104%
Uranium	2,82	0,02	2,67	0,40	µg/l	95%
Zinc	12,9	1,6	13,4	2,7	µg/l	104%



Sample **M164B**
Laboratory **AJ**

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	17,2	0,3	18,5	2,8	µg/l	108%
Arsenic	2,268	0,014	2,40	0,48	µg/l	106%
Lead	2,84	0,02	2,70	0,54	µg/l	95%
Cadmium	0,208	0,003	0,200	0,03	µg/l	96%
Chromium	2,83	0,02	3,05	0,46	µg/l	108%
Iron	92,0	0,4	95	14	µg/l	103%
Copper	4,02	0,05	4,00	0,60	µg/l	100%
Manganese	25,20	0,16	25,9	3,9	µg/l	103%
Nickel	6,26	0,06	6,4	1,0	µg/l	102%
Mercury	1,502	0,016	1,34	0,34	µg/l	89%
Selenium	1,002	0,017	1,00	0,25	µg/l	100%
Uranium	7,25	0,05	6,7	1,0	µg/l	92%
Zinc	93,2	1,6	97	19	µg/l	104%