



IFA-Proficiency Testing Scheme zur Wasseranalytik / for Water Analysis

Endbericht / Final Report
Eignungsprüfungsrunde / Proficiency testing round
M181

Metalle / Metals

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Allgemeine Informationen

Diese Zusammenfassung beschreibt die 181. Runde der regelmäßigen Eignungsprüfungen zur Parametergruppe „Metalle“. Die Prüfgegenstände M181A und M181B wurden am 16. März 2026 an 20 Teilnehmer versendet. Jedes Labor erhielt zwei Prüfgegenstände zu je 250 ml, abgefüllt in LDPE-Flaschen.

Einsendeschluss für die Ergebnisse war am 17. April 2026. Von 18 Teilnehmern wurden Ergebnisse übermittelt.

Zur Anonymisierung wurde jedem Labor per Zufallsgenerator ein Buchstabencode zugeteilt.

Zusammensetzung des Prüfgegenstands

Die Prüfgegenstände M181A und M181B enthielten Al, As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, U und Zn in einer den natürlichen Bedingungen angepassten Matrix, welche durch Zugabe von hochreinen Salzen (CaCO_3 , $\text{Mg}(\text{NO}_3)_2$, NaCl und KCl), H_2SO_4 , HCl und eines Sr-Standards eingestellt wurde: 45,7 mg/l Ca, 19,5 mg/l Mg, 8,9 mg/l Na, 1,14 mg/l K, 19,2 mg/l SO_4^{2-} , 15,1 (16,1) mg/l Cl^- und 358 (565) $\mu\text{g/l}$ Sr; M181A (M181B). Die Prüfgegenstände wurden mit hochreiner HNO_3 (0,5 % v/v) bei $\text{pH} < 2$ stabilisiert.

Homogenitäts-, Richtigkeits- und Stabilitätsuntersuchung

Die Prüfgegenstände wurden vor dem Versand am IFA auf Homogenität und Richtigkeit untersucht. Die Ergebnisse der Kontrollanalytik finden sich auf den Rohdatenblättern sowie auf den Auswertungen zu jedem Parameter.

Die Stabilitätsuntersuchungen zu allen Parametern werden zusammen mit der Kontrollanalytik zur folgenden Runde (M182) durchgeführt.

Nach unseren Erfahrungen bleiben die Konzentrationen aller Parameter, mit Ausnahme von Hg, bei Lagerung bei 4-6 °C im Dunkeln bis 18 Monate stabil. Bei Hg ist eine Konzentrationsabnahme von 2 % bis 4 % pro Monat zu erwarten.

Zugewiesene Werte

Die zugewiesenen Werte ergaben sich aus den Wägewerten der zur Herstellung der Prüfgegenstände verwendeten Standards. Sie lagen bei Al, As, Cd, Cr, Fe, Hg, Cu, Mn, Ni, Pb, Se, U und Zn in mindestens einem Prüfgegenstand über den Mindestbestimmungsgrenzen der österreichischen Gewässerzustandsüberwachungsverordnung (GZÜV - BGBl. II. 479/2006).

Die Unsicherheiten der zugewiesenen Werte (erweiterte Unsicherheiten, $k = 2$, $\alpha = 0,05$) wurden nach den Vorgaben des EURACHEM / CITAC Guides „Quantifying Uncertainty in Analytical Measurement, 3rd Edition (2012)“ ermittelt.

Hg wurde dem Prüfgegenstand M181B nicht zugesetzt, um die Wiederfindung der Blindwerte zu überprüfen. Der zugewiesene Wert von $<0,1 \mu\text{g/l}$ Hg wurde entsprechend der Mindestbestimmungsgrenze der GZÜV festgelegt.

Auswertung

Mit den bei uns eingegangenen Messwerten wurde ein Ausreißertest nach Hampel durchgeführt. Die von diesem Test als auffällig eingestuften Werte sind in den Tabellen der parameterorientierten Auswertung mit einem Stern gekennzeichnet.

Die aus den ausreißerbereinigten Daten berechneten, auf die zugewiesenen Werte bezogenen mittleren Wiederfindungen lagen zwischen 94,6 % (Hg in M181A) und 103,1 % (Se in M181B). Die aus den ausreißerbereinigten Daten berechneten Standardabweichungen bewegten sich im Bereich von 2,5 % (Cd in M181B) bis 9,8 % (Al in M181A).

Zu den Mittelwerten und mittleren Wiederfindungen wurden auch die Vertrauensbereiche ($P = 99 \%$) angegeben. Diese Vertrauensbereiche der Labormittelwerte enthielten in allen Fällen mit Ausnahme von Cu in M181A ($96,5 \% \pm 2,5 \%$) und Pb in M181B ($96,5 \% \pm 2,4 \%$) die entsprechenden zugewiesenen Werte mit ihren Unsicherheiten.

Die Standardunsicherheiten aller zugewiesenen Werte wurden nach dem Kriterium $u(x_{pp}) < 0,3\sigma_{pp}$ oder $u(x_{pp}) < 0,1\delta E$ (DIN ISO 13528, Punkt 9.2) überprüft und entsprach in allen Fällen bis auf Zn im Prüfgegenstand M181A und M181B der Vorgabe.

Bei diesem Parameter, sowie auch für Cu in M181A und Pb in M181B wurde deshalb zusätzlich der Vergleich der absoluten Differenz zwischen zugewiesenem Wert (x_{pt}) und Labormittelwert (\bar{X}) unter Berücksichtigung der Messunsicherheiten $u(x_{pt})$ und $u(\bar{X})$ durchgeführt.

$$|x_{pt} - \bar{X}| < 2 * \sqrt{u(x_{pt})^2 + u(\bar{X})^2} \quad (\text{DIN ISO 13528, Punkt 7 und E7})$$

Zn (M181A und M181B) entsprach der Vorgabe. Daher wurden die berechneten zugewiesenen Werte mit den zugehörigen Standardunsicherheiten übernommen.

Bei Cu (M181A) und Pb (M181B) ergaben die ausreißerbereinigten Ergebnisse bei Auswertung über die metrologisch rückführbaren zugewiesenen Werte keine z-Scores > 3; eine Änderung der Auswertung war daher nicht erforderlich.

z-Score-Auswertung

Ein z-Score ist die auf eine Standardabweichung bezogene Abweichung eines Messwertes vom zugewiesenen Wert. Er wird mittels folgender Formel berechnet:

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

z	z-Score
x_i	Messwert eines Labors
X	zugewiesener Wert oder ausreißerbereinigter Mittelwert („Konsenswert“)
σ_{pt}	Standardabweichung für die Eignungsbewertung

Es handelt sich also um das Verhältnis der Abweichung des Messwertes eines Labors vom zugewiesenen Wert zu einer vorgegebenen Standardabweichung.

Die Standardabweichungen für die Eignungsbewertung wurden aus den Ergebnissen der im Zeitraum 2015 - 2025 vom IFA-Tulln veranstalteten Eignungsprüfung berechnet.

Diese Vorgehensweise wurde deshalb gewählt, weil, unserer Erfahrung nach, die Standardabweichungen der ausreißerbereinigten Messwerte zwischen den einzelnen Eignungsprüfungen variieren. Die Ermittlung der Standardabweichung über die Eignungsprüfungsrunden aus mehreren Jahren bietet jedoch eine gut abgesicherte Basis auf einer breiten Datengrundlage und ist somit meistens besser geeignet, als das bei der direkt aus der Eignungsprüfung berechneten Standardabweichung der Fall wäre. (siehe EN ISO/IEC 17043:2023, B.4.1.3)

Der Vorteil, der sich für alle Teilnehmer daraus ergibt, ist, dass dadurch bei unseren Eignungsprüfungen schon vor der Teilnahme vorhersehbar ist, welche z-Scores man mit den eigenen, aus Routineverfahren bekannten, Messabweichungen erwarten kann.

Rechenbeispiel:

Ein Labor bestimmte für den Parameter Aluminium einen Messwert von 73,7 µg/l (Wiederfindung von 101,94 %). Der zugewiesene Wert für Aluminium lag bei 72,3 µg/l (100 %).

In der nachfolgenden Tabelle (und in der Tabelle des Jahresprogrammes www.ifatest.at) ist die relative Standardabweichung für die Eignungsbewertung beim Parameter Aluminium mit 7,5 % angegeben. Bezogen auf den zugewiesenen Wert 72,3 µg/l Al entsprechen 7,5 % 5,4 µg/l.

$$z = \frac{x_i - X}{\sigma_{pt}} = \frac{73,7 \mu\text{g/l} - 72,3 \mu\text{g/l}}{5,4 \mu\text{g/l}} \approx 0,26 \quad \text{oder} \quad \frac{101,94 \% - 100 \%}{7,5 \%} \approx 0,26$$

z	z-Score	
x_i	73,7 µg/l	entsprechen 101,94 % (Messwert des Labors)
X	72,3 µg/l	entsprechen 100 % (zugewiesener Wert)
σ_{pt}	5,4 µg/l	entsprechen 7,5 % (Standardabweichung für die Eignungsbewertung, siehe Tabelle unten)

Abweichungen in den Nachkommastellen können sich bei Nachberechnung dadurch ergeben, dass im Bericht bei den Wiederfindungen zwecks Übersichtlichkeit gerundete Werte angegeben sind.

Die folgende Tabelle enthält die Standardabweichung für die Eignungsbewertung bezogen auf den zugewiesenen Wert mit ihren Anwendungsbereichen. Die Berechnung von z-Scores erfolgt nur dann, wenn der zugehörige zugewiesene Wert über der in der Tabelle angegebenen Konzentration liegt.

Parameter	Standardabweichung für die Eignungsbewertung bezogen auf den zugewiesenen Wert	untere Grenze
Aluminium	7,5 %	7,5 µg/l
Arsen	6,5 %	0,5 µg/l
Blei	6,4 %	0,3 µg/l
Cadmium	4,8 %	0,1 µg/l
Chrom	5,9 %	0,5 µg/l
Eisen	6,2 %	10 µg/l
Kupfer	7,1 %	1,0 µg/l
Mangan	5,0 %	2,0 µg/l
Nickel	6,3 %	0,75 µg/l
Quecksilber	10,4 %	0,2 µg/l
Selen	8,5 %	0,45 µg/l
Uran	5,4 %	0,35 µg/l
Zink	6,2 %	3 µg/l

Zur Interpretation von z-Scores wird meist folgende Klassifikation vorgeschlagen:

z-Score	Klassifikation
≤2	zufriedenstellend
2< z <3	fraglich
≥3	nicht zufriedenstellend

Die z-Scores sind in der parameterorientierten Auswertung in den Tabellen neben den Wiederfindungen angegeben. Jedes Labor erhält zusätzlich zu dieser Auswertung ein Blatt, auf dem die erzielten z-Scores zusammengefasst und grafisch dargestellt sind. Die Standardabweichungen für die Eignungsbewertung sind dort in Konzentrationseinheiten angegeben.

Eine Übersichtstabelle aller z-Scores ist im Anschluss an die Rohdatentabellen im parameterorientierten Teil zu finden.

Zur Darstellung der Ergebnisse in der Auswertung:

Eine Legende zur Darstellung der Ergebnisse finden Sie auf der nächsten Seite. In den Tabellen der Auswertung sind jeweils zugewiesener Wert, Messwert, Unsicherheit und die Wiederfindung dargestellt. In der parameterorientierten Auswertung befindet sich der Sollwert direkt unter der Parameterbezeichnung. Die Unsicherheit des Sollwertes ist immer als erweiterte Unsicherheit ($k = 2$; $\alpha = 0,05$) angegeben. Sie wurde nach den Vorgaben des EURACHEM / CITAC Guides „Quantifying Uncertainty in Analytical Measurement, 3rd Edition (2012)“ ermittelt. Die grafische Darstellung der Ergebnisse enthält die Unsicherheit des zugewiesenen Wertes als grau unterlegtes Band.

In der Spalte „A“ bei der parameterorientierten Auswertung wurden die Messwerte, die nach dem Test nach Hampel als Ausreißer gewertet wurden, mit einem Stern (*) gekennzeichnet. Die Grafik der Messwerte wurde für alle Parameter auf $100 \% \pm 45 \%$ des zugewiesenen Wertes skaliert. Die kleine Tabelle unten links enthält statistische Parameter, darunter den 99 % - Vertrauensbereich der Labormittelwerte vor und nach Ausreißereliminierung.

Ergebnisse, für die keine Wiederfindung bzw. Abweichung vom zugewiesenen Wert berechnet werden kann (d.h. „Kleiner als“ Ergebnisse oder Zahlenwerte bei nicht zugegebenen Substanzen) werden in den Tabellen und Grafiken entweder als **FN** (falsch negativ), **FP** (falsch positiv) oder als • - Symbol dargestellt.

- Als falsch negativ gelten „< Ergebnisse“ mit einem Betrag des Zahlenwertes unterhalb des zugewiesenen Wertes bzw. Messwert „0“ bei zugegebenen Substanzen.
- Falsch positive Ergebnisse sind für Substanzen möglich, die über „< zugewiesener Wert“ ausgewertet wurden. Mit FP werden alle Messwerte gekennzeichnet, die mit ihren Unsicherheiten das Kriterium „< zugewiesener Wert“ nicht einschließen (tangieren).
- Mit einem • - Symbol werden alle weiteren Ergebnisse illustriert, für die keine Wiederfindung berechnet werden kann

Prüfmethoden

Den Teilnehmenden stand die Wahl der Analysenmethode frei. Die Parameter sollten mit den im jeweiligen Teilnehmerlabor eingesetzten Routineverfahren bestimmt werden. Eine Übersicht der angewendeten Methoden befindet sich am Ende des Berichts.

„< Werte“ bzw. „> Werte“ sowie stark abweichende Messwerte, welche zu einer unübersichtlichen Skalierung führen würden, sind in den Graphiken nicht berücksichtigt.

Tulln, 29. April 2026

Probe M106A

Parameter Kupfer

*Sollwert ± U (k=2) 4,79 µg/l ± 0,13 µg/l
 IFA-Kontrolle ± U (k=2) 4,79 µg/l ± 0,38 µg/l
 IFA-Stabilität ± U (k=2) 4,69 µg/l ± 0,38 µg/l

*Sollwert = "zugewiesener Wert"
Sollwert ± Unsicherheit aus Einwaage
Kontrollmessung IFA vor Versand
Messung IFA 3 Wochen nach Versand

Labor-Kennung	Messwert	±	Einheit	Wiederfindung	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	95%	-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	*	

Wiederfindung des zugewiesenen Wertes in Prozent

z-Score des Labors

Ein Stern markiert einen Ausreißer nach dem Hampel-Test

Ergebnisunsicherheit laut Teilnehmer

	alle Ergebnisse	ohne Ausreißer	Einheit
MW ± VB(99%)	4,65 ± 0,57	4,51 ± 0,42	µg/l
WF ± VB(99%)	97,1 ± 12,0	94,1 ± 8,8	%
Standardabw.	0,84	0,59	µg/l
rel. Standardabw.	18,1	13,2	%
n für Berechnung	18	17	

Standardabweichung zwischen den Labors

Mittelwert der Messwerte und Wiederfindung des zugewiesenen Wertes mit zugehörigen Vertrauensbereichen (p=99%)

Anzahl der Messungen zur Berechnung der statistischen Kenngrößen

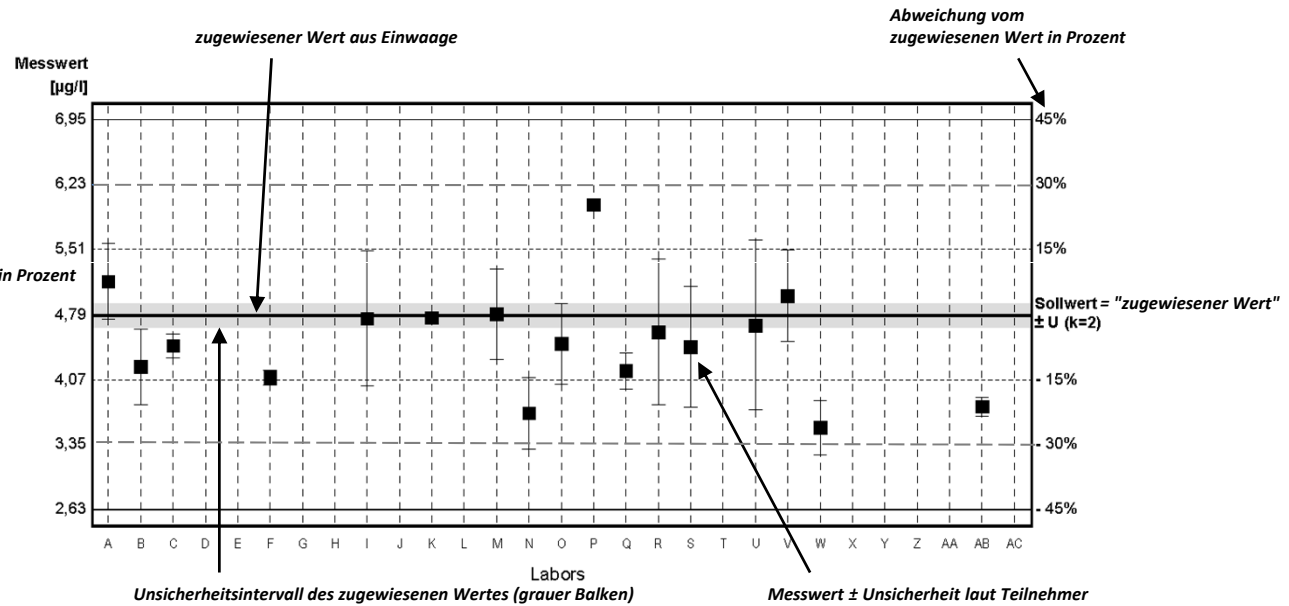
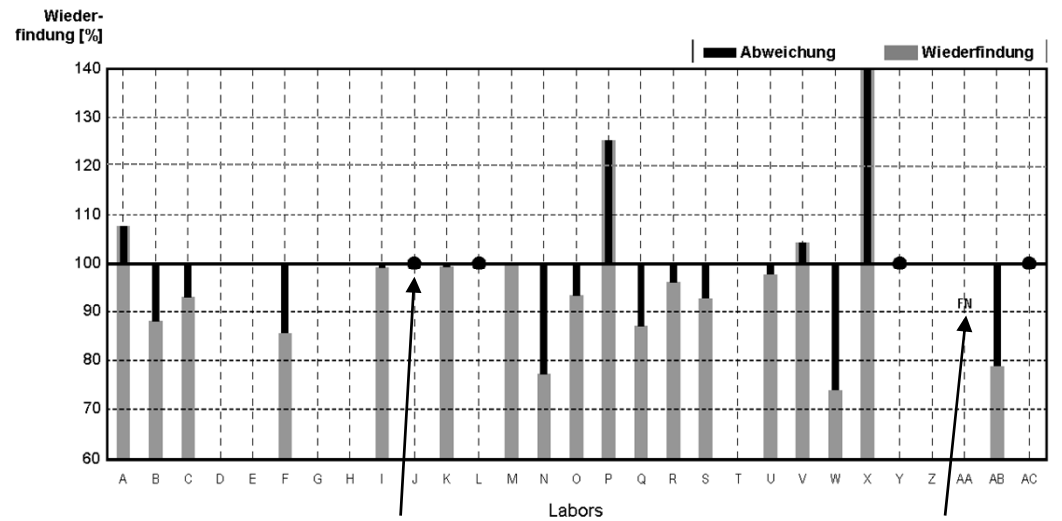


Diagramm 1: Messwerte mit zugehörigen Unsicherheitsintervallen



Ergebnis abgegeben, Berechnung der Wiederfindung oder Zuordnung FN, FP nicht möglich

Falsch negativ „< Ergebnis“ kleiner als der theoretische Sollwert

Diagramm 2: Wiederfindung und Abweichung vom zugewiesenen Wert

LEGENDE

Information

This report summarises the results of the round M181 (trace metals) within the IFA-Proficiency Testing Scheme for Water Analysis. The proficiency testing items M181A and M181B were distributed to 20 participants on Monday, 16 March 2026. Each participant received two proficiency testing items of 250 mL filled into LDPE bottles.

Closing date for reporting results to the IFA-Tulln was Friday, 17 April 2026. 18 participants submitted results. To make the participants anonymous, each laboratory obtained a letter code by random.

Proficiency testing items

The proficiency testing items consisted of artificial ground water spiked with pure standards. For the preparation, ultrapure water was spiked with concentrated solutions of salts to simulate the ionic composition of natural Austrian ground water. The ultrapure salts CaCO_3 , $\text{Mg}(\text{NO}_3)_2$, NaCl , KCl were used and the ultrapure acids H_2SO_4 and HCl as well as an additional Sr standard were added. By this, the matrix of the proficiency testing items consisted of about 45.7 mg/L Ca, 19.5 mg/L Mg, 8.9 mg/L Na, 1.14 mg/L K, 19.2 mg/L SO_4^{2-} , 15.1 (16.1) mg/L Cl⁻ and 358 (565) $\mu\text{g/L}$ Sr M181A (M181B). Ultrapure HNO_3 (0.5 % v/v) was added to stabilise the proficiency testing item at a pH below 2, which meets the standard sampling procedure in the Austrian monitoring program.

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

Homogeneity, accuracy and stability tests

Some proficiency testing items of the round M181A and M181B were analysed for all investigated parameters prior to shipment to the participants. The results are listed in the results tables and the parameter oriented part of the report ("IFA result").

Stability tests will be carried out together with the accuracy tests of the following round (M182). According to our experience, the concentrations of all parameters except Hg in the proficiency testing items remain stable up to 18 months when stored at 4-6 °C in the dark. For the parameter Hg a concentration decrease of 2 % to 4 % per month can be expected.

Results

Data evaluation was based on assigned concentrations that were calculated from the weights of the standards used to produce the proficiency testing items. 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 %).

Hg was not added to M181B to check the analytical blank values. The assigned concentration was set to $<0.1 \mu\text{g/L}$ Hg, which meets the minimum quantifiable values defined by the Austrian ground and river water monitoring.

The recoveries of the assigned concentrations, calculated from outlier-corrected data mean values ranged between 94.6 % (Hg in M181A) and 103.1 % (Se in M181B).

The between laboratory CVs covered the ranged between 2.5 % (Cd in M181B) and 9.8 % (Al in M181A).

All confidence intervals of the outlier-corrected laboratory mean values except that for Cu in M181A ($96.5 \% \pm 2.5 \%$) and Pb in M181B ($96.5 \% \pm 2.4 \%$) encompass the corresponding assigned values with their uncertainties. For all other parameters, no

difference could be detected between assigned concentrations and outlier corrected laboratory mean values statistically.

The standard uncertainties of all assigned values were checked according to the criterion

$$u(x_{pp}) < 0,3\sigma_{pp} \text{ or } u(x_{pp}) < 0,1\delta E, \text{ (DIN ISO 13528, Section 9.2)}$$

and met the requirement in all cases except for Zn in M181A and M181B.

For this parameter and additionally for Cu in M181A and Pb M181B, the comparison of the absolute difference between the assigned value (x_{pt}) and the laboratory mean value (\bar{X}), considering the measurement uncertainties $u(x_{pt})$ and $u(\bar{X})$, was additionally carried out.

$$|x_{pt} - \bar{X}| < 2 * \sqrt{u(x_{pt})^2 + u(\bar{X})^2} \quad \text{(DIN ISO 13528, Section 7 and E7)}$$

Zn in M181A and M181B complied with the specification. Therefore, the calculated assigned values with the associated standard uncertainties were adopted.

For Cu (M181A) and Pb (M179B), the outlier-cleaned results, when evaluated against the metrologically traceable assigned values, yielded no z -scores > 3 ; therefore, no change to the evaluation was required.

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	assigned 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 assigned 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 2015 to 2025. 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 17043:2023, B.4.1.3). 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.

Calculation example:

A laboratory found 73.7 µg/L for the parameter Aluminium (recovery of 101.94 %). The assigned 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 7.5 %, which is 5.4 µg/L Al, when based on the assigned value.

$$z = \frac{x_i - X}{\sigma_{pt}} = \frac{73.7 \mu\text{g/L} - 72.3 \mu\text{g/L}}{5.4 \mu\text{g/L}} \approx 0.26 \quad \text{or} \quad \frac{101.94 \% - 100 \%}{7.5 \%} \approx 0.26$$

z	z-score	
x_i	73.7 µg/L	equivalent to 101.94 % (result of the laboratory)
X	72.3 µg/L	equivalent to 100 % (assigned value)
σ_{pt}	5.4 µg/L	equivalent to 7.5 % (standard deviation for proficiency assessment see table below)

Minor deviations in the last digits may occur because rounded values are reported for clarity. The following table lists the standard deviations for proficiency assessment and their limits of applicability. Z-scores were only calculated, if the assigned values were higher than these limits.

Parameter	standard deviation for proficiency assessment based on the assigned value	Lower limit
Aluminium	7.5 %	7.5 µg/L
Arsenic	6.5 %	0.5 µg/L
Cadmium	4.8 %	0.1 µg/L
Chromium	5.9 %	0.5 µg/L
Copper	7.1 %	1.0 µg/L
Iron	6.2 %	10 µg/L
Lead	6.4 %	0.3 µg/L
Manganese	5.0 %	2.0 µg/L
Mercury	10.4 %	0.2 µg/L
Nickel	6.3 %	0.75 µg/L
Selenium	8.5 %	0.45 µg/L
Uranium	5.4 %	0.35 µg/L
Zinc	6.2 %	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 assigned 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 assigned 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 assigned 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 based on a "< assigned value". A result is termed FP if it does not include (strike) the "< assigned value" with its measurement uncertainty.
- "•": All other results for which no recoveries can be calculated are illustrated by this symbol

Overview of measurement methods

The participants were free to choose the analytical method. The test methods should be consistent with the methods applied in routine. An overview of the methods used can be found at the end of the report.

"< values" or "> values" as well as significantly different measured values, which would lead to confusing scaling, are not included in the graphics.

Tulln, 29 April 2026

Sample M106A
Parameter Copper

*Target value ± U (k=2) 4,79 µg/l ± 0,13 µg/l
 IFA result ± U (k=2) 4,79 µg/l ± 0,38 µg/l
 Stability test ± U (k=2) 4,69 µg/l ± 0,38 µg/l

**Target value = "assigned value"*
Obtained from sample preparation, U=uncertainty
Determined at IFA prior to shipment of samples
Determined at IFA 3 weeks after sample dispatch

Lab Code	Result	±	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 assigned 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 assigned value with corresponding confidence intervals (p=99%)

Number of results used for calculation of statistic parameters

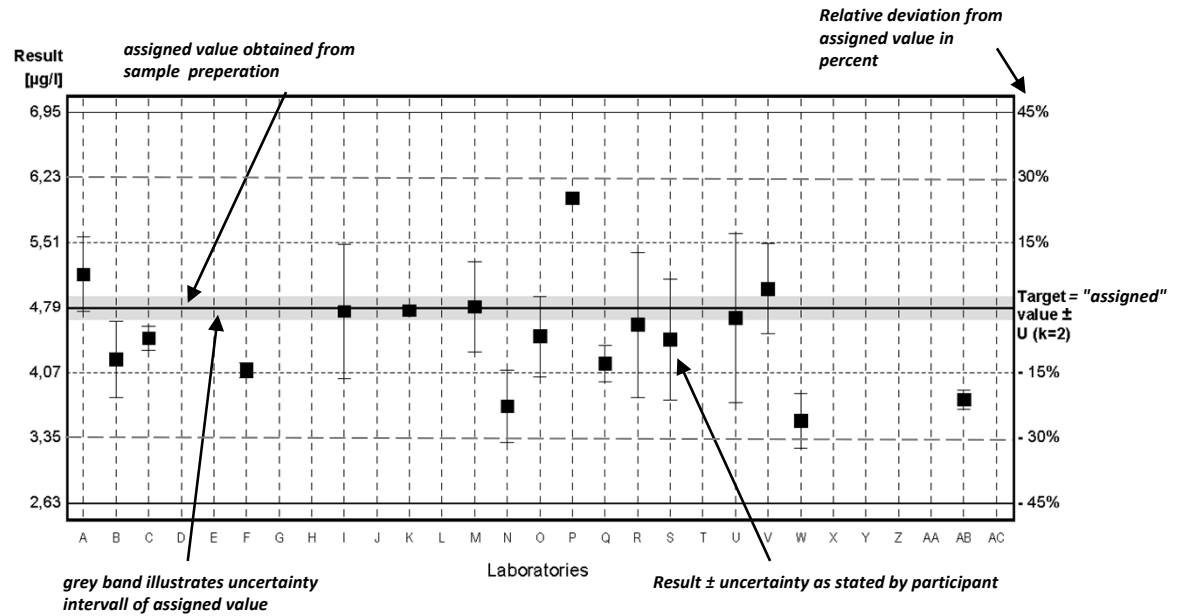
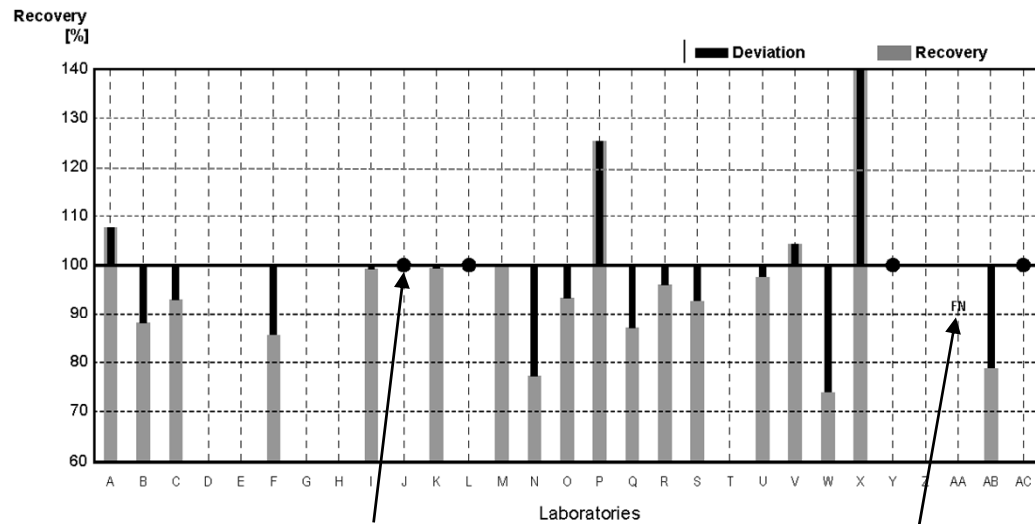


Diagram 1: Measurement results and their uncertainties



Result neither possible to calculate recovery nor false positive or false negative

False negative: reported „<-result“ is lower than target value

Diagram 2: Recoveries and deviations from assigned values

EXPLANATION



**Rohdatenblätter und
Parameterorientierte Auswertung
Tables and Parameter Oriented Part**

Eignungsprüfungsrunde / Proficiency testing round
M181

Metalle / Metals

Versand / Dispatch: 16.03.2026

Results M181A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
assigned value	13.14	2.591	2.71	0.635	2.99	22.67	4.00
IFA result	12.7	2.64	2.44	0.61	2.98	22.0	3.98
A	15.5	2.77	2.68	0.67	3.02	24.5	3.99
B	15.0	2.70	2.70	0.65	3.10	22.0	3.90
C	13.283	2.421	2.717	0.626	2.922	22.3	3.914
D	13.2	2.70	2.55	0.65	3.03	21.3	3.90
E	12.3					21.0	
F							
G	15.0	2.61	2.40	0.650	2.93	21.6	3.79
H	10.7	2.64	2.62	0.637	2.89	22.8	3.84
I	12.9	<5	2.70	<1	3.00	23.0	4.00
J						<25	
K	13.7	2.65	2.55	0.600	2.83	22.1	3.86
L	62.0	1.49	1.92	0.713	2.33	25.0	2.41
M	12.76	<5	<3	<1	2.76	21.55	<5
N	14.0	2.49	2.52	0.63	2.84	21.3	3.62
O							
P	12.7378	2.5681	2.6815	0.6154	2.9036	21.8769	4.2334
Q	13.2	2.69	2.75	0.621	2.91	22.4	3.85
R	13.2	2.66	2.68	0.629	2.77	18.8	3.93
S	11.1	2.55	2.64	0.619	2.73	19.4	3.64
T	14.25	2.77	2.55	0.595	3.11	23.85	3.92

All data in µg/L

Measurement Uncertainties M181A

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
assigned value	0.17	0.019	0.02	0.005	0.02	0.16	0.03
IFA result	0.5	0.24	0.12	0.04	0.11	1.7	0.28
A	3.1	0.55	0.27	0.07	0.45	4.9	0.80
B	2.25	0.405	0.405	0.0975	0.465	5.72	0.585
C	2.15	0.38	0.33	0.05	0.21	2.27	0.44
D	1.51	0.20	0.28			1.50	
E	3.6					3.6	
F							
G	1.5	0.39	0.24	0.065	0.29	2.2	0.38
H	2.1	0.40	0.31	0.076	0.43	3.4	0.46
I	1.50		0.20		0.40	2.7	0.40
J							
K	0.100	0.050	0.026	0.017	0.055	0.058	0.015
L	8.1	0.52	0.31	0.164	0.839	3.25	1.08
M	1.97				0.23	1.81	
N	2.8	0.5	0.5	0.1	0.6	4.3	0.7
O							
P	1.284	0.258	0.2703	0.0619	0.2936	2.203	0.425
Q	1.98	0.40	0.41	0.093	0.44	3.37	0.58
R	0.629	0.160	0.0643	0.0124	0.115	0.698	0.103
S	2.5	0.69	0.59	0.14	0.74	5.2	0.82
T	3.0	0.40	0.40	0.070	0.40	3.0	0.70

All data in µg/L

Results M181A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
assigned value	19.96	2.21	1.120	1.92	1.505	20.7
IFA result	20.1	2.08	1.03	1.84	1.31	21.2
A	21.1	2.03	1.08	2.05	1.54	21.7
B	20.0	2.20	1.077	1.96	1.51	21.0
C	19.997	2.178	1.023	1.728	1.517	21.24
D	19.4	2.15	0.96	2.02	1.41	20.3
E	18.9					
F						
G	19.7	2.14	0.980	1.92	1.40	19.8
H	19.9	2.13	0.745	1.89	1.41	19.6
I	20.0	2.30	1.00	<3	1.50	21.5
J	<25					
K	19.8	2.02	1.03	1.88	1.47	19.9
L	15.0	1.73	1.20	0.794		20.4
M	19.44	<5		<5		20.4
N	19.4	2.06			1.44	19.8
O						
P	19.1263	2.1337			1.4482	20.2008
Q	19.3	2.14	1.169	2.08	1.60	20.4
R	19.1	2.18	1.03	1.81	1.58	19.8
S	19.6	2.23	1.15	1.92	1.41	19.9
T	20.62	2.23	1.02	<5.0	1.52	21.83

All data in µg/L

Measurement Uncertainties M181A

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
assigned value	0.12	0.03	0.015	0.02	0.013	1.0
IFA result	1.3	0.11	0.17	0.24	0.13	3.2
A	4.2	0.51	0.22	0.51	0.31	4.34
B	2.00	0.330	0.1616	0.294	0.227	3.15
C	1.66	0.21	0.05	0.15	0.22	3.76
D	1.36	0.23		0.2		5.35
E	1.9					
F						
G	2.0	0.21	0.147	0.29	0.14	1.98
H	2.4	0.23	0.16	0.28	0.21	2.9
I	1.3	0.20	0.20		0.2	2.5
J						
K	0.153	0.020	0.015	0.035	0.025	0.058
L	3.15	0.450	0.444	0.357		3.67
M	1.83					2.86
N	3.9	0.4			0.3	4.0
O						
P	1.93	0.214			0.146	2.0
Q	2.89	0.32	0.175	0.31	0.24	3.06
R	0.521	0.102	0.0110	0.107	0.0982	0.091
S	5.29	0.50	0.31	0.69	0.38	4.98
T	2.0	0.40	0.2		0.20	3.0

All data in µg/L

Results M181B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
assigned value	42.3	1.507	6.47	1.231	1.906	56.0	2.08
IFA result	41.2	1.56	5.6	1.18	1.91	54	2.06
A	45.1	1.62	6.5	1.26	1.90	59	2.08
B	45.0	1.60	6.40	1.26	1.90	56.0	2.10
C	42.487	1.409	6.509	1.196	1.851	55.887	2.009
D	43.9	1.56	6.02	1.23	2.57	52.9	2.47
E	43.3					51.8	
F							
G	46.0	1.52	5.90	1.24	1.82	53.0	2.06
H	33.8	1.51	6.38	1.22	1.80	55.5	1.72
I	42.4	<5	6.3	1.20	1.90	57.0	2.00
J						58	
K	41.6	1.52	5.93	1.19	1.86	54.4	2.03
L	27.0	0.138	6.26	0.155	1.12	23.5	0.563
M	42.58	<5	6.05	1.198	<2	53.43	<5
N	41.6	1.51	5.98	1.21	1.82	52.9	1.84
O							
P	41.6289	1.5079	6.4216	1.1907	1.8524	54.3083	2.0149
Q	42.1	1.61	6.47	1.21	1.91	55.8	2.04
R	43.6	1.51	6.31	1.22	1.77	50.6	2.12
S	39.9	1.52	6.29	1.23	1.83	45.4	1.80
T	44.44	1.60	6.14	1.138	1.99	58.10	2.04

All data in µg/L

Measurement Uncertainties M181B

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
assigned value	0.3	0.014	0.04	0.011	0.015	0.2	0.03
IFA result	1.4	0.14	0.3	0.07	0.08	4	0.15
A	9.0	0.32	0.7	0.13	0.29	12	0.42
B	6.75	0.240	0.960	0.189	0.285	14.56	0.315
C	6.88	0.22	0.79	0.1	0.14	5.7	0.23
D	6.86	0.1	0.84	0.11		3.55	
E	6.5					8.8	
F							
G	4.6	0.23	0.59	0.12	0.18	5.3	0.21
H	6.8	0.23	0.77	0.15	0.27	8.3	0.21
I	4.80		0.40	0.10	0.20	6.8	0.20
J						5	
K	0.900	0.021	0.093	0.015	0.010	0.208	0.025
L	3.5	0.048	1.00	0.036	0.405	3.06	0.253
M	6.56		1.03	0.085		4.49	
N	8.3	0.3	1.2	0.2	0.4	11	0.4
O							
P	4.196	0.152	0.6473	0.1197	0.1873	5.47	0.202
Q	6.32	0.24	0.97	0.18	0.29	8.37	0.31
R	0.548	0.170	0.0599	0.0670	0.122	0.622	0.111
S	8.98	0.41	1.41	0.28	0.49	12.0	0.41
T	8.0	0.30	0.9	0.1	0.3	8.0	0.3

All data in µg/L

Results M181B

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
assigned value	35.60	5.64	<0.1	2.39	2.99	15.1
IFA result	35.2	5.4	<0.1	2.52	2.44	15.4
A	37.5	5.5	<0.100	2.58	3.05	15.8
B	37.0	5.70	<0.001	2.52	2.98	15.0
C	35.935	5.732	<0.1	2.161	2.997	15.60
D	33.9	5.91	0.0170	2.50	2.84	14.8
E	33.6					
F						
G	34.9	5.40	<0.05	2.40	2.81	14.5
H	35.6	5.48	<0.05	2.44	2.77	14.0
I	37.0	5.8	<0.2	<3	3.00	15.6
J	28.1					
K	35.6	5.48	<0.011	2.38	2.93	14.2
L	23.6	5.50	0.107	1.45		14.8
M	34.75	6.47		<5		14.9
N	34.2	5.38			2.82	15.3
O						
P	34.0889	5.6324			2.8639	14.6199
Q	35.1	5.58	<0.1	2.69	3.30	15.6
R	34.2	5.66	<0.050	2.31	2.98	14.6
S	35.8	5.54	0.150	2.66	2.85	14.3
T	36.46	5.66	<0.04	<5.0	3.05	15.65

All data in µg/L

Measurement Uncertainties M181B

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
assigned value	0.17	0.04		0.02	0.02	1.0
IFA result	2.3	0.2		0.33	0.24	2.6
A	7.5	1.4		0.65	0.61	3.2
B	3.70	0.855		0.378	0.447	2.25
C	2.98	0.55		0.19	0.43	2.76
D	2.10	0.79		0.35	0.18	2.18
E	5.0					
F						
G	3.5	0.54		0.36	0.28	1.4
H	4.3	0.60		0.37	0.42	2.1
I	2.4	0.50			0.3	2.2
J	2.4					
K	0.153	0.035		0.085	0.025	0.153
L	4.96	1.43	0.040	0.653		2.66
M	3.27	0.80				2.08
N	6.8	1.1			0.6	3.1
O						
P	3.44	0.566			0.290	1.5
Q	5.26	0.84		0.40	0.49	2.34
R	0.488	0.0911		0.104	0.0911	0.094
S	9.70	1.25	0.040	0.96	0.77	3.58
T	4.0	0.9			0.4	3.0

All data in µg/L

z-Scores M181A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A	2.39	1.06	-0.17	1.15	0.17	1.30	-0.04
B	1.89	0.65	-0.06	0.49	0.62	-0.48	-0.35
C	0.15	-1.01	0.04	-0.30	-0.39	-0.26	-0.30
D	0.06	0.65	-0.92	0.49	0.23	-0.97	-0.35
E	-0.85					-1.19	
F							
G	1.89	0.11	-1.79	0.49	-0.34	-0.76	-0.74
H	-2.48	0.29	-0.52	0.07	-0.57	0.09	-0.56
I	-0.24		-0.06		0.06	0.23	0.00
J							
K	0.57	0.35	-0.92	-1.15	-0.91	-0.41	-0.49
L	49.58	-6.54	-4.55	2.56	-3.74	1.66	-5.60
M	-0.39				-1.30	-0.80	
N	0.87	-0.60	-1.10	-0.16	-0.85	-0.97	-1.34
O							
P	-0.41	-0.14	-0.16	-0.64	-0.49	-0.56	0.82
Q	0.06	0.59	0.23	-0.46	-0.45	-0.19	-0.53
R	0.06	0.41	-0.17	-0.20	-1.25	-2.75	-0.25
S	-2.07	-0.24	-0.40	-0.52	-1.47	-2.33	-1.27
T	1.13	1.06	-0.92	-1.31	0.68	0.84	-0.28

z-Scores M181A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A	1.14	-1.29	-0.34	0.80	0.43	0.78
B	0.04	-0.07	-0.37	0.25	0.06	0.23
C	0.04	-0.23	-0.83	-1.18	0.15	0.42
D	-0.56	-0.43	-1.37	0.61	-1.17	-0.31
E	-1.06					
F						
G	-0.26	-0.50	-1.20	0.00	-1.29	-0.70
H	-0.06	-0.57	-3.22	-0.18	-1.17	-0.86
I	0.04	0.65	-1.03		-0.06	0.62
J						
K	-0.16	-1.36	-0.77	-0.25	-0.43	-0.62
L	-4.97	-3.45	0.69	-6.90		-0.23
M	-0.52					-0.23
N	-0.56	-1.08			-0.80	-0.70
O						
P	-0.84	-0.55			-0.70	-0.39
Q	-0.66	-0.50	0.42	0.98	1.17	-0.23
R	-0.86	-0.22	-0.77	-0.67	0.92	-0.70
S	-0.36	0.14	0.26	0.00	-1.17	-0.62
T	0.66	0.14	-0.86		0.18	0.88

z-Scores M181B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A	0.88	1.15	0.07	0.49	-0.05	0.86	0.00
B	0.85	0.95	-0.17	0.49	-0.05	0.00	0.14
C	0.06	-1.00	0.09	-0.59	-0.49	-0.03	-0.48
D	0.50	0.54	-1.09	-0.02	5.90	-0.89	2.64
E	0.32					-1.21	
F							
G	1.17	0.13	-1.38	0.15	-0.76	-0.86	-0.14
H	-2.68	0.03	-0.22	-0.19	-0.94	-0.14	-2.44
I	0.03		-0.41	-0.52	-0.05	0.29	-0.54
J						0.58	
K	-0.22	0.13	-1.30	-0.69	-0.41	-0.46	-0.34
L	-4.82	-13.98	-0.51	-18.21	-6.99	-9.36	-10.27
M	0.09		-1.01	-0.56		-0.74	
N	-0.22	0.03	-1.18	-0.36	-0.76	-0.89	-1.63
O							
P	-0.21	0.01	-0.12	-0.68	-0.48	-0.49	-0.44
Q	-0.06	1.05	0.00	-0.36	0.04	-0.06	-0.27
R	0.41	0.03	-0.39	-0.19	-1.21	-1.56	0.27
S	-0.76	0.13	-0.43	-0.02	-0.68	-3.05	-1.90
T	0.67	0.95	-0.80	-1.57	0.75	0.60	-0.27

z-Scores M181B

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A	1.07	-0.39		0.94	0.37	0.75
B	0.79	0.17		0.64	-0.06	-0.11
C	0.19	0.26		-1.13	0.04	0.53
D	-0.96	0.76		0.54	-0.93	-0.32
E	-1.12					
F						
G	-0.39	-0.68		0.05	-1.11	-0.64
H	0.00	-0.45		0.25	-1.36	-1.17
I	0.79	0.45			0.06	0.53
J	-4.21					
K	0.00	-0.45		-0.05	-0.37	-0.96
L	-6.74	-0.39		-4.63		-0.32
M	-0.48	2.34				-0.21
N	-0.79	-0.73			-1.05	0.21
O						
P	-0.85	-0.02			-0.78	-0.51
Q	-0.28	-0.17		1.48	1.92	0.53
R	-0.79	0.06		-0.39	-0.06	-0.53
S	0.11	-0.28		1.33	-0.87	-0.85
T	0.48	0.06			0.37	0.59

Sample M181A

Parameter Aluminium

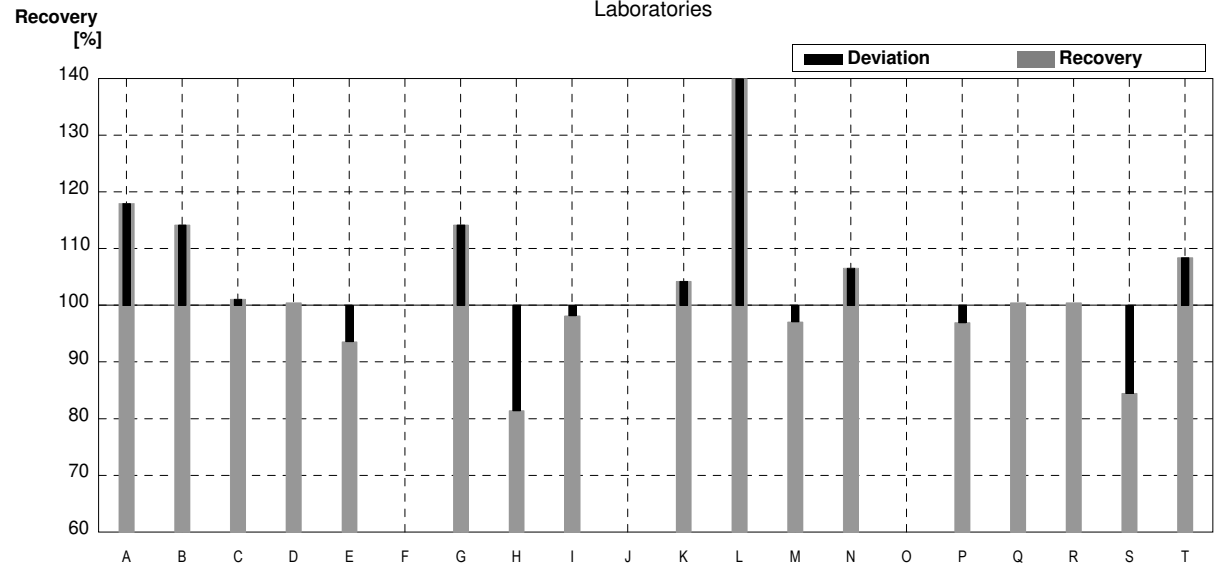
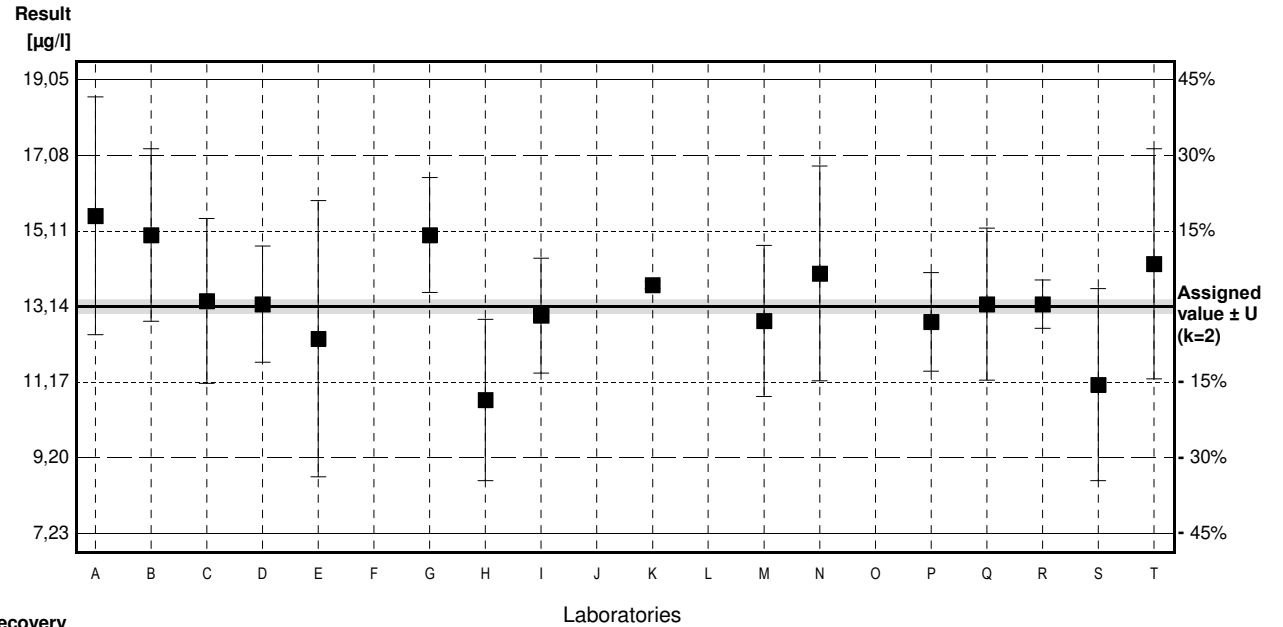
Assigned value $\pm U$ (k=2) 13,14 $\mu\text{g/l}$ \pm 0,17 $\mu\text{g/l}$

IFA result $\pm U$ (k=2) 12,7 $\mu\text{g/l}$ \pm 0,5 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	15,5	3,1	$\mu\text{g/l}$	118%	2,39
B	15,0	2,25	$\mu\text{g/l}$	114%	1,89
C	13,283	2,15	$\mu\text{g/l}$	101%	0,15
D	13,2	1,51	$\mu\text{g/l}$	100%	0,06
E	12,3	3,6	$\mu\text{g/l}$	94%	-0,85
F			$\mu\text{g/l}$		
G	15,0	1,5	$\mu\text{g/l}$	114%	1,89
H	10,7	2,1	$\mu\text{g/l}$	81%	-2,48
I	12,9	1,50	$\mu\text{g/l}$	98%	-0,24
J			$\mu\text{g/l}$		
K	13,7	0,100	$\mu\text{g/l}$	104%	0,57
L	62,0 *	8,1	$\mu\text{g/l}$	472%	49,58
M	12,76	1,97	$\mu\text{g/l}$	97%	-0,39
N	14,0	2,8	$\mu\text{g/l}$	107%	0,87
O			$\mu\text{g/l}$		
P	12,7378	1,284	$\mu\text{g/l}$	97%	-0,41
Q	13,2	1,98	$\mu\text{g/l}$	100%	0,06
R	13,2	0,629	$\mu\text{g/l}$	100%	0,06
S	11,1	2,5	$\mu\text{g/l}$	84%	-2,07
T	14,25	3,0	$\mu\text{g/l}$	108%	1,13

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	16,17 \pm 8,41	13,30 \pm 0,96	$\mu\text{g/l}$
Recov. \pm CI(99%)	123,0 \pm 64,0	101,2 \pm 7,3	%
SD between labs	11,88	1,31	$\mu\text{g/l}$
RSD between labs	73,5	9,8	%
n for calculation	17	16	



Sample M181B

Parameter Aluminium

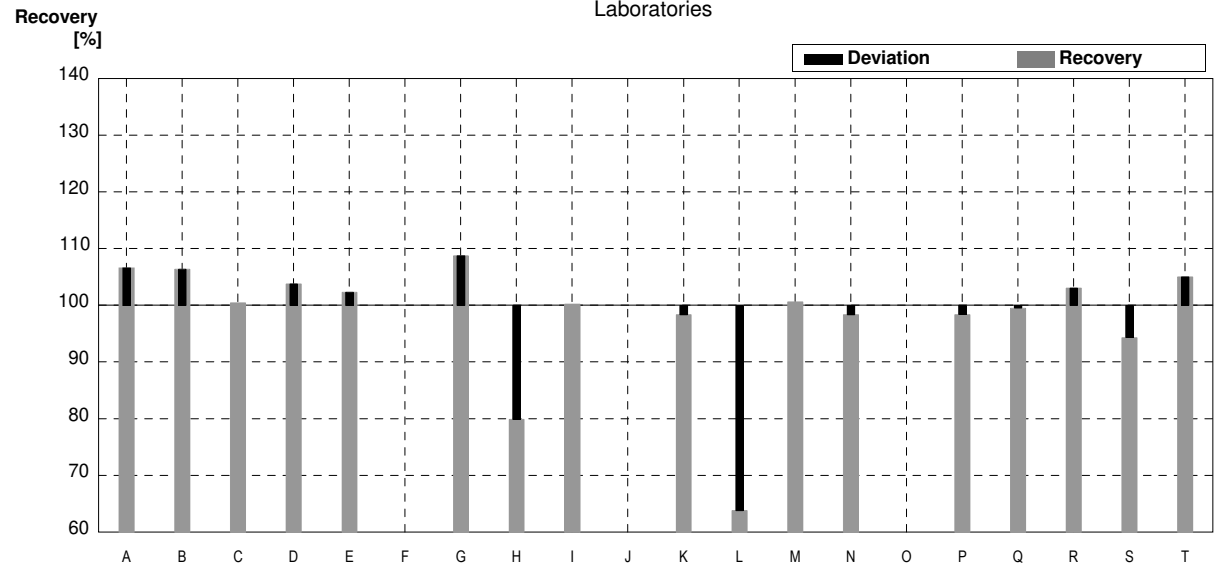
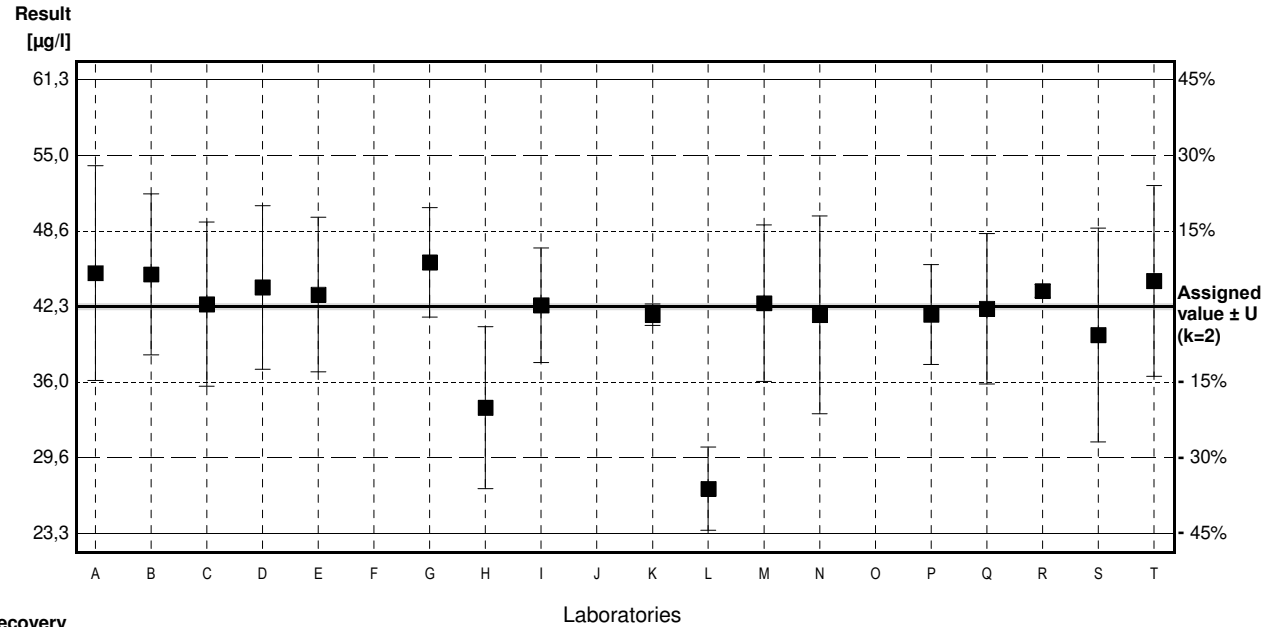
Assigned value ± U (k=2) 42,3 µg/l ± 0,3 µg/l

IFA result ± U (k=2) 41,2 µg/l ± 1,4 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	45,1	9,0	µg/l	107%	0,88
B	45,0	6,75	µg/l	106%	0,85
C	42,487	6,88	µg/l	100%	0,06
D	43,9	6,86	µg/l	104%	0,50
E	43,3	6,5	µg/l	102%	0,32
F			µg/l		
G	46,0	4,6	µg/l	109%	1,17
H	33,8 *	6,8	µg/l	80%	-2,68
I	42,4	4,80	µg/l	100%	0,03
J			µg/l		
K	41,6	0,900	µg/l	98%	-0,22
L	27,0 *	3,5	µg/l	64%	-4,82
M	42,58	6,56	µg/l	101%	0,09
N	41,6	8,3	µg/l	98%	-0,22
O			µg/l		
P	41,6289	4,196	µg/l	98%	-0,21
Q	42,1	6,32	µg/l	100%	-0,06
R	43,6	0,548	µg/l	103%	0,41
S	39,9	8,98	µg/l	94%	-0,76
T	44,44	8,0	µg/l	105%	0,67

	All results	Outliers excl.	Unit
Mean ± CI(99%)	41,6 ± 3,3	43,0 ± 1,3	µg/l
Recov. ± CI(99%)	98,2 ± 7,8	101,8 ± 3,0	%
SD between labs	4,6	1,6	µg/l
RSD between labs	11,1	3,8	%
n for calculation	17	15	



Sample M181A

Parameter Arsenic

Assigned value \pm U (k=2) 2,591 $\mu\text{g/l}$ \pm 0,019 $\mu\text{g/l}$

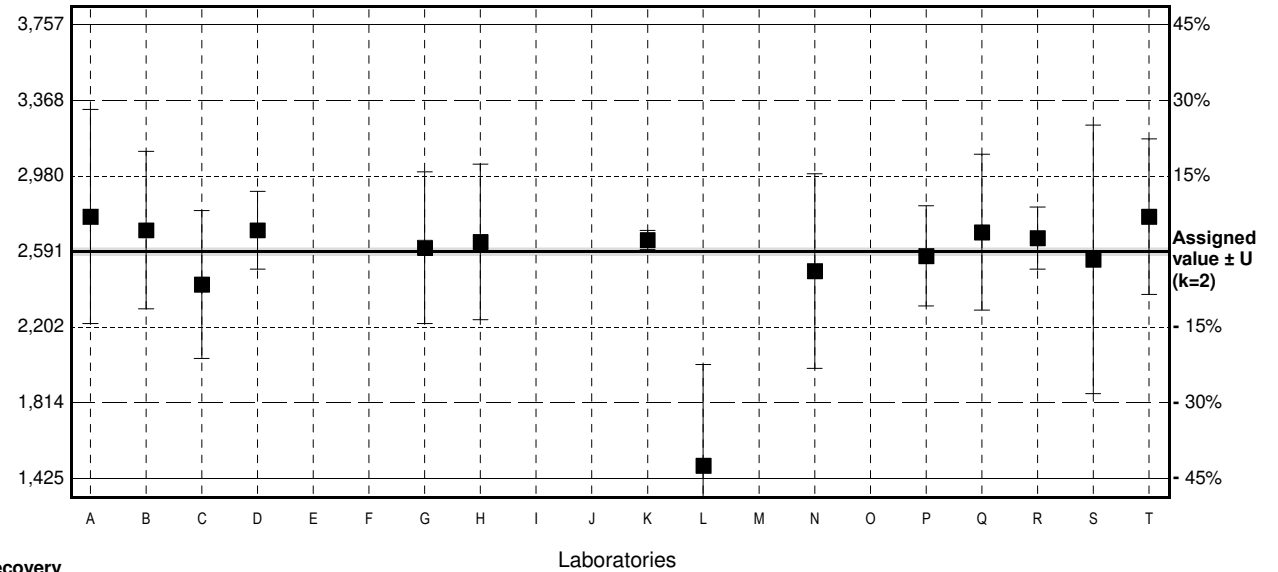
IFA result \pm U (k=2) 2,64 $\mu\text{g/l}$ \pm 0,24 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

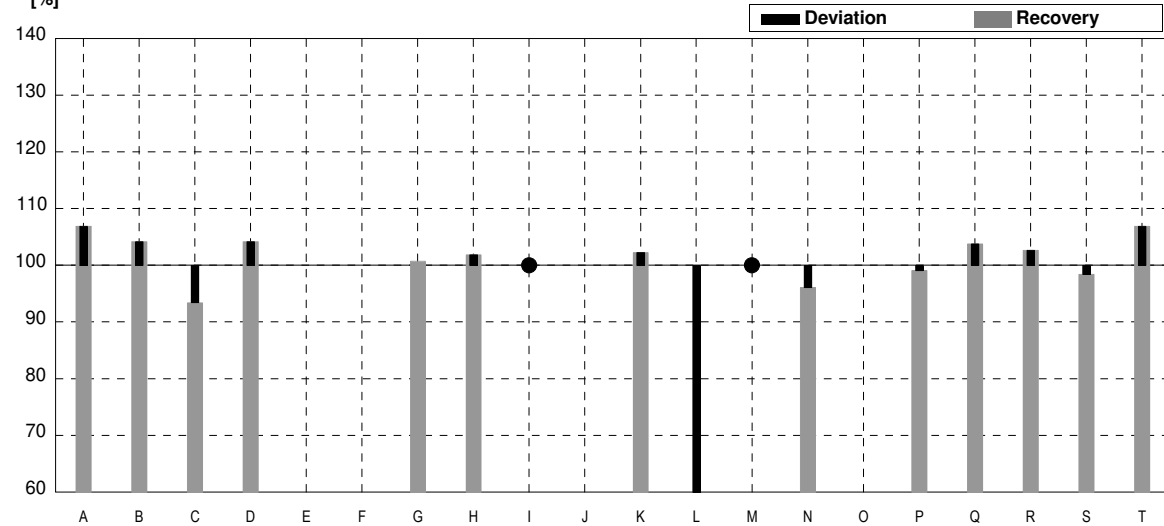
Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,77	0,55	$\mu\text{g/l}$	107%	1,06
B	2,70	0,405	$\mu\text{g/l}$	104%	0,65
C	2,421	0,38	$\mu\text{g/l}$	93%	-1,01
D	2,70	0,20	$\mu\text{g/l}$	104%	0,65
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	2,61	0,39	$\mu\text{g/l}$	101%	0,11
H	2,64	0,40	$\mu\text{g/l}$	102%	0,29
I	<5		$\mu\text{g/l}$	*	
J			$\mu\text{g/l}$		
K	2,65	0,050	$\mu\text{g/l}$	102%	0,35
L	1,49	0,52	$\mu\text{g/l}$	58%	-6,54
M	<5		$\mu\text{g/l}$	*	
N	2,49	0,5	$\mu\text{g/l}$	96%	-0,60
O			$\mu\text{g/l}$		
P	2,5681	0,258	$\mu\text{g/l}$	99%	-0,14
Q	2,69	0,40	$\mu\text{g/l}$	104%	0,59
R	2,66	0,160	$\mu\text{g/l}$	103%	0,41
S	2,55	0,69	$\mu\text{g/l}$	98%	-0,24
T	2,77	0,40	$\mu\text{g/l}$	107%	1,06

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	2,551 \pm 0,258	2,632 \pm 0,087	$\mu\text{g/l}$
Recov. \pm CI(99%)	98,4 \pm 10,0	101,6 \pm 3,4	%
SD between labs	0,321	0,103	$\mu\text{g/l}$
RSD between labs	12,6	3,9	%
n for calculation	14	13	

Result
[$\mu\text{g/l}$]



Recovery
[%]



Sample M181B

Parameter Arsenic

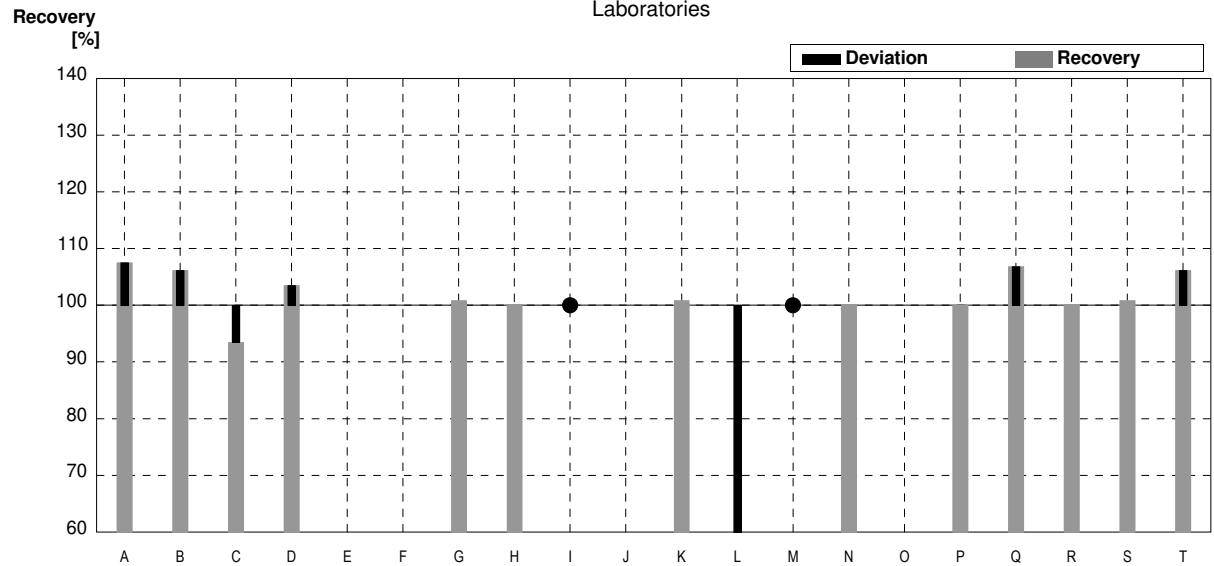
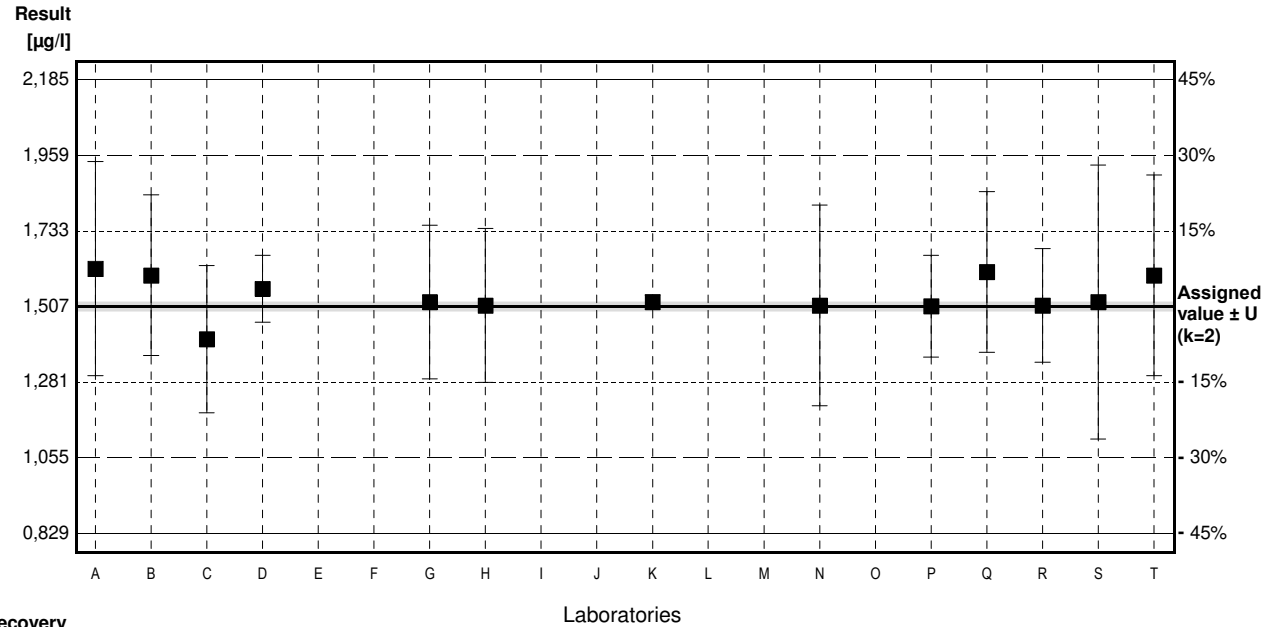
Assigned value $\pm U$ (k=2) 1,507 $\mu\text{g/l}$ \pm 0,014 $\mu\text{g/l}$

IFA result $\pm U$ (k=2) 1,56 $\mu\text{g/l}$ \pm 0,14 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	1,62	0,32	$\mu\text{g/l}$	107%	1,15
B	1,60	0,240	$\mu\text{g/l}$	106%	0,95
C	1,409	0,22	$\mu\text{g/l}$	93%	-1,00
D	1,56	0,1	$\mu\text{g/l}$	104%	0,54
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	1,52	0,23	$\mu\text{g/l}$	101%	0,13
H	1,51	0,23	$\mu\text{g/l}$	100%	0,03
I	<5		$\mu\text{g/l}$	*	
J			$\mu\text{g/l}$		
K	1,52	0,021	$\mu\text{g/l}$	101%	0,13
L	0,138	0,048	$\mu\text{g/l}$	9%	-13,98
M	<5		$\mu\text{g/l}$	*	
N	1,51	0,3	$\mu\text{g/l}$	100%	0,03
O			$\mu\text{g/l}$		
P	1,5079	0,152	$\mu\text{g/l}$	100%	0,01
Q	1,61	0,24	$\mu\text{g/l}$	107%	1,05
R	1,51	0,170	$\mu\text{g/l}$	100%	0,03
S	1,52	0,41	$\mu\text{g/l}$	101%	0,13
T	1,60	0,30	$\mu\text{g/l}$	106%	0,95

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	1,438 \pm 0,304	1,538 \pm 0,049	$\mu\text{g/l}$
Recov. \pm CI(99%)	95,4 \pm 20,2	102,1 \pm 3,3	%
SD between labs	0,378	0,058	$\mu\text{g/l}$
RSD between labs	26,3	3,8	%
n for calculation	14	13	



Sample M181A

Parameter Lead

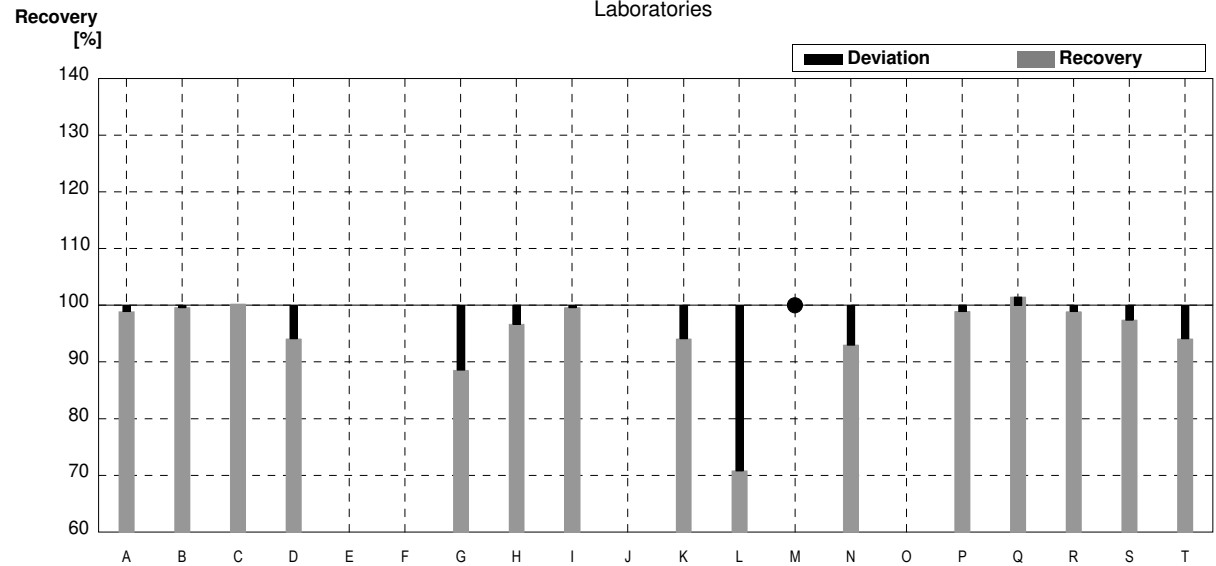
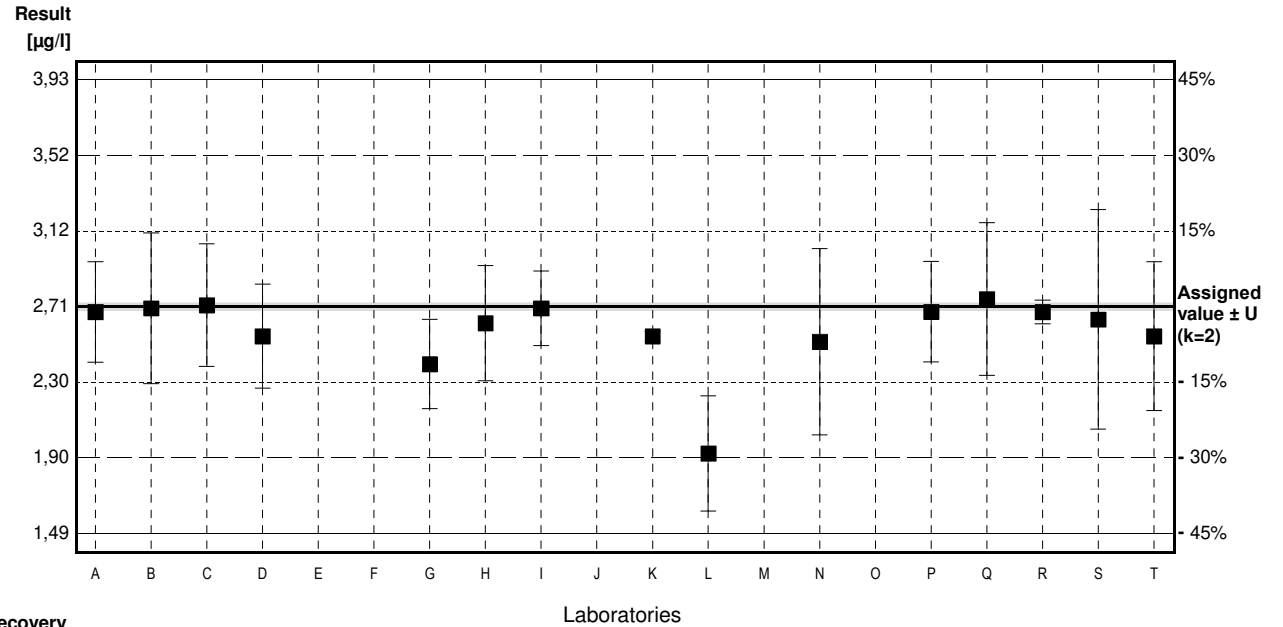
Assigned value $\pm U$ (k=2) 2,71 $\mu\text{g/l}$ \pm 0,02 $\mu\text{g/l}$

IFA result $\pm U$ (k=2) 2,44 $\mu\text{g/l}$ \pm 0,12 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,68	0,27	$\mu\text{g/l}$	99%	-0,17
B	2,70	0,405	$\mu\text{g/l}$	100%	-0,06
C	2,717	0,33	$\mu\text{g/l}$	100%	0,04
D	2,55	0,28	$\mu\text{g/l}$	94%	-0,92
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	2,40	0,24	$\mu\text{g/l}$	89%	-1,79
H	2,62	0,31	$\mu\text{g/l}$	97%	-0,52
I	2,70	0,20	$\mu\text{g/l}$	100%	-0,06
J			$\mu\text{g/l}$		
K	2,55	0,026	$\mu\text{g/l}$	94%	-0,92
L	1,92 *	0,31	$\mu\text{g/l}$	71%	-4,55
M	<3		$\mu\text{g/l}$	*	
N	2,52	0,5	$\mu\text{g/l}$	93%	-1,10
O			$\mu\text{g/l}$		
P	2,6815	0,2703	$\mu\text{g/l}$	99%	-0,16
Q	2,75	0,41	$\mu\text{g/l}$	101%	0,23
R	2,68	0,0643	$\mu\text{g/l}$	99%	-0,17
S	2,64	0,59	$\mu\text{g/l}$	97%	-0,40
T	2,55	0,40	$\mu\text{g/l}$	94%	-0,92

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	2,58 \pm 0,16	2,62 \pm 0,08	$\mu\text{g/l}$
Recov. \pm CI(99%)	95,1 \pm 5,8	96,8 \pm 2,9	%
SD between labs	0,20	0,10	$\mu\text{g/l}$
RSD between labs	7,9	3,7	%
n for calculation	15	14	



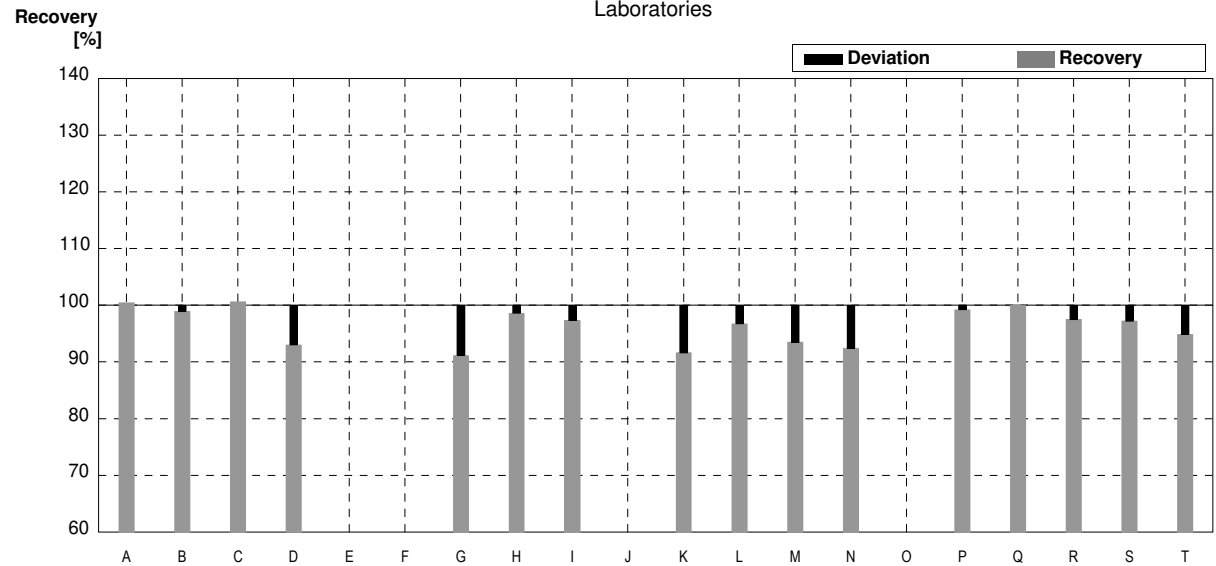
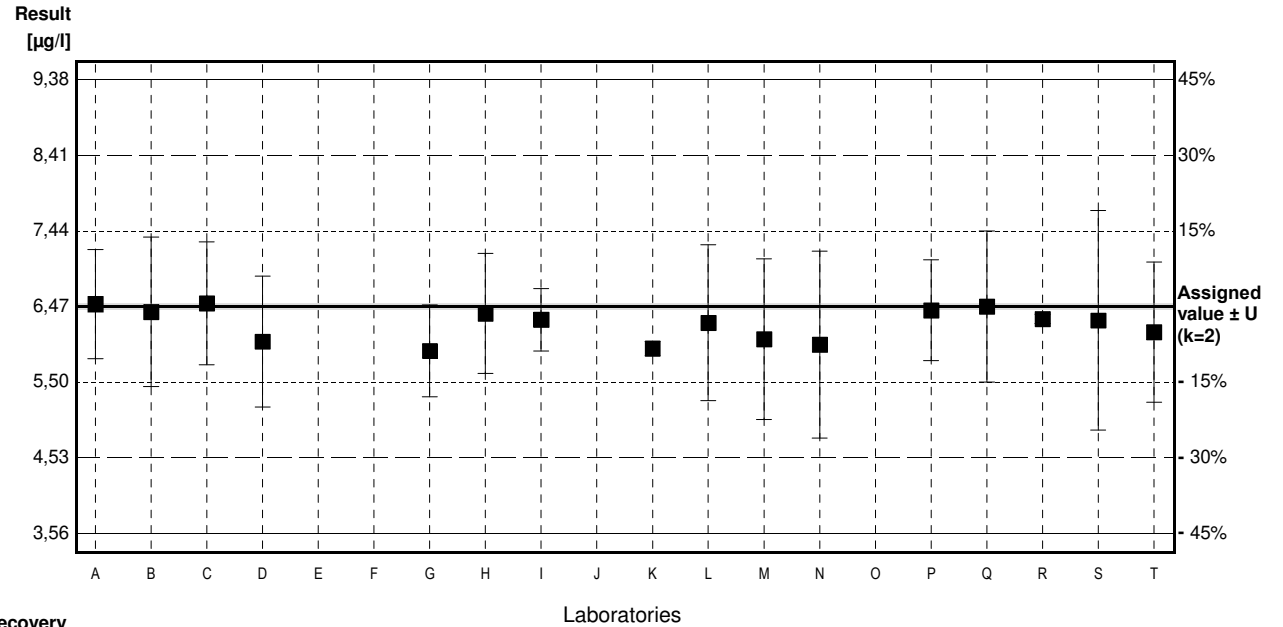
Sample M181B

Parameter Lead

Assigned value $\pm U$ (k=2) 6,47 $\mu\text{g/l}$ \pm 0,04 $\mu\text{g/l}$
 IFA result $\pm U$ (k=2) 5,6 $\mu\text{g/l}$ \pm 0,3 $\mu\text{g/l}$
 Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	6,5	0,7	$\mu\text{g/l}$	100%	0,07
B	6,40	0,960	$\mu\text{g/l}$	99%	-0,17
C	6,509	0,79	$\mu\text{g/l}$	101%	0,09
D	6,02	0,84	$\mu\text{g/l}$	93%	-1,09
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	5,90	0,59	$\mu\text{g/l}$	91%	-1,38
H	6,38	0,77	$\mu\text{g/l}$	99%	-0,22
I	6,3	0,40	$\mu\text{g/l}$	97%	-0,41
J			$\mu\text{g/l}$		
K	5,93	0,093	$\mu\text{g/l}$	92%	-1,30
L	6,26	1,00	$\mu\text{g/l}$	97%	-0,51
M	6,05	1,03	$\mu\text{g/l}$	94%	-1,01
N	5,98	1,2	$\mu\text{g/l}$	92%	-1,18
O			$\mu\text{g/l}$		
P	6,4216	0,6473	$\mu\text{g/l}$	99%	-0,12
Q	6,47	0,97	$\mu\text{g/l}$	100%	0,00
R	6,31	0,0599	$\mu\text{g/l}$	98%	-0,39
S	6,29	1,41	$\mu\text{g/l}$	97%	-0,43
T	6,14	0,9	$\mu\text{g/l}$	95%	-0,80

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	6,24 \pm 0,15	6,24 \pm 0,15	$\mu\text{g/l}$
Recov. \pm CI(99%)	96,5 \pm 2,4	96,5 \pm 2,4	%
SD between labs	0,21	0,21	$\mu\text{g/l}$
RSD between labs	3,4	3,4	%
n for calculation	16	16	



Sample M181A

Parameter Cadmium

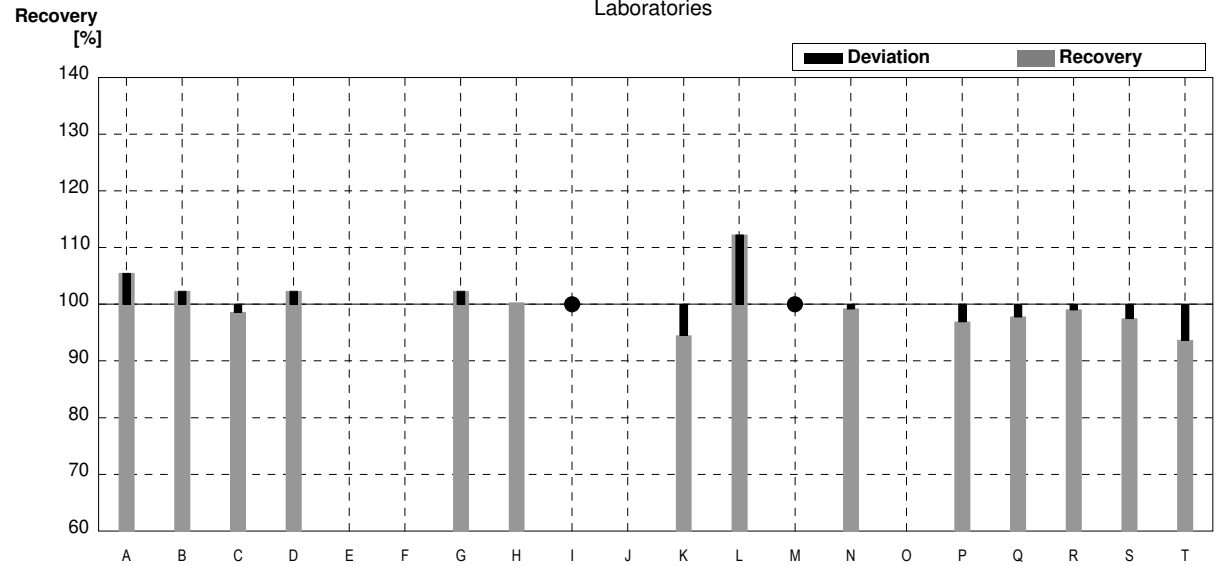
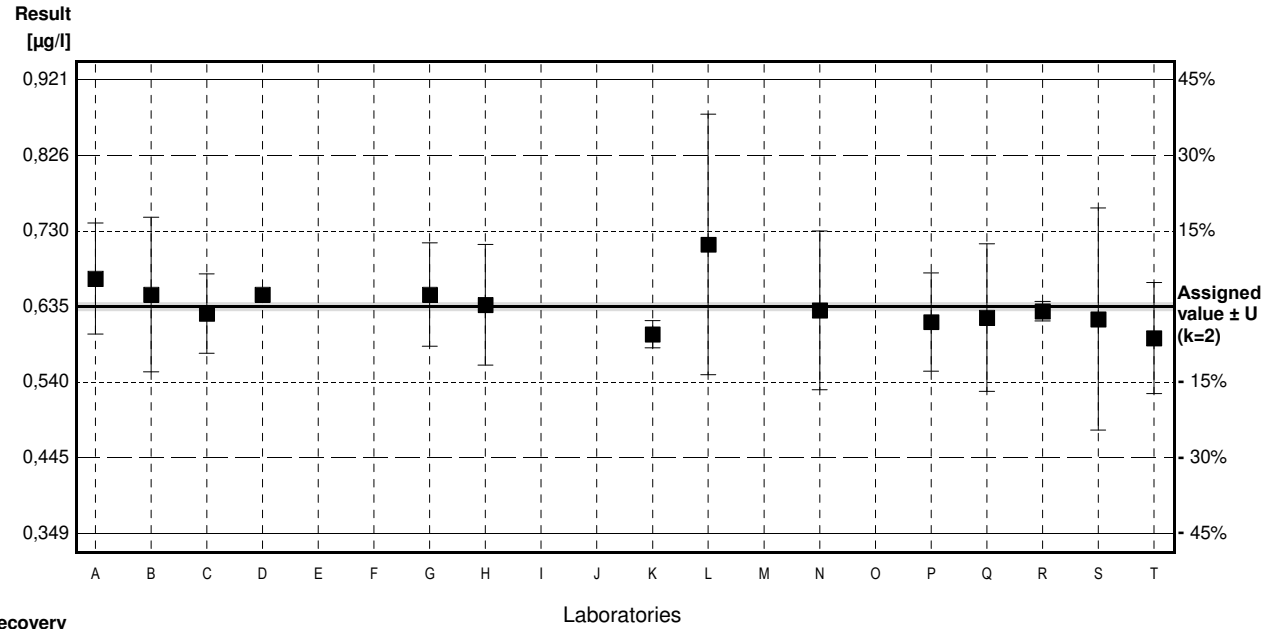
Assigned value ± U (k=2) 0,635 µg/l ± 0,005 µg/l

IFA result ± U (k=2) 0,61 µg/l ± 0,04 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	0,67	0,07	µg/l	106%	1,15
B	0,65	0,0975	µg/l	102%	0,49
C	0,626	0,05	µg/l	99%	-0,30
D	0,65		µg/l	102%	0,49
E			µg/l		
F			µg/l		
G	0,650	0,065	µg/l	102%	0,49
H	0,637	0,076	µg/l	100%	0,07
I	<1		µg/l	•	
J			µg/l		
K	0,600	0,017	µg/l	94%	-1,15
L	0,713	0,164	µg/l	112%	2,56
M	<1		µg/l	•	
N	0,63	0,1	µg/l	99%	-0,16
O			µg/l		
P	0,6154	0,0619	µg/l	97%	-0,64
Q	0,621	0,093	µg/l	98%	-0,46
R	0,629	0,0124	µg/l	99%	-0,20
S	0,619	0,14	µg/l	97%	-0,52
T	0,595	0,070	µg/l	94%	-1,31

	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,636 ± 0,024	0,636 ± 0,024	µg/l
Recov. ± CI(99%)	100,2 ± 3,8	100,2 ± 3,8	%
SD between labs	0,030	0,030	µg/l
RSD between labs	4,7	4,7	%
n for calculation	14	14	



Sample M181B

Parameter Cadmium

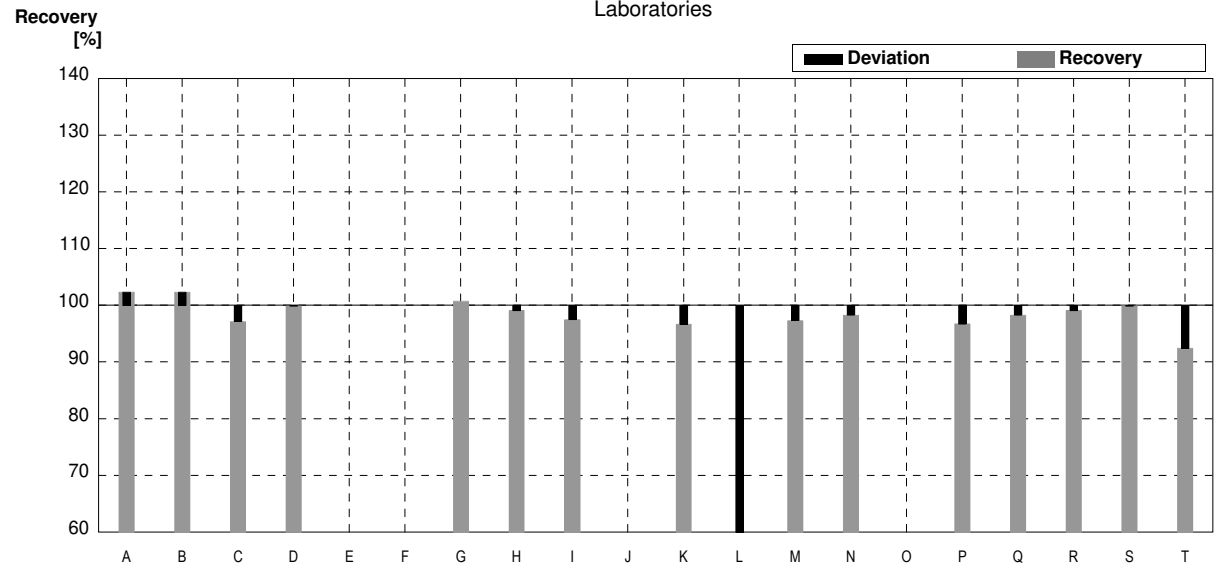
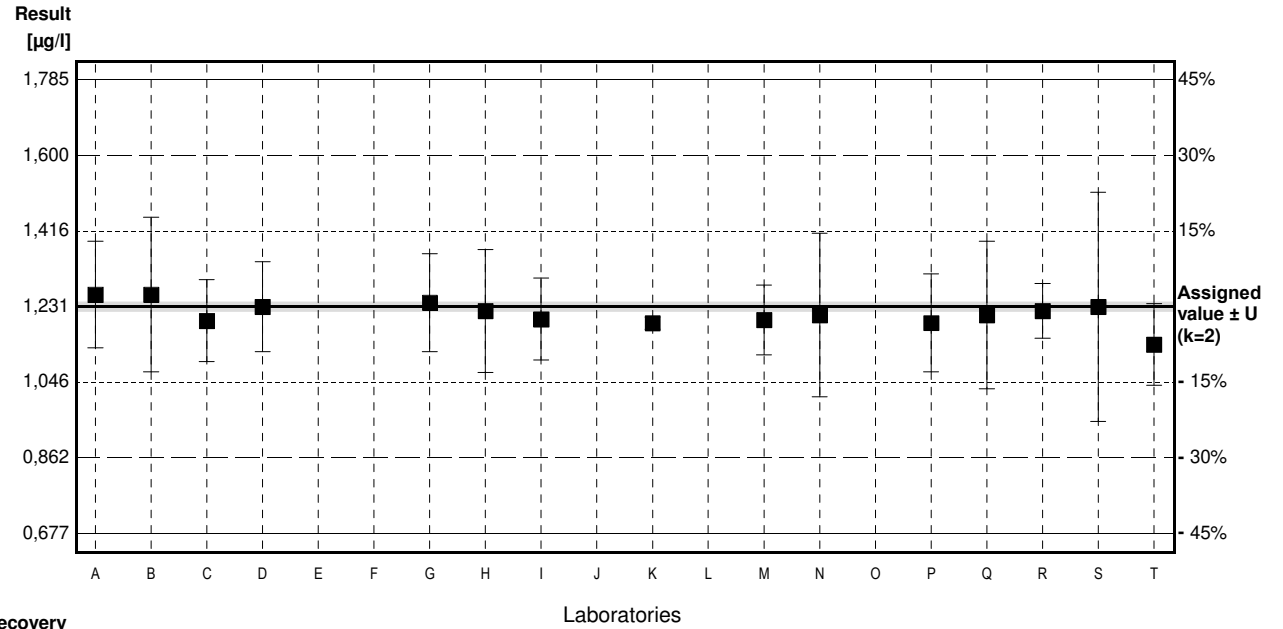
Assigned value ± U (k=2) 1,231 µg/l ± 0,011 µg/l

IFA result ± U (k=2) 1,18 µg/l ± 0,07 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,26	0,13	µg/l	102%	0,49
B	1,26	0,189	µg/l	102%	0,49
C	1,196	0,1	µg/l	97%	-0,59
D	1,23	0,11	µg/l	100%	-0,02
E			µg/l		
F			µg/l		
G	1,24	0,12	µg/l	101%	0,15
H	1,22	0,15	µg/l	99%	-0,19
I	1,20	0,10	µg/l	97%	-0,52
J			µg/l		
K	1,19	0,015	µg/l	97%	-0,69
L	0,155 *	0,036	µg/l	13%	-18,21
M	1,198	0,085	µg/l	97%	-0,56
N	1,21	0,2	µg/l	98%	-0,36
O			µg/l		
P	1,1907	0,1197	µg/l	97%	-0,68
Q	1,21	0,18	µg/l	98%	-0,36
R	1,22	0,0670	µg/l	99%	-0,19
S	1,23	0,28	µg/l	100%	-0,02
T	1,138	0,1	µg/l	92%	-1,57

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,147 ± 0,196	1,213 ± 0,024	µg/l
Recov. ± CI(99%)	93,2 ± 15,9	98,5 ± 1,9	%
SD between labs	0,266	0,031	µg/l
RSD between labs	23,2	2,5	%
n for calculation	16	15	



Sample M181A

Parameter Chromium

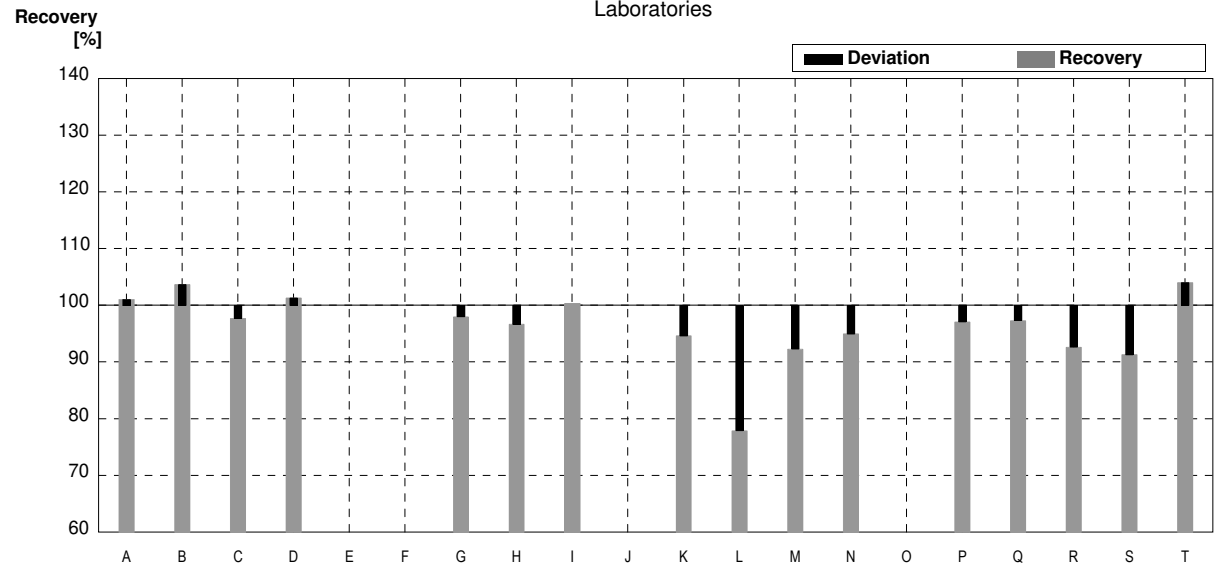
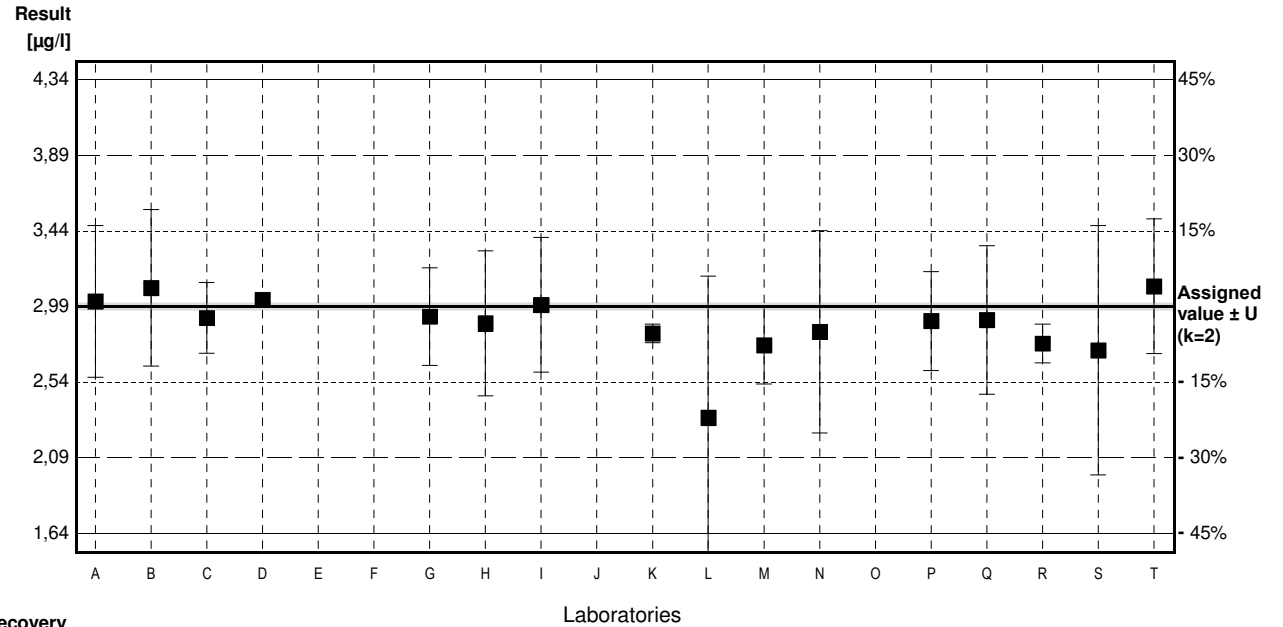
Assigned value ± U (k=2) 2,99 µg/l ± 0,02 µg/l

IFA result ± U (k=2) 2,98 µg/l ± 0,11 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	3,02	0,45	µg/l	101%	0,17
B	3,10	0,465	µg/l	104%	0,62
C	2,922	0,21	µg/l	98%	-0,39
D	3,03		µg/l	101%	0,23
E			µg/l		
F			µg/l		
G	2,93	0,29	µg/l	98%	-0,34
H	2,89	0,43	µg/l	97%	-0,57
I	3,00	0,40	µg/l	100%	0,06
J			µg/l		
K	2,83	0,055	µg/l	95%	-0,91
L	2,33 *	0,839	µg/l	78%	-3,74
M	2,76	0,23	µg/l	92%	-1,30
N	2,84	0,6	µg/l	95%	-0,85
O			µg/l		
P	2,9036	0,2936	µg/l	97%	-0,49
Q	2,91	0,44	µg/l	97%	-0,45
R	2,77	0,115	µg/l	93%	-1,25
S	2,73	0,74	µg/l	91%	-1,47
T	3,11	0,40	µg/l	104%	0,68

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,88 ± 0,14	2,92 ± 0,09	µg/l
Recov. ± CI(99%)	96,3 ± 4,6	97,5 ± 3,1	%
SD between labs	0,19	0,12	µg/l
RSD between labs	6,5	4,1	%
n for calculation	16	15	



Sample M181B

Parameter Chromium

Assigned value $\pm U$ (k=2) 1,906 $\mu\text{g/l}$ \pm 0,015 $\mu\text{g/l}$

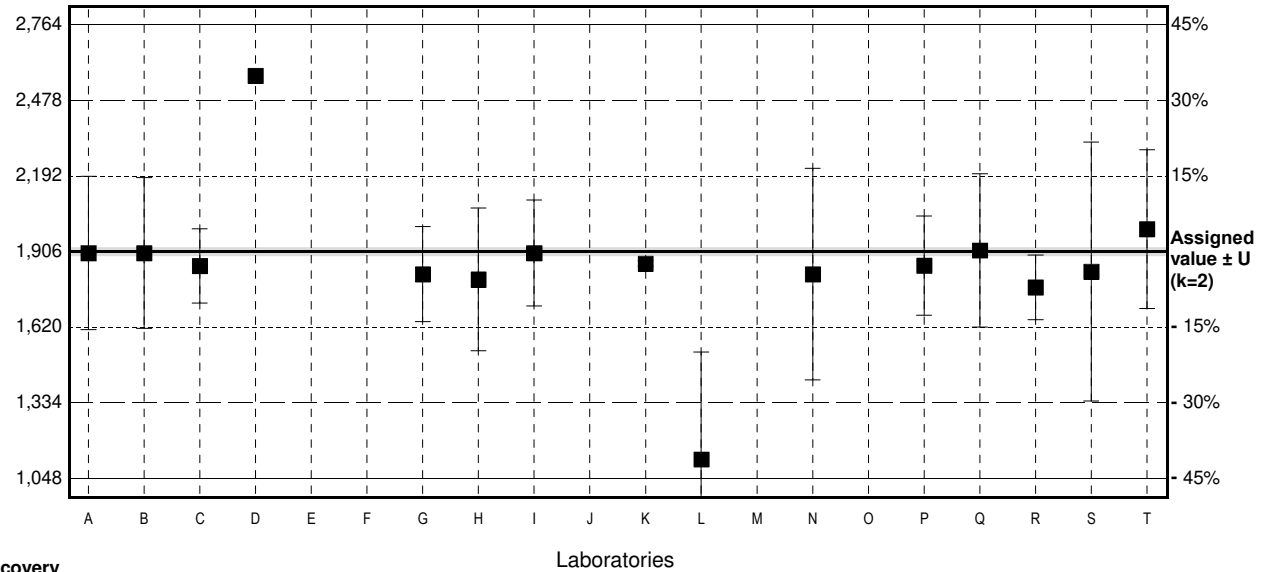
IFA result $\pm U$ (k=2) 1,91 $\mu\text{g/l}$ \pm 0,08 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

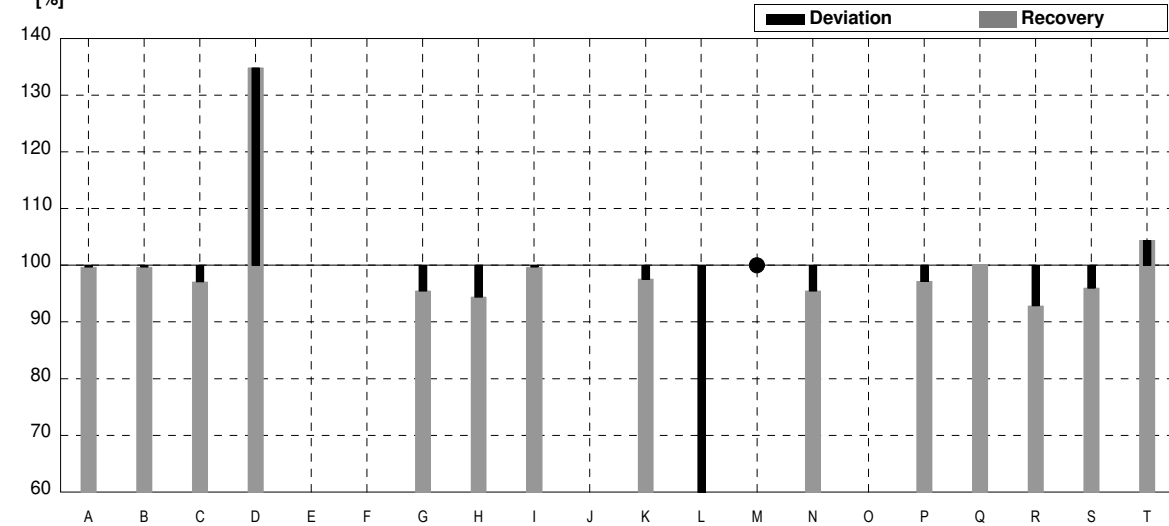
Lab Code	Result	\pm	Unit	Recovery	z-Score
A	1,90	0,29	$\mu\text{g/l}$	100%	-0,05
B	1,90	0,285	$\mu\text{g/l}$	100%	-0,05
C	1,851	0,14	$\mu\text{g/l}$	97%	-0,49
D	2,57 *		$\mu\text{g/l}$	135%	5,90
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	1,82	0,18	$\mu\text{g/l}$	95%	-0,76
H	1,80	0,27	$\mu\text{g/l}$	94%	-0,94
I	1,90	0,20	$\mu\text{g/l}$	100%	-0,05
J			$\mu\text{g/l}$		
K	1,86	0,010	$\mu\text{g/l}$	98%	-0,41
L	1,12 *	0,405	$\mu\text{g/l}$	59%	-6,99
M	<2		$\mu\text{g/l}$	*	
N	1,82	0,4	$\mu\text{g/l}$	95%	-0,76
O			$\mu\text{g/l}$		
P	1,8524	0,1873	$\mu\text{g/l}$	97%	-0,48
Q	1,91	0,29	$\mu\text{g/l}$	100%	0,04
R	1,77	0,122	$\mu\text{g/l}$	93%	-1,21
S	1,83	0,49	$\mu\text{g/l}$	96%	-0,68
T	1,99	0,3	$\mu\text{g/l}$	104%	0,75

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	1,860 \pm 0,215	1,862 \pm 0,049	$\mu\text{g/l}$
Recov. \pm CI(99%)	97,6 \pm 11,3	97,7 \pm 2,6	%
SD between labs	0,279	0,058	$\mu\text{g/l}$
RSD between labs	15,0	3,1	%
n for calculation	15	13	

Result
[$\mu\text{g/l}$]



Recovery
[%]



Sample M181A

Parameter Iron

Assigned value ± U (k=2) 22,67 µg/l ± 0,16 µg/l

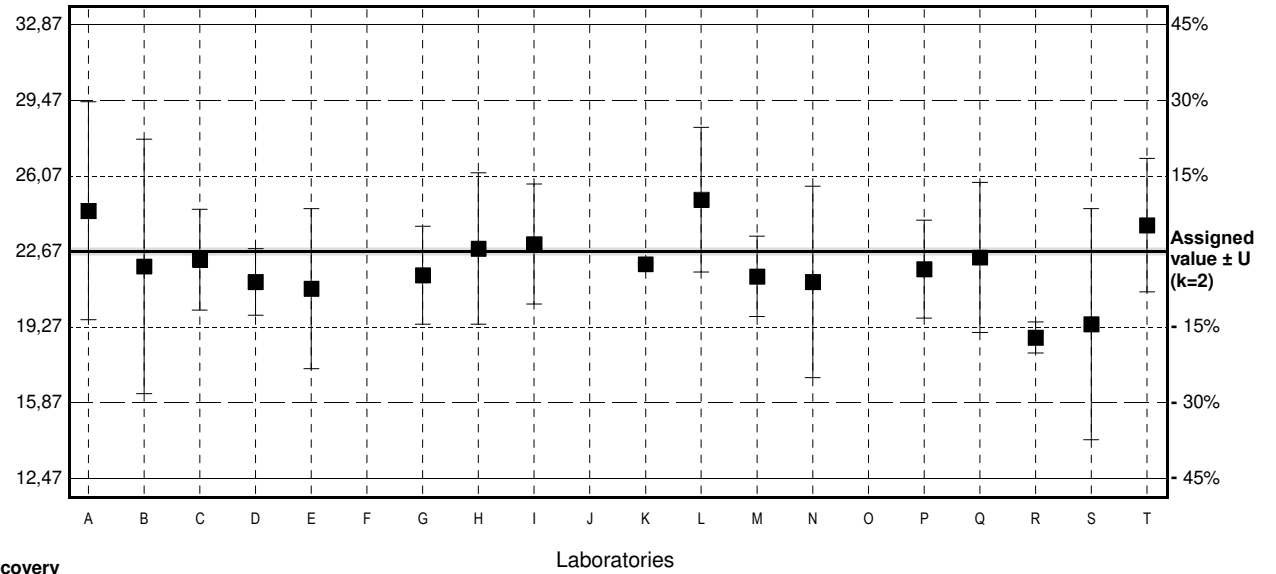
IFA result ± U (k=2) 22,0 µg/l ± 1,7 µg/l

Stability test µg/l

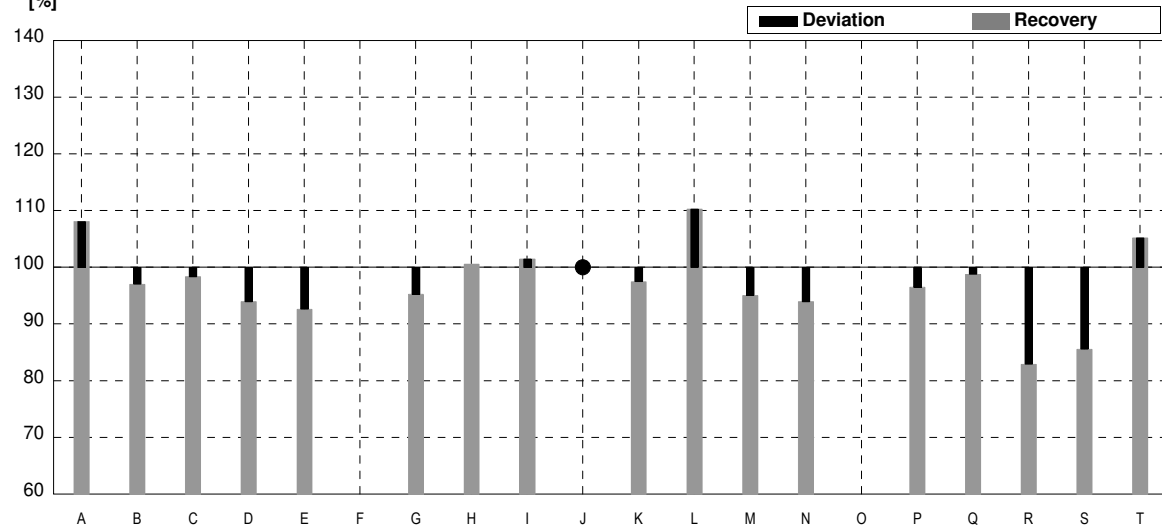
Lab Code	Result	±	Unit	Recovery	z-Score
A	24,5	4,9	µg/l	108%	1,30
B	22,0	5,72	µg/l	97%	-0,48
C	22,3	2,27	µg/l	98%	-0,26
D	21,3	1,50	µg/l	94%	-0,97
E	21,0	3,6	µg/l	93%	-1,19
F			µg/l		
G	21,6	2,2	µg/l	95%	-0,76
H	22,8	3,4	µg/l	101%	0,09
I	23,0	2,7	µg/l	101%	0,23
J	<25		µg/l	.	
K	22,1	0,058	µg/l	97%	-0,41
L	25,0	3,25	µg/l	110%	1,66
M	21,55	1,81	µg/l	95%	-0,80
N	21,3	4,3	µg/l	94%	-0,97
O			µg/l		
P	21,8769	2,203	µg/l	97%	-0,56
Q	22,4	3,37	µg/l	99%	-0,19
R	18,8	0,698	µg/l	83%	-2,75
S	19,4	5,2	µg/l	86%	-2,33
T	23,85	3,0	µg/l	105%	0,84

	All results	Outliers excl.	Unit
Mean ± CI(99%)	22,05 ± 1,12	22,05 ± 1,12	µg/l
Recov. ± CI(99%)	97,2 ± 4,9	97,2 ± 4,9	%
SD between labs	1,58	1,58	µg/l
RSD between labs	7,2	7,2	%
n for calculation	17	17	

Result [µg/l]



Recovery [%]



Sample M181B

Parameter Iron

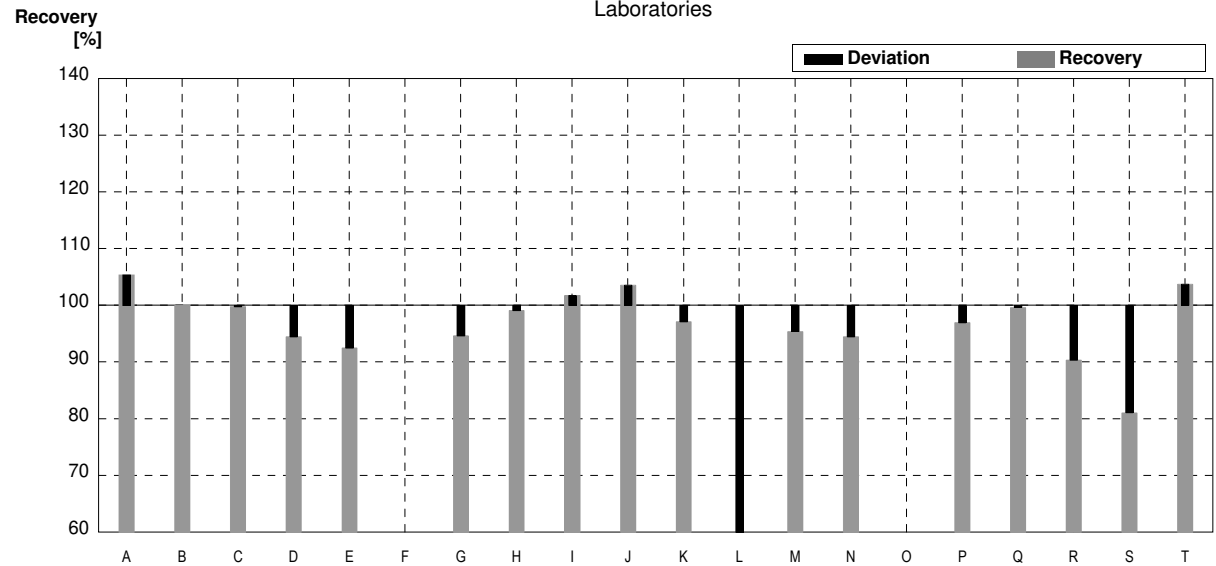
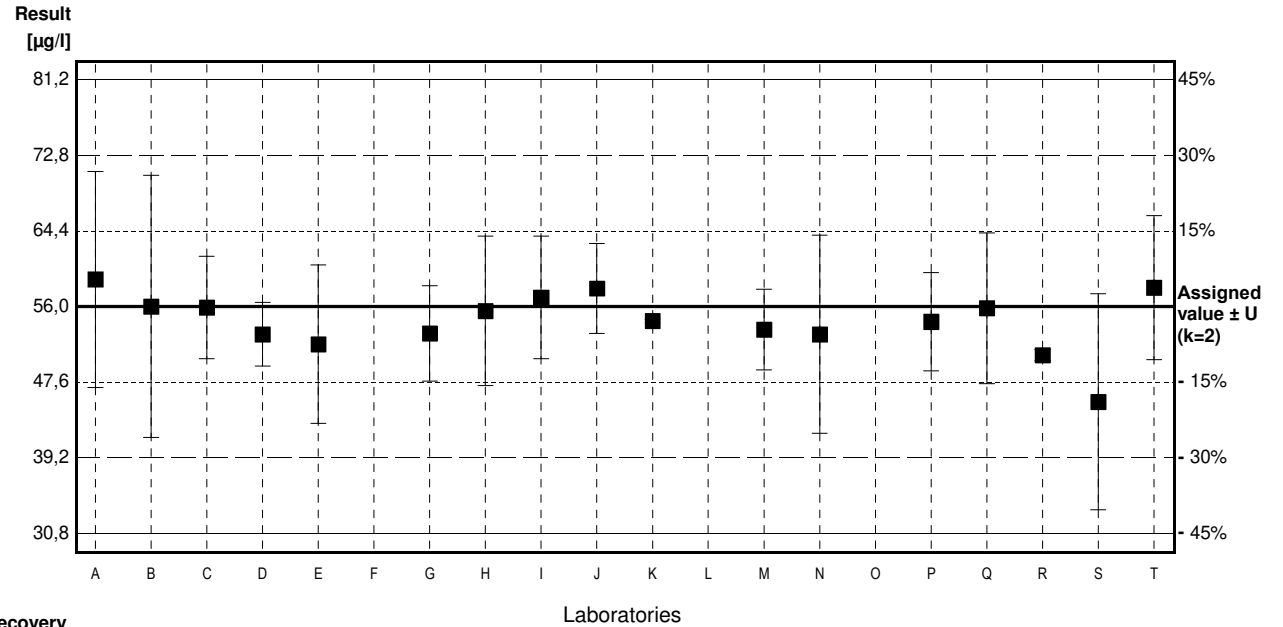
Assigned value ± U (k=2) 56,0 µg/l ± 0,2 µg/l

IFA result ± U (k=2) 54 µg/l ± 4 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	59	12	µg/l	105%	0,86
B	56,0	14,56	µg/l	100%	0,00
C	55,887	5,7	µg/l	100%	-0,03
D	52,9	3,55	µg/l	94%	-0,89
E	51,8	8,8	µg/l	93%	-1,21
F			µg/l		
G	53,0	5,3	µg/l	95%	-0,86
H	55,5	8,3	µg/l	99%	-0,14
I	57,0	6,8	µg/l	102%	0,29
J	58	5	µg/l	104%	0,58
K	54,4	0,208	µg/l	97%	-0,46
L	23,5 *	3,06	µg/l	42%	-9,36
M	53,43	4,49	µg/l	95%	-0,74
N	52,9	11	µg/l	94%	-0,89
O			µg/l		
P	54,3083	5,47	µg/l	97%	-0,49
Q	55,8	8,37	µg/l	100%	-0,06
R	50,6	0,622	µg/l	90%	-1,56
S	45,4 *	12,0	µg/l	81%	-3,05
T	58,10	8,0	µg/l	104%	0,60

	All results	Outliers excl.	Unit
Mean ± CI(99%)	52,6 ± 5,4	54,9 ± 1,8	µg/l
Recov. ± CI(99%)	94,0 ± 9,7	98,1 ± 3,2	%
SD between labs	7,9	2,4	µg/l
RSD between labs	15,1	4,4	%
n for calculation	18	16	



Sample M181A

Parameter Copper

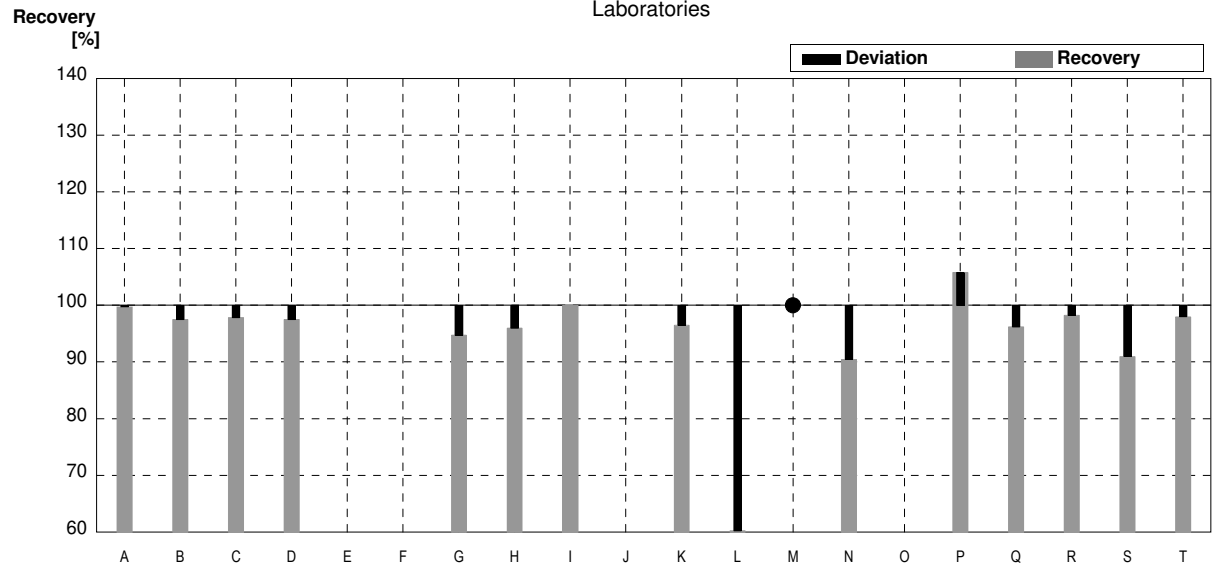
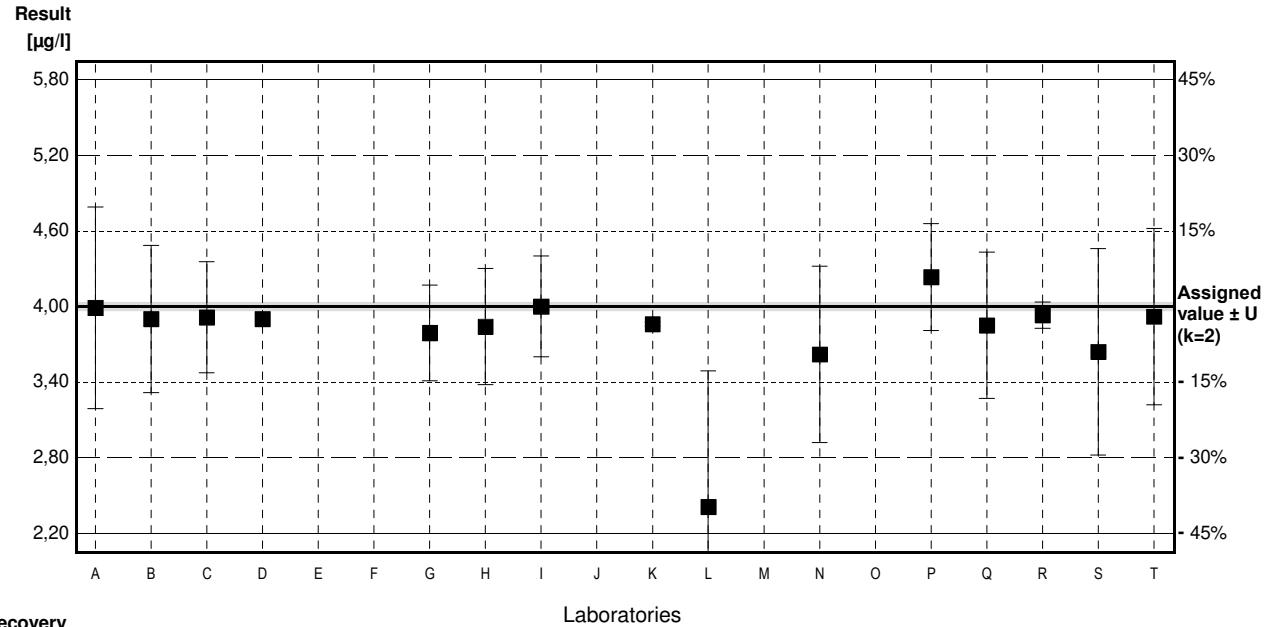
Assigned value ± U (k=2) 4,00 µg/l ± 0,03 µg/l

IFA result ± U (k=2) 3,98 µg/l ± 0,28 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	3,99	0,80	µg/l	100%	-0,04
B	3,90	0,585	µg/l	98%	-0,35
C	3,914	0,44	µg/l	98%	-0,30
D	3,90		µg/l	98%	-0,35
E			µg/l		
F			µg/l		
G	3,79	0,38	µg/l	95%	-0,74
H	3,84	0,46	µg/l	96%	-0,56
I	4,00	0,40	µg/l	100%	0,00
J			µg/l		
K	3,86	0,015	µg/l	97%	-0,49
L	2,41 *	1,08	µg/l	60%	-5,60
M	<5		µg/l	*	
N	3,62	0,7	µg/l	91%	-1,34
O			µg/l		
P	4,2334 *	0,425	µg/l	106%	0,82
Q	3,85	0,58	µg/l	96%	-0,53
R	3,93	0,103	µg/l	98%	-0,25
S	3,64	0,82	µg/l	91%	-1,27
T	3,92	0,70	µg/l	98%	-0,28

	All results	Outliers excl.	Unit
Mean ± CI(99%)	3,79 ± 0,31	3,86 ± 0,10	µg/l
Recov. ± CI(99%)	94,7 ± 7,8	96,5 ± 2,5	%
SD between labs	0,41	0,12	µg/l
RSD between labs	10,8	3,0	%
n for calculation	15	13	



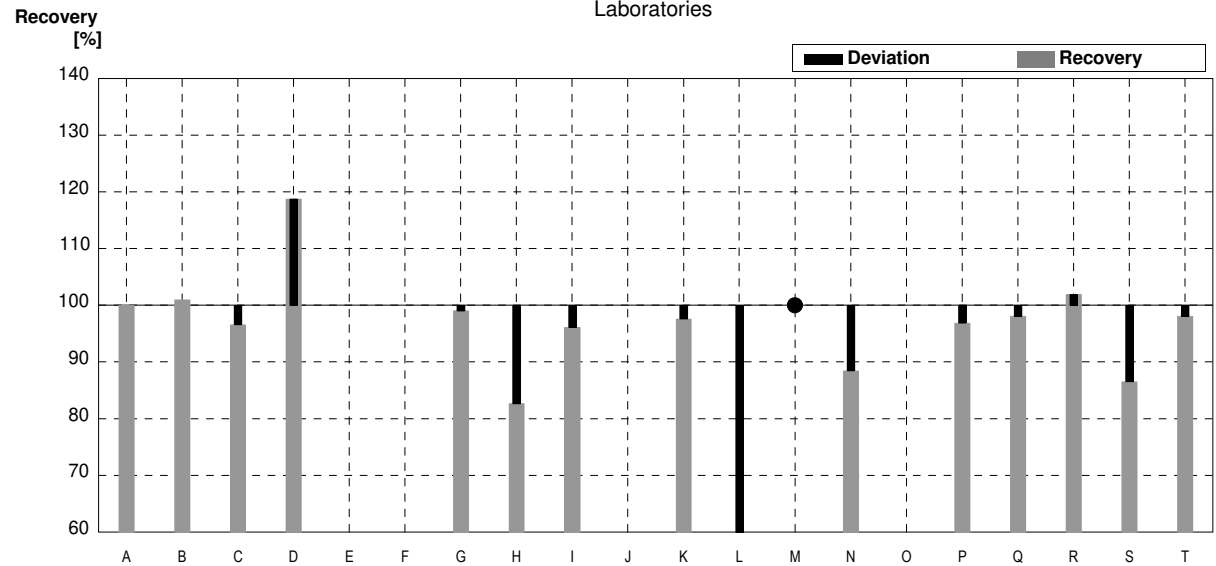
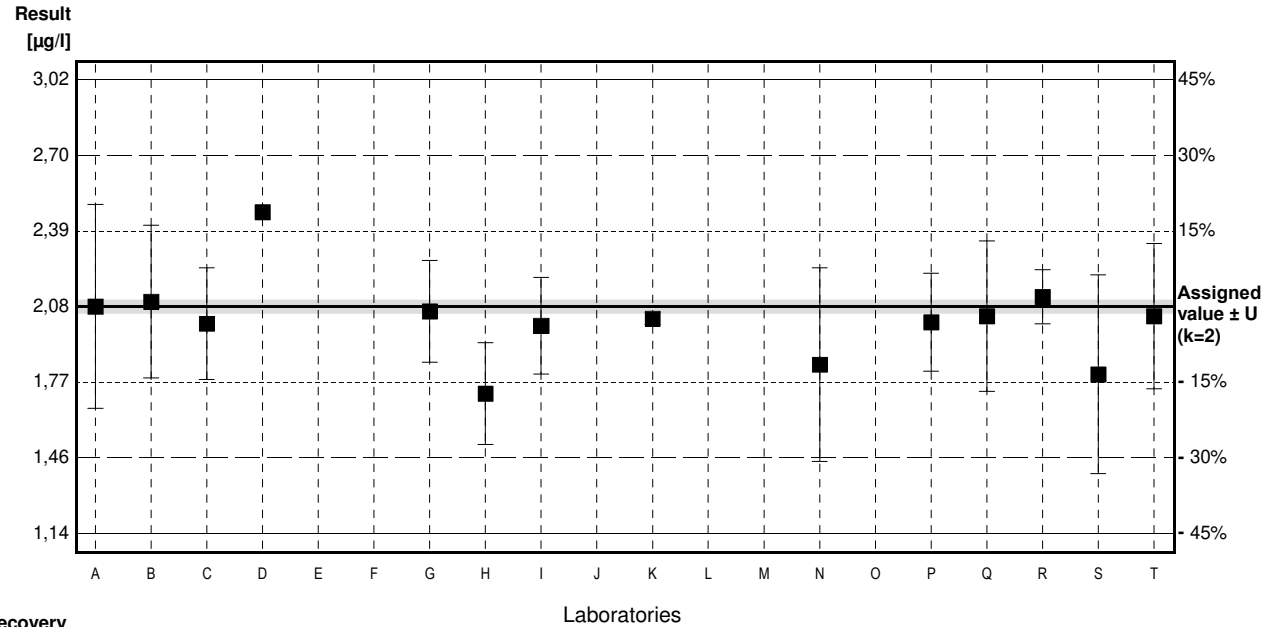
Sample M181B
Parameter Copper

Assigned value ± U (k=2) 2,08 µg/l ± 0,03 µg/l
IFA result ± U (k=2) 2,06 µg/l ± 0,15 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	2,08	0,42	µg/l	100%	0,00
B	2,10	0,315	µg/l	101%	0,14
C	2,009	0,23	µg/l	97%	-0,48
D	2,47 *		µg/l	119%	2,64
E			µg/l		
F			µg/l		
G	2,06	0,21	µg/l	99%	-0,14
H	1,72 *	0,21	µg/l	83%	-2,44
I	2,00	0,20	µg/l	96%	-0,54
J			µg/l		
K	2,03	0,025	µg/l	98%	-0,34
L	0,563 *	0,253	µg/l	27%	-10,27
M	<5		µg/l	*	
N	1,84	0,4	µg/l	88%	-1,63
O			µg/l		
P	2,0149	0,202	µg/l	97%	-0,44
Q	2,04	0,31	µg/l	98%	-0,27
R	2,12	0,111	µg/l	102%	0,27
S	1,80	0,41	µg/l	87%	-1,90
T	2,04	0,3	µg/l	98%	-0,27

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,93 ± 0,32	2,01 ± 0,09	µg/l
Recov. ± CI(99%)	92,6 ± 15,3	96,7 ± 4,2	%
SD between labs	0,41	0,10	µg/l
RSD between labs	21,4	4,8	%
n for calculation	15	12	



Sample M181A

Parameter Manganese

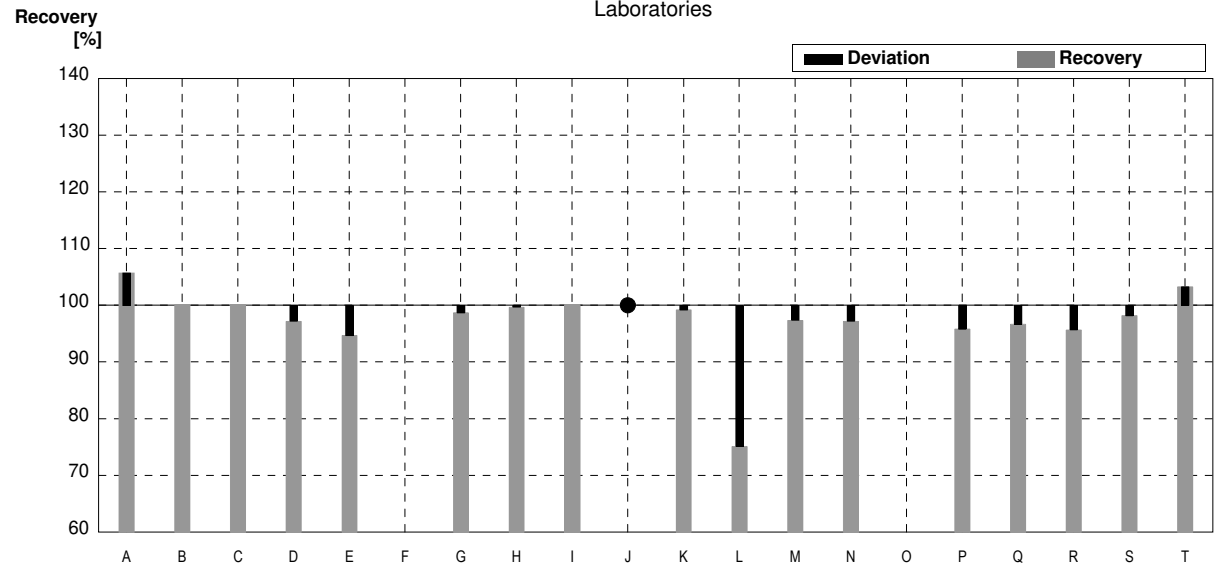
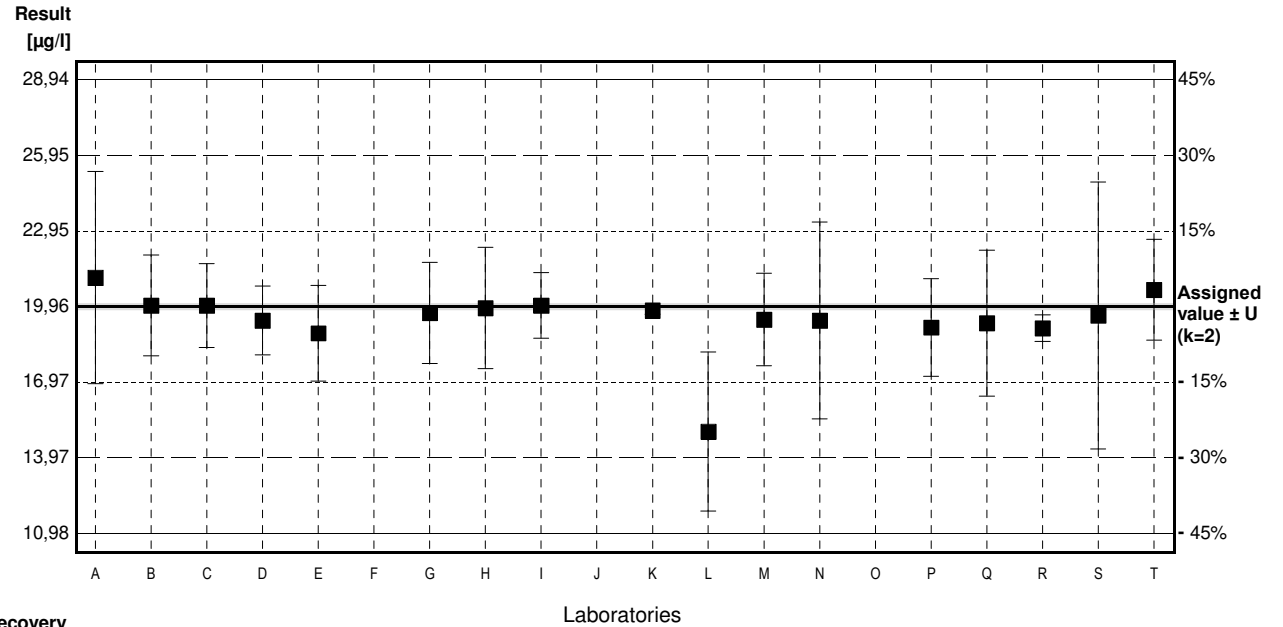
Assigned value $\pm U$ (k=2) 19,96 $\mu\text{g/l}$ \pm 0,12 $\mu\text{g/l}$

IFA result $\pm U$ (k=2) 20,1 $\mu\text{g/l}$ \pm 1,3 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	21,1	4,2	$\mu\text{g/l}$	106%	1,14
B	20,0	2,00	$\mu\text{g/l}$	100%	0,04
C	19,997	1,66	$\mu\text{g/l}$	100%	0,04
D	19,4	1,36	$\mu\text{g/l}$	97%	-0,56
E	18,9	1,9	$\mu\text{g/l}$	95%	-1,06
F			$\mu\text{g/l}$		
G	19,7	2,0	$\mu\text{g/l}$	99%	-0,26
H	19,9	2,4	$\mu\text{g/l}$	100%	-0,06
I	20,0	1,3	$\mu\text{g/l}$	100%	0,04
J	<25		$\mu\text{g/l}$	*	
K	19,8	0,153	$\mu\text{g/l}$	99%	-0,16
L	15,0 *	3,15	$\mu\text{g/l}$	75%	-4,97
M	19,44	1,83	$\mu\text{g/l}$	97%	-0,52
N	19,4	3,9	$\mu\text{g/l}$	97%	-0,56
O			$\mu\text{g/l}$		
P	19,1263	1,93	$\mu\text{g/l}$	96%	-0,84
Q	19,3	2,89	$\mu\text{g/l}$	97%	-0,66
R	19,1	0,521	$\mu\text{g/l}$	96%	-0,86
S	19,6	5,29	$\mu\text{g/l}$	98%	-0,36
T	20,62	2,0	$\mu\text{g/l}$	103%	0,66

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	19,43 \pm 0,90	19,71 \pm 0,42	$\mu\text{g/l}$
Recov. \pm CI(99%)	97,4 \pm 4,5	98,8 \pm 2,1	%
SD between labs	1,27	0,57	$\mu\text{g/l}$
RSD between labs	6,5	2,9	%
n for calculation	17	16	



Sample M181B

Parameter Manganese

Assigned value ± U (k=2) 35,60 µg/l ± 0,17 µg/l

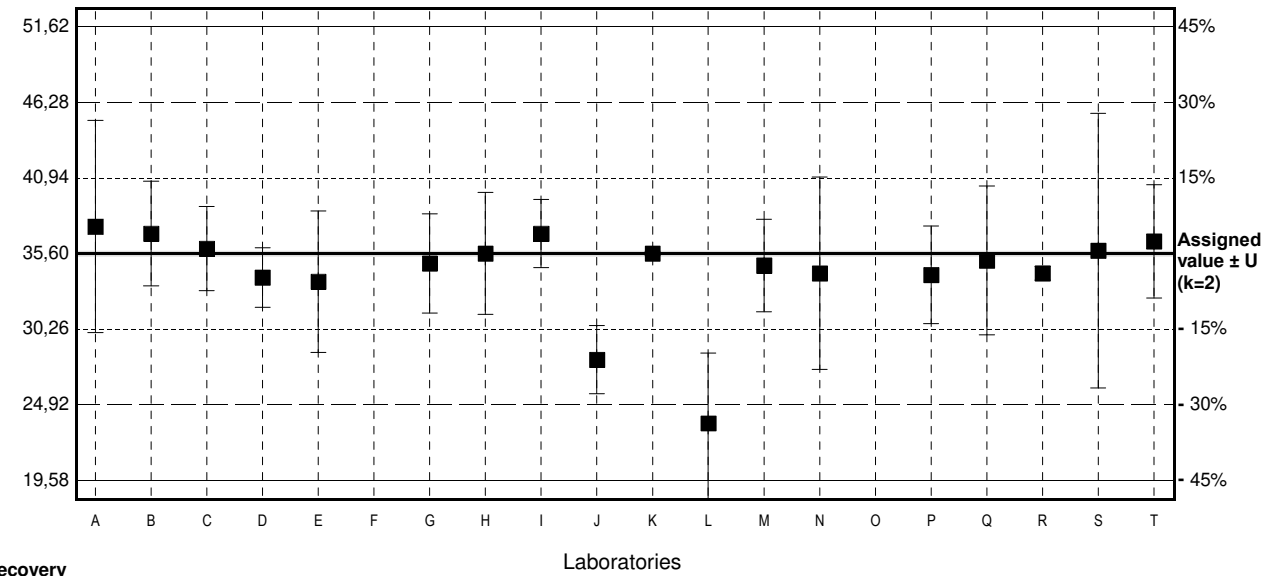
IFA result ± U (k=2) 35,2 µg/l ± 2,3 µg/l

Stability test µg/l

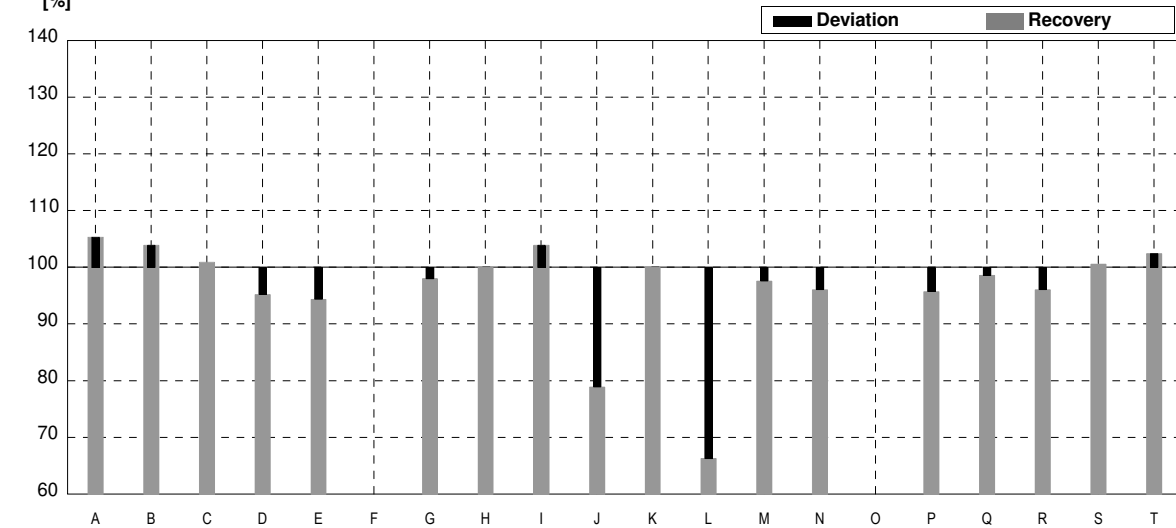
Lab Code	Result	±	Unit	Recovery	z-Score
A	37,5	7,5	µg/l	105%	1,07
B	37,0	3,70	µg/l	104%	0,79
C	35,935	2,98	µg/l	101%	0,19
D	33,9	2,10	µg/l	95%	-0,96
E	33,6	5,0	µg/l	94%	-1,12
F			µg/l		
G	34,9	3,5	µg/l	98%	-0,39
H	35,6	4,3	µg/l	100%	0,00
I	37,0	2,4	µg/l	104%	0,79
J	28,1 *	2,4	µg/l	79%	-4,21
K	35,6	0,153	µg/l	100%	0,00
L	23,6 *	4,96	µg/l	66%	-6,74
M	34,75	3,27	µg/l	98%	-0,48
N	34,2	6,8	µg/l	96%	-0,79
O			µg/l		
P	34,0889	3,44	µg/l	96%	-0,85
Q	35,1	5,26	µg/l	99%	-0,28
R	34,2	0,488	µg/l	96%	-0,79
S	35,8	9,70	µg/l	101%	0,11
T	36,46	4,0	µg/l	102%	0,48

	All results	Outliers excl.	Unit
Mean ± CI(99%)	34,30 ± 2,30	35,35 ± 0,89	µg/l
Recov. ± CI(99%)	96,3 ± 6,5	99,3 ± 2,5	%
SD between labs	3,37	1,21	µg/l
RSD between labs	9,8	3,4	%
n for calculation	18	16	

Result [µg/l]



Recovery [%]



Sample M181A

Parameter Nickel

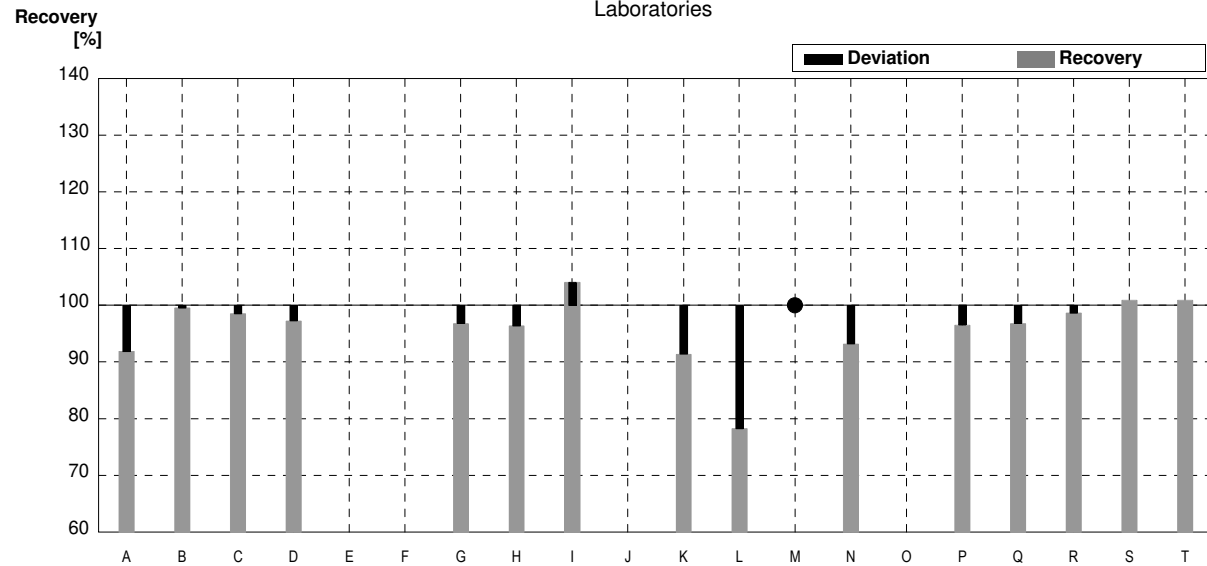
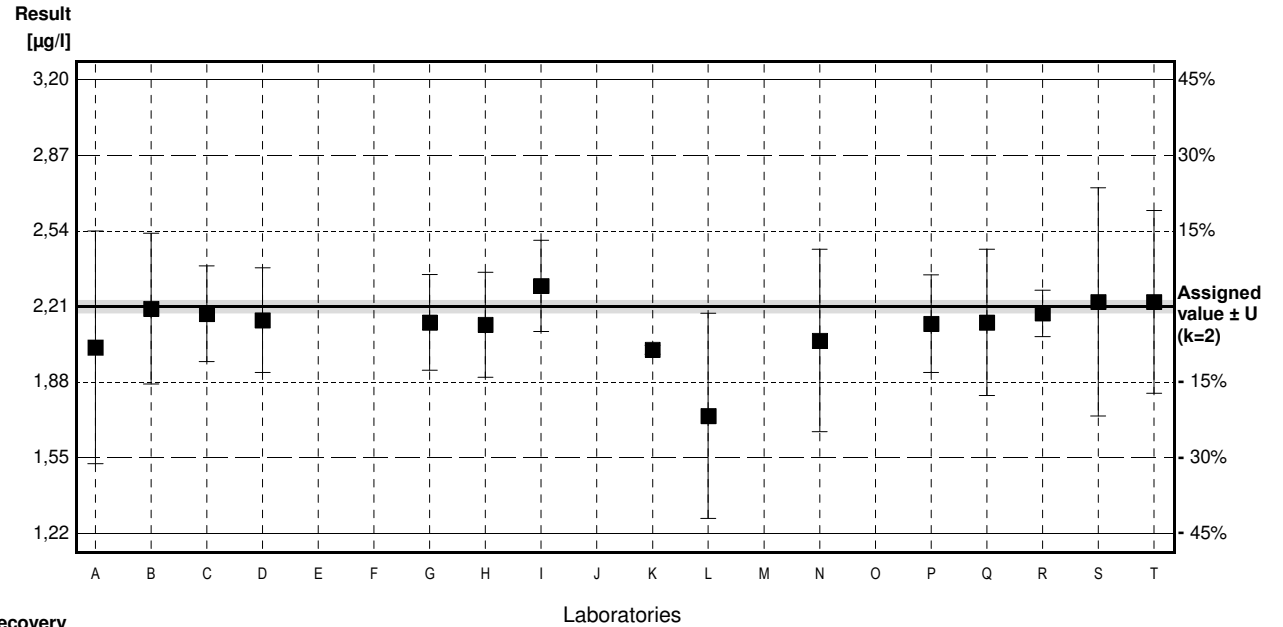
Assigned value ± U (k=2) 2,21 µg/l ± 0,03 µg/l

IFA result ± U (k=2) 2,08 µg/l ± 0,11 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	2,03	0,51	µg/l	92%	-1,29
B	2,20	0,330	µg/l	100%	-0,07
C	2,178	0,21	µg/l	99%	-0,23
D	2,15	0,23	µg/l	97%	-0,43
E			µg/l		
F			µg/l		
G	2,14	0,21	µg/l	97%	-0,50
H	2,13	0,23	µg/l	96%	-0,57
I	2,30	0,20	µg/l	104%	0,65
J			µg/l		
K	2,02	0,020	µg/l	91%	-1,36
L	1,73 *	0,450	µg/l	78%	-3,45
M	<5		µg/l	*	
N	2,06	0,4	µg/l	93%	-1,08
O			µg/l		
P	2,1337	0,214	µg/l	97%	-0,55
Q	2,14	0,32	µg/l	97%	-0,50
R	2,18	0,102	µg/l	99%	-0,22
S	2,23	0,50	µg/l	101%	0,14
T	2,23	0,40	µg/l	101%	0,14

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,12 ± 0,10	2,15 ± 0,06	µg/l
Recov. ± CI(99%)	96,1 ± 4,6	97,4 ± 2,9	%
SD between labs	0,13	0,08	µg/l
RSD between labs	6,2	3,6	%
n for calculation	15	14	



Sample M181B

Parameter Nickel

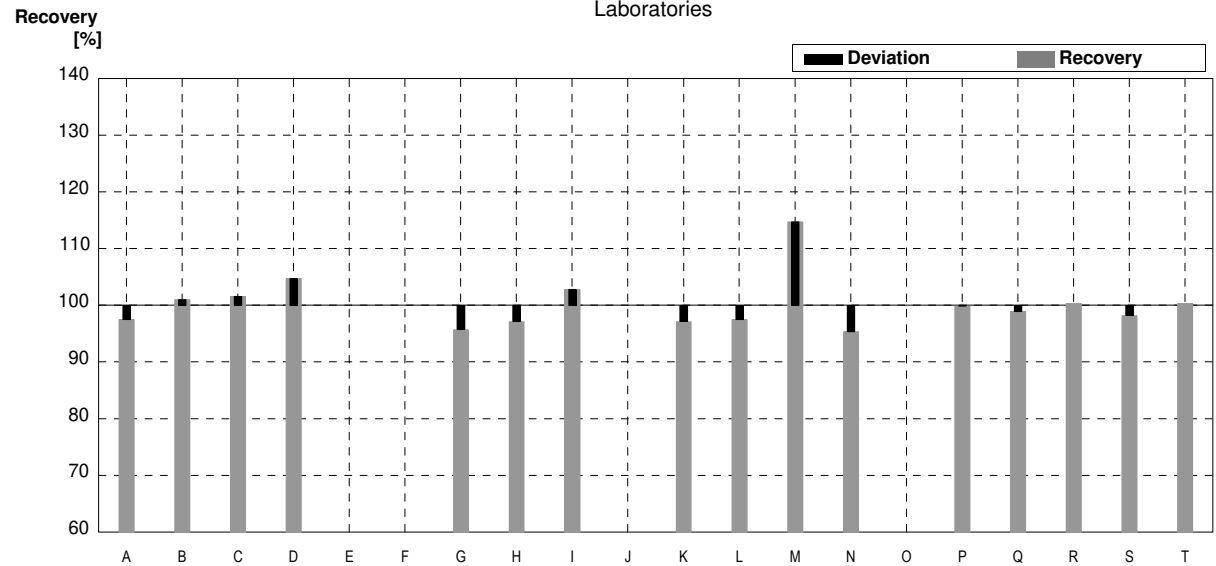
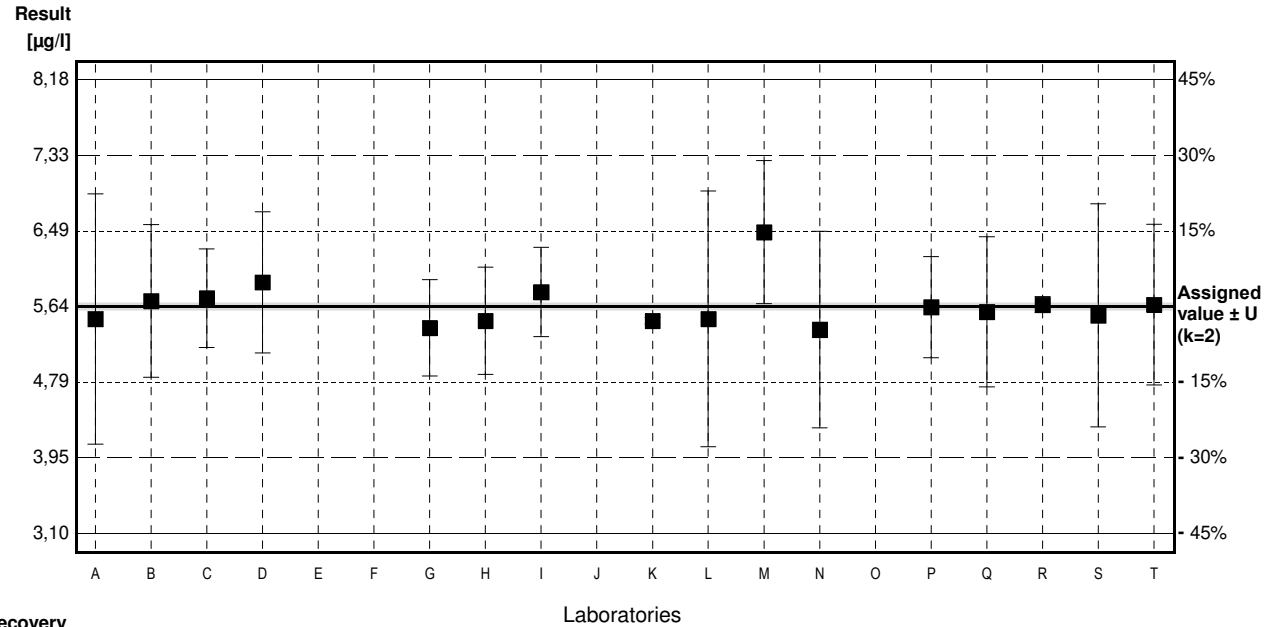
Assigned value ± U (k=2) 5,64 µg/l ± 0,04 µg/l

IFA result ± U (k=2) 5,4 µg/l ± 0,2 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	5,5	1,4	µg/l	98%	-0,39
B	5,70	0,855	µg/l	101%	0,17
C	5,732	0,55	µg/l	102%	0,26
D	5,91	0,79	µg/l	105%	0,76
E			µg/l		
F			µg/l		
G	5,40	0,54	µg/l	96%	-0,68
H	5,48	0,60	µg/l	97%	-0,45
I	5,8	0,50	µg/l	103%	0,45
J			µg/l		
K	5,48	0,035	µg/l	97%	-0,45
L	5,50	1,43	µg/l	98%	-0,39
M	6,47 *	0,80	µg/l	115%	2,34
N	5,38	1,1	µg/l	95%	-0,73
O			µg/l		
P	5,6324	0,566	µg/l	100%	-0,02
Q	5,58	0,84	µg/l	99%	-0,17
R	5,66	0,0911	µg/l	100%	0,06
S	5,54	1,25	µg/l	98%	-0,28
T	5,66	0,9	µg/l	100%	0,06

	All results	Outliers excl.	Unit
Mean ± CI(99%)	5,65 ± 0,19	5,60 ± 0,12	µg/l
Recov. ± CI(99%)	100,2 ± 3,4	99,2 ± 2,0	%
SD between labs	0,26	0,15	µg/l
RSD between labs	4,6	2,7	%
n for calculation	16	15	



Sample M181A

Parameter Mercury

Assigned value ± U (k=2) 1,120 µg/l ± 0,015 µg/l

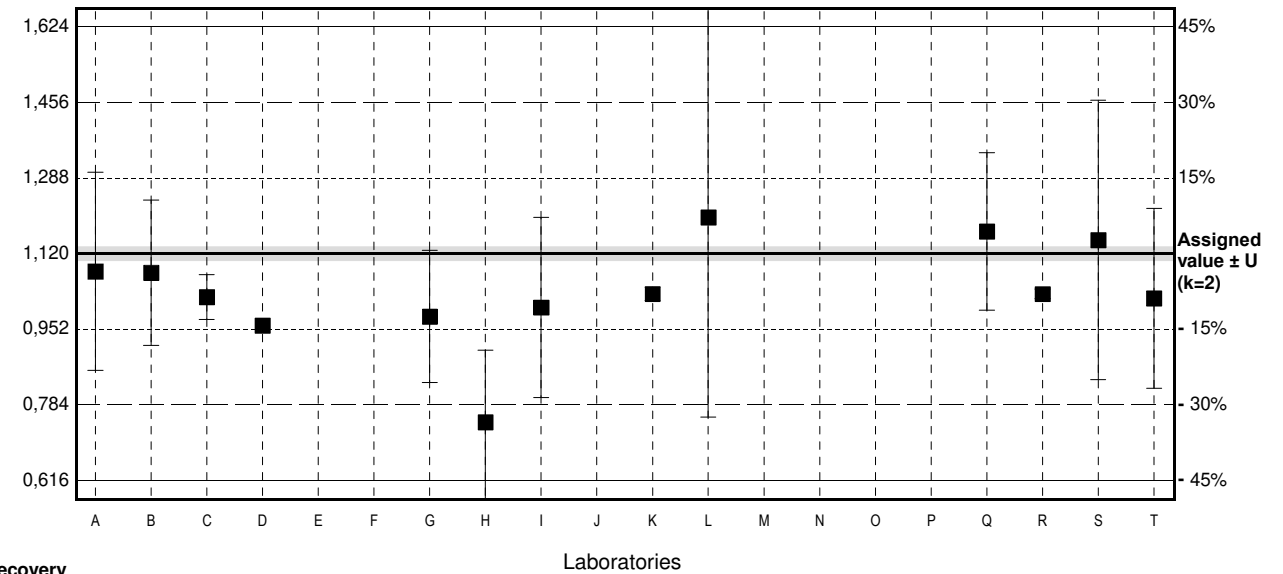
IFA result ± U (k=2) 1,03 µg/l ± 0,17 µg/l

Stability test µg/l

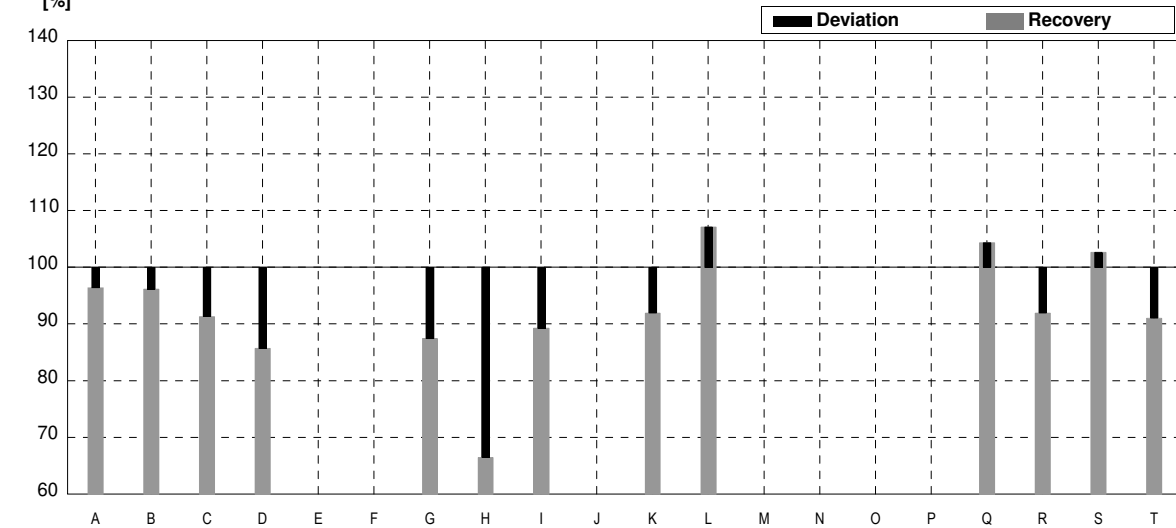
Lab Code	Result	±	Unit	Recovery	z-Score
A	1,08	0,22	µg/l	96%	-0,34
B	1,077	0,1616	µg/l	96%	-0,37
C	1,023	0,05	µg/l	91%	-0,83
D	0,96		µg/l	86%	-1,37
E			µg/l		
F			µg/l		
G	0,980	0,147	µg/l	88%	-1,20
H	0,745 *	0,16	µg/l	67%	-3,22
I	1,00	0,20	µg/l	89%	-1,03
J			µg/l		
K	1,03	0,015	µg/l	92%	-0,77
L	1,20	0,444	µg/l	107%	0,69
M			µg/l		
N			µg/l		
O			µg/l		
P			µg/l		
Q	1,169	0,175	µg/l	104%	0,42
R	1,03	0,0110	µg/l	92%	-0,77
S	1,15	0,31	µg/l	103%	0,26
T	1,02	0,2	µg/l	91%	-0,86

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,036 ± 0,097	1,060 ± 0,069	µg/l
Recov. ± CI(99%)	92,5 ± 8,6	94,6 ± 6,2	%
SD between labs	0,114	0,077	µg/l
RSD between labs	11,0	7,3	%
n for calculation	13	12	

Result [µg/l]



Recovery [%]



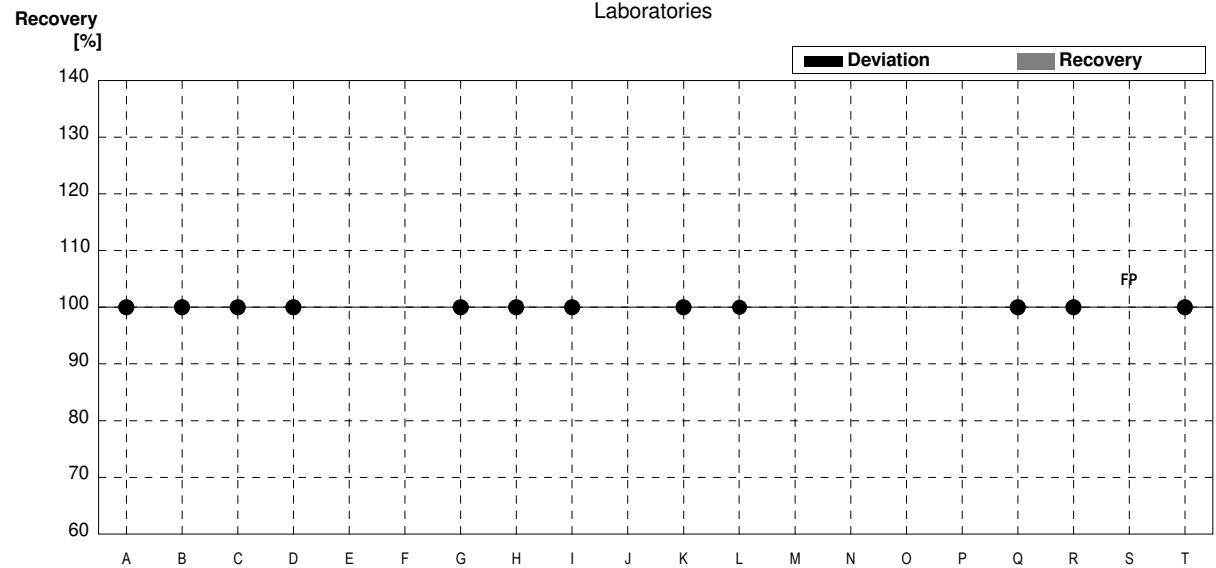
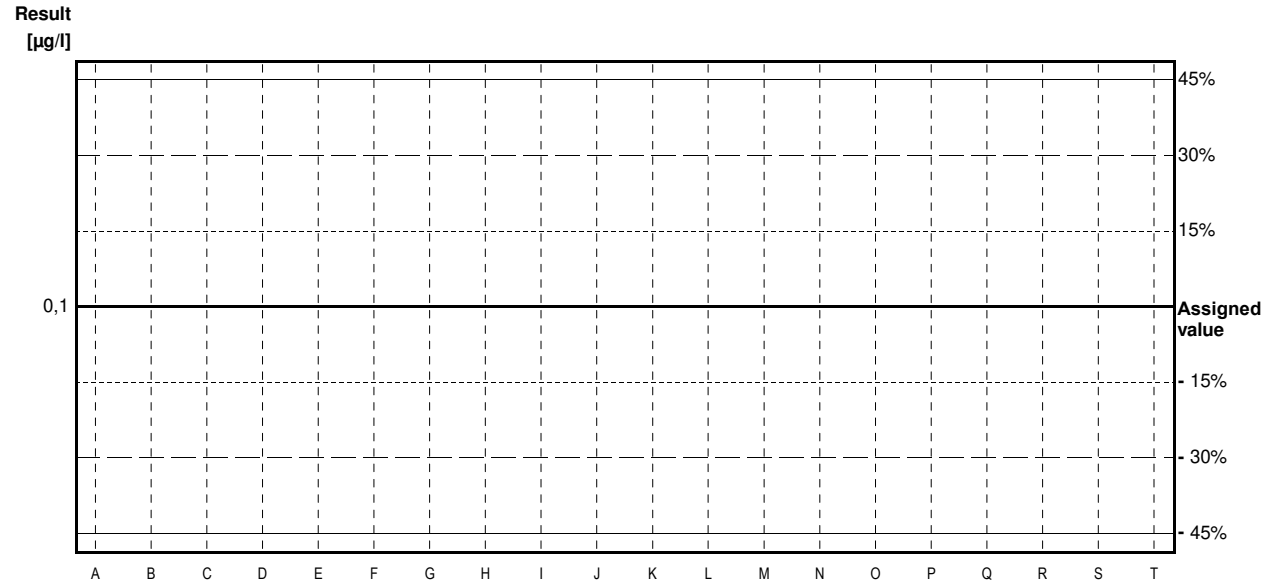
Sample M181B

Parameter Mercury

Assigned value <0,1 µg/l
 IFA result <0,1 µg/l
 Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	<0,100		µg/l	•	
B	<0,001		µg/l	•	
C	<0,1		µg/l	•	
D	0,0170		µg/l	•	
E			µg/l		
F			µg/l		
G	<0,05		µg/l	•	
H	<0,05		µg/l	•	
I	<0,2		µg/l	•	
J			µg/l		
K	<0,011		µg/l	•	
L	0,107	0,040	µg/l	•	
M			µg/l		
N			µg/l		
O			µg/l		
P			µg/l		
Q	<0,1		µg/l	•	
R	<0,050		µg/l	•	
S	0,150	0,040	µg/l	FP	
T	<0,04		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 M181A

Parameter Selenium

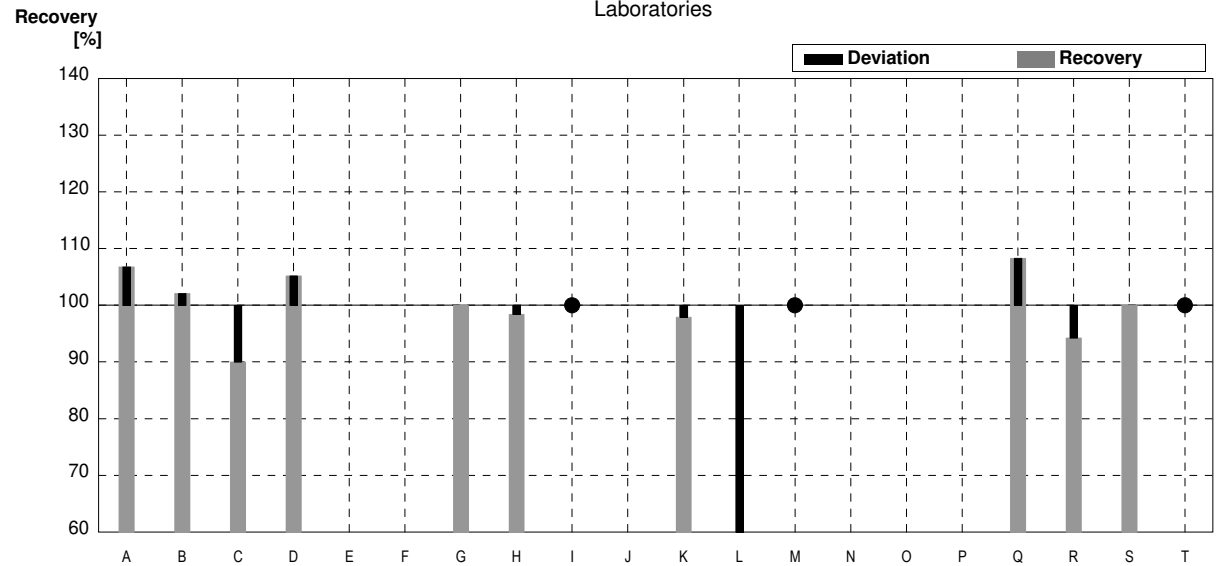
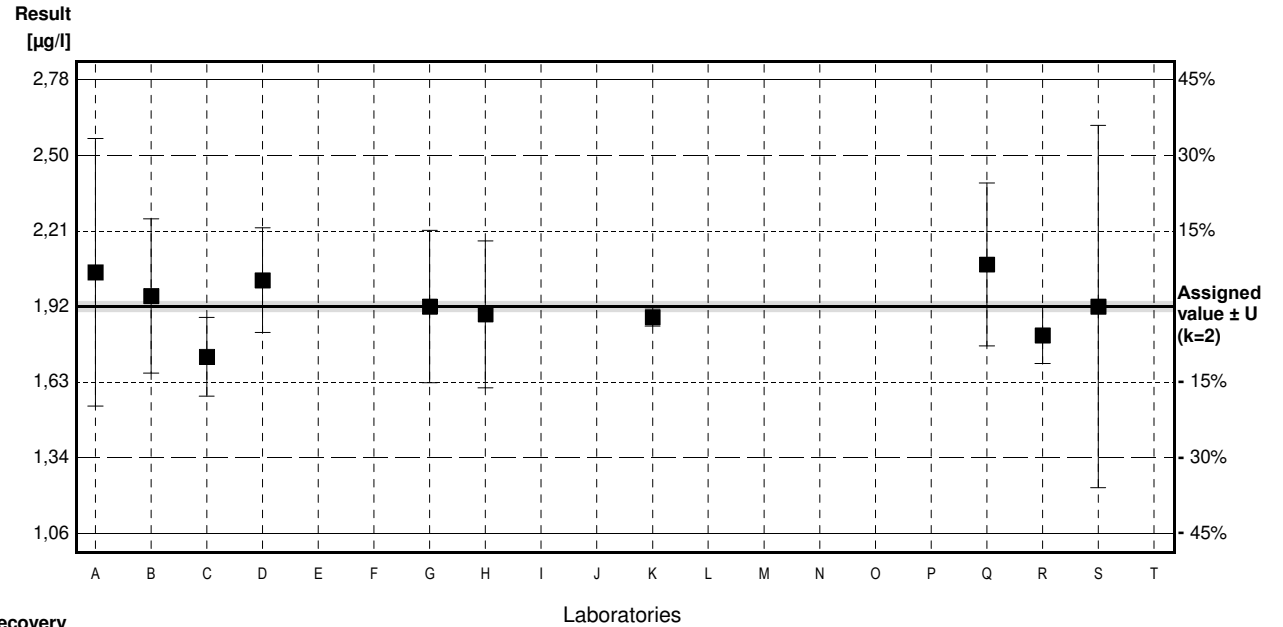
Assigned value ± U (k=2) 1,92 µg/l ± 0,02 µg/l

IFA result ± U (k=2) 1,84 µg/l ± 0,24 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	2,05	0,51	µg/l	107%	0,80
B	1,96	0,294	µg/l	102%	0,25
C	1,728	0,15	µg/l	90%	-1,18
D	2,02	0,2	µg/l	105%	0,61
E			µg/l		
F			µg/l		
G	1,92	0,29	µg/l	100%	0,00
H	1,89	0,28	µg/l	98%	-0,18
I	<3		µg/l	•	
J			µg/l		
K	1,88	0,035	µg/l	98%	-0,25
L	0,794 *	0,357	µg/l	41%	-6,90
M	<5		µg/l	•	
N			µg/l		
O			µg/l		
P			µg/l		
Q	2,08	0,31	µg/l	108%	0,98
R	1,81	0,107	µg/l	94%	-0,67
S	1,92	0,69	µg/l	100%	0,00
T	<5,0		µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,82 ± 0,34	1,93 ± 0,11	µg/l
Recov. ± CI(99%)	94,9 ± 17,7	100,3 ± 5,8	%
SD between labs	0,36	0,11	µg/l
RSD between labs	19,5	5,6	%
n for calculation	11	10	



Sample M181B

Parameter Selenium

Assigned value ± U (k=2) 2,39 µg/l ± 0,02 µg/l

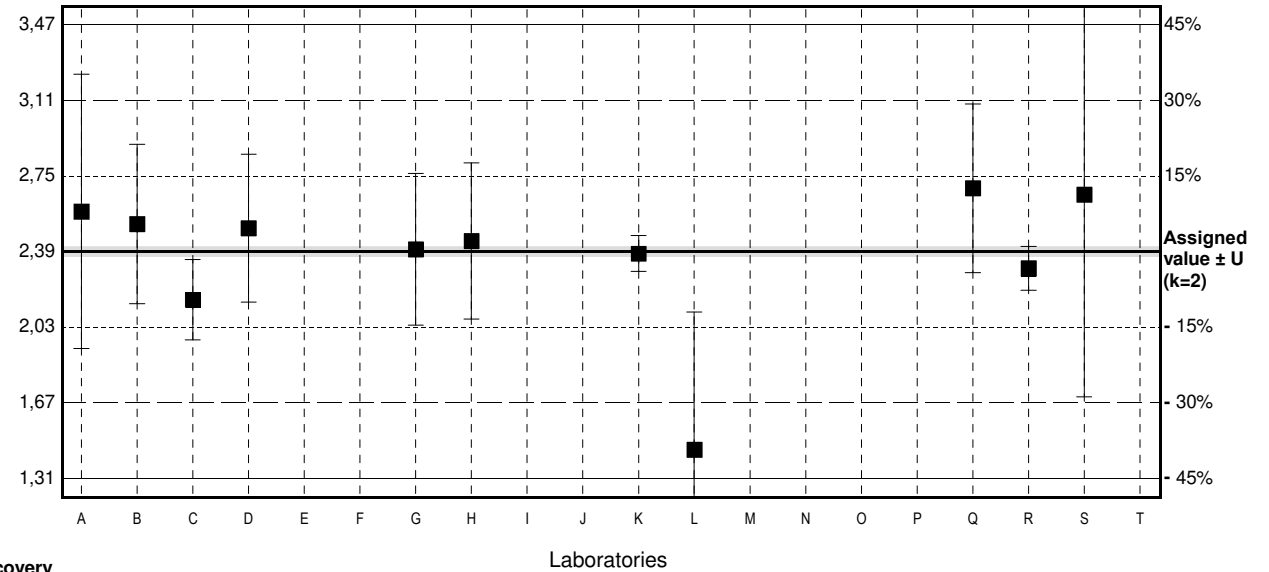
IFA result ± U (k=2) 2,52 µg/l ± 0,33 µg/l

Stability test µg/l

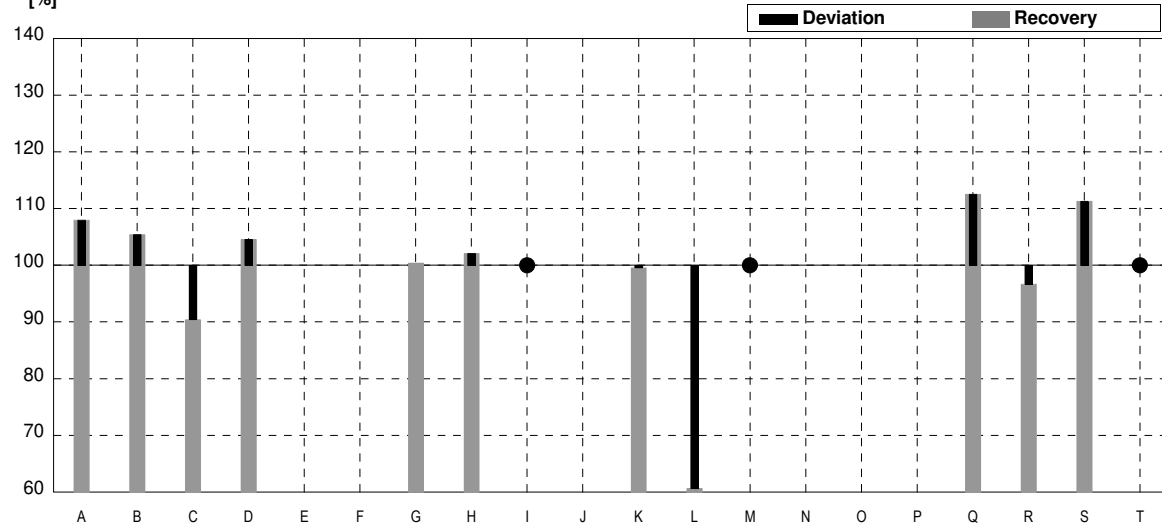
Lab Code	Result	±	Unit	Recovery	z-Score
A	2,58	0,65	µg/l	108%	0,94
B	2,52	0,378	µg/l	105%	0,64
C	2,161	0,19	µg/l	90%	-1,13
D	2,50	0,35	µg/l	105%	0,54
E			µg/l		
F			µg/l		
G	2,40	0,36	µg/l	100%	0,05
H	2,44	0,37	µg/l	102%	0,25
I	<3		µg/l	•	
J			µg/l		
K	2,38	0,085	µg/l	100%	-0,05
L	1,45	0,653	µg/l	61%	-4,63
M	<5		µg/l	•	
N			µg/l		
O			µg/l		
P			µg/l		
Q	2,69	0,40	µg/l	113%	1,48
R	2,31	0,104	µg/l	97%	-0,39
S	2,66	0,96	µg/l	111%	1,33
T	<5,0		µg/l	•	

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,37 ± 0,33	2,46 ± 0,17	µg/l
Recov. ± CI(99%)	99,2 ± 13,7	103,1 ± 7,0	%
SD between labs	0,34	0,16	µg/l
RSD between labs	14,4	6,6	%
n for calculation	11	10	

Result [µg/l]



Recovery [%]



Sample M181A

Parameter Uranium

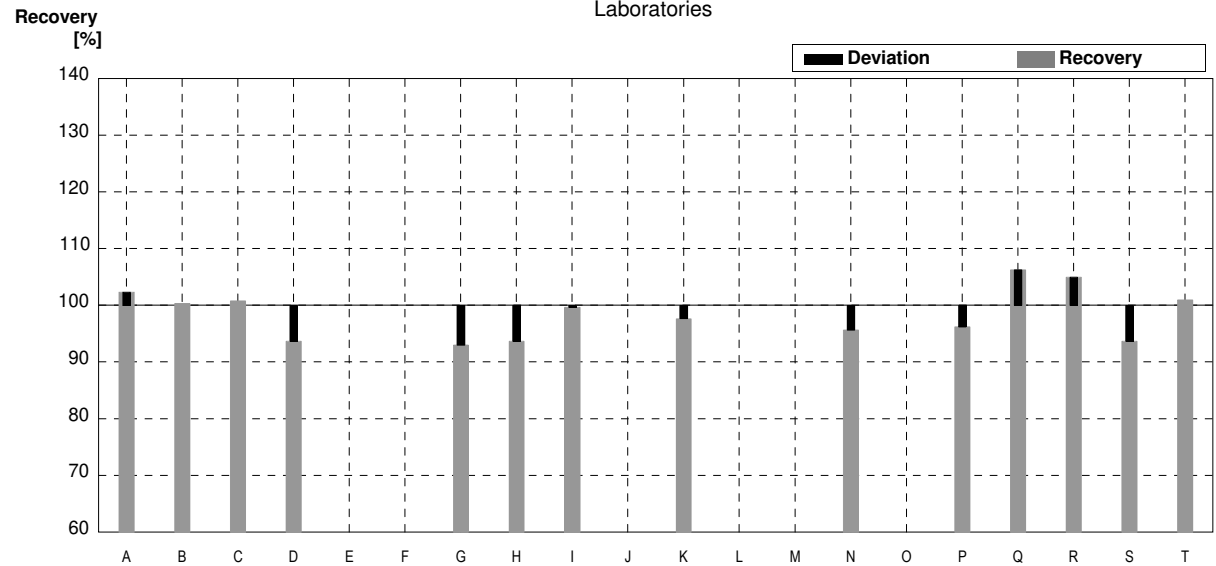
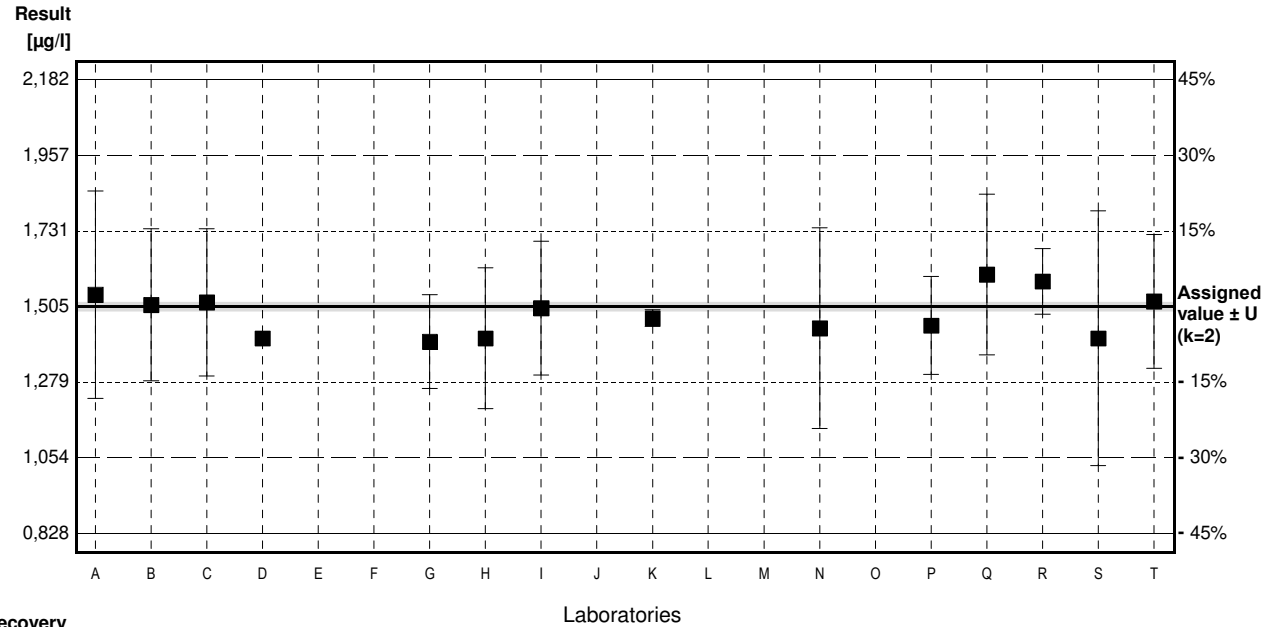
Assigned value ± U (k=2) 1,505 µg/l ± 0,013 µg/l

IFA result ± U (k=2) 1,31 µg/l ± 0,13 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	1,54	0,31	µg/l	102%	0,43
B	1,51	0,227	µg/l	100%	0,06
C	1,517	0,22	µg/l	101%	0,15
D	1,41		µg/l	94%	-1,17
E			µg/l		
F			µg/l		
G	1,40	0,14	µg/l	93%	-1,29
H	1,41	0,21	µg/l	94%	-1,17
I	1,50	0,2	µg/l	100%	-0,06
J			µg/l		
K	1,47	0,025	µg/l	98%	-0,43
L			µg/l		
M			µg/l		
N	1,44	0,3	µg/l	96%	-0,80
O			µg/l		
P	1,4482	0,146	µg/l	96%	-0,70
Q	1,60	0,24	µg/l	106%	1,17
R	1,58	0,0982	µg/l	105%	0,92
S	1,41	0,38	µg/l	94%	-1,17
T	1,52	0,20	µg/l	101%	0,18

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,483 ± 0,053	1,483 ± 0,053	µg/l
Recov. ± CI(99%)	98,5 ± 3,5	98,5 ± 3,5	%
SD between labs	0,066	0,066	µg/l
RSD between labs	4,4	4,4	%
n for calculation	14	14	



Sample M181B

Parameter Uranium

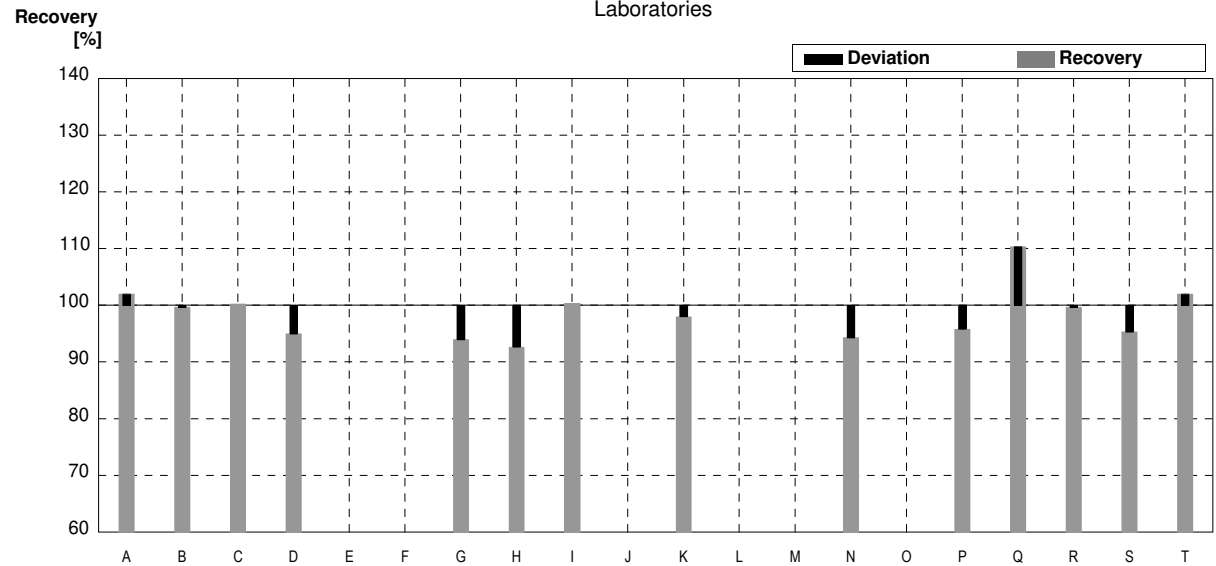
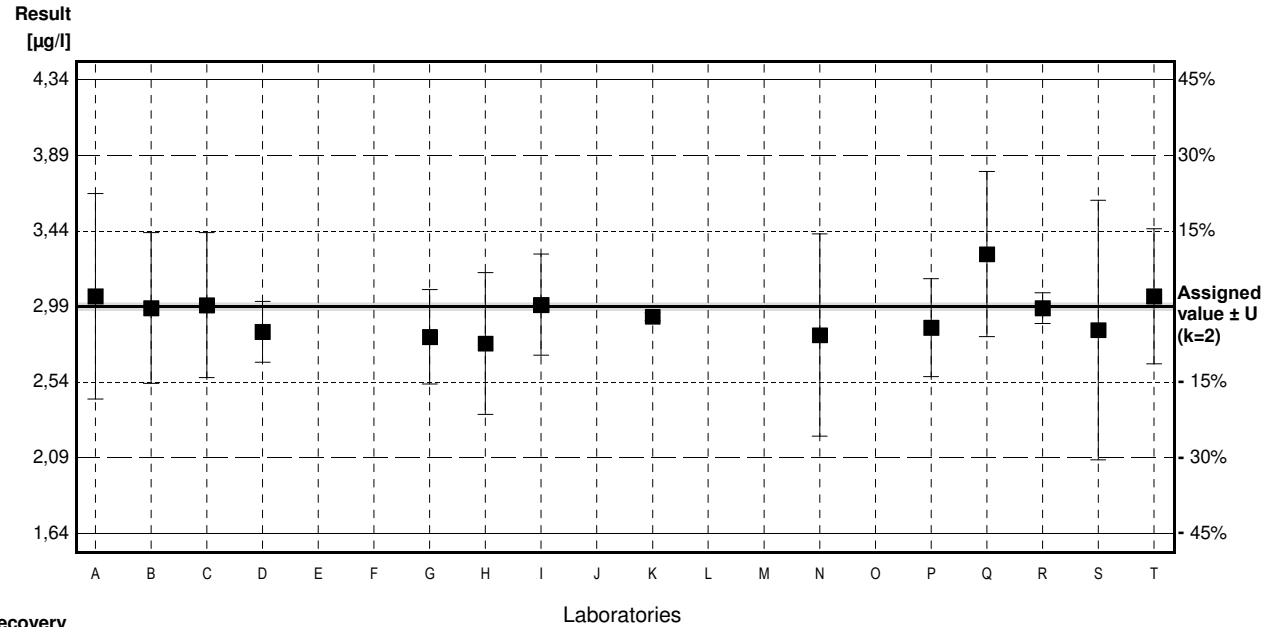
Assigned value $\pm U$ (k=2) 2,99 $\mu\text{g/l}$ \pm 0,02 $\mu\text{g/l}$

IFA result $\pm U$ (k=2) 2,44 $\mu\text{g/l}$ \pm 0,24 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	3,05	0,61	$\mu\text{g/l}$	102%	0,37
B	2,98	0,447	$\mu\text{g/l}$	100%	-0,06
C	2,997	0,43	$\mu\text{g/l}$	100%	0,04
D	2,84	0,18	$\mu\text{g/l}$	95%	-0,93
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	2,81	0,28	$\mu\text{g/l}$	94%	-1,11
H	2,77	0,42	$\mu\text{g/l}$	93%	-1,36
I	3,00	0,3	$\mu\text{g/l}$	100%	0,06
J			$\mu\text{g/l}$		
K	2,93	0,025	$\mu\text{g/l}$	98%	-0,37
L			$\mu\text{g/l}$		
M			$\mu\text{g/l}$		
N	2,82	0,6	$\mu\text{g/l}$	94%	-1,05
O			$\mu\text{g/l}$		
P	2,8639	0,290	$\mu\text{g/l}$	96%	-0,78
Q	3,30	0,49	$\mu\text{g/l}$	110%	1,92
R	2,98	0,0911	$\mu\text{g/l}$	100%	-0,06
S	2,85	0,77	$\mu\text{g/l}$	95%	-0,87
T	3,05	0,4	$\mu\text{g/l}$	102%	0,37

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	2,95 \pm 0,11	2,95 \pm 0,11	$\mu\text{g/l}$
Recov. \pm CI(99%)	98,5 \pm 3,7	98,5 \pm 3,7	%
SD between labs	0,14	0,14	$\mu\text{g/l}$
RSD between labs	4,7	4,7	%
n for calculation	14	14	



Sample M181A

Parameter Zinc

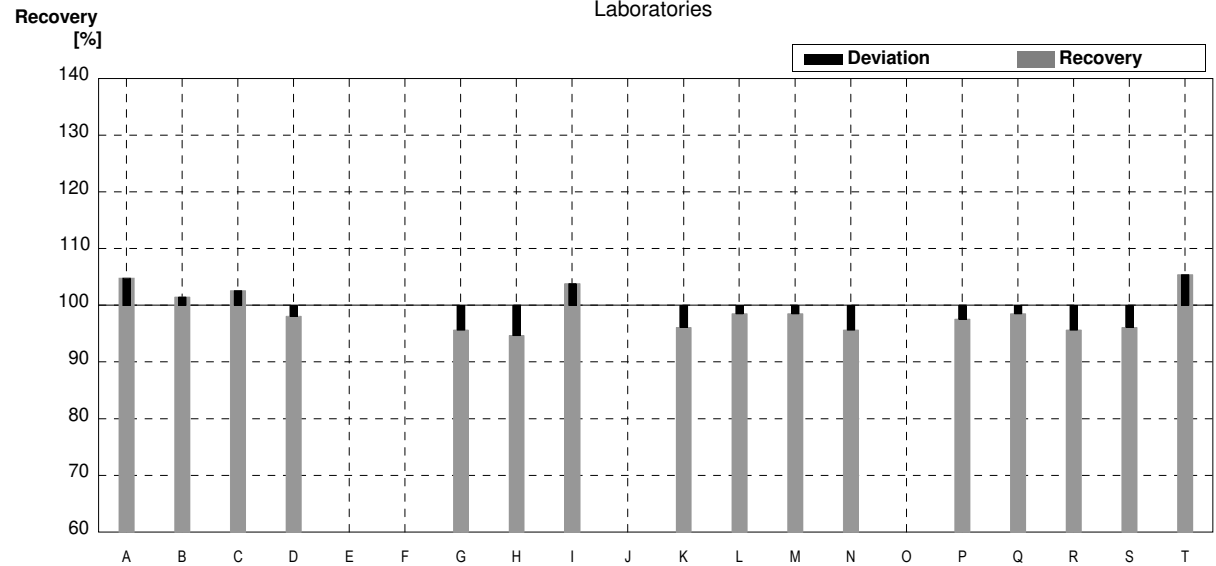
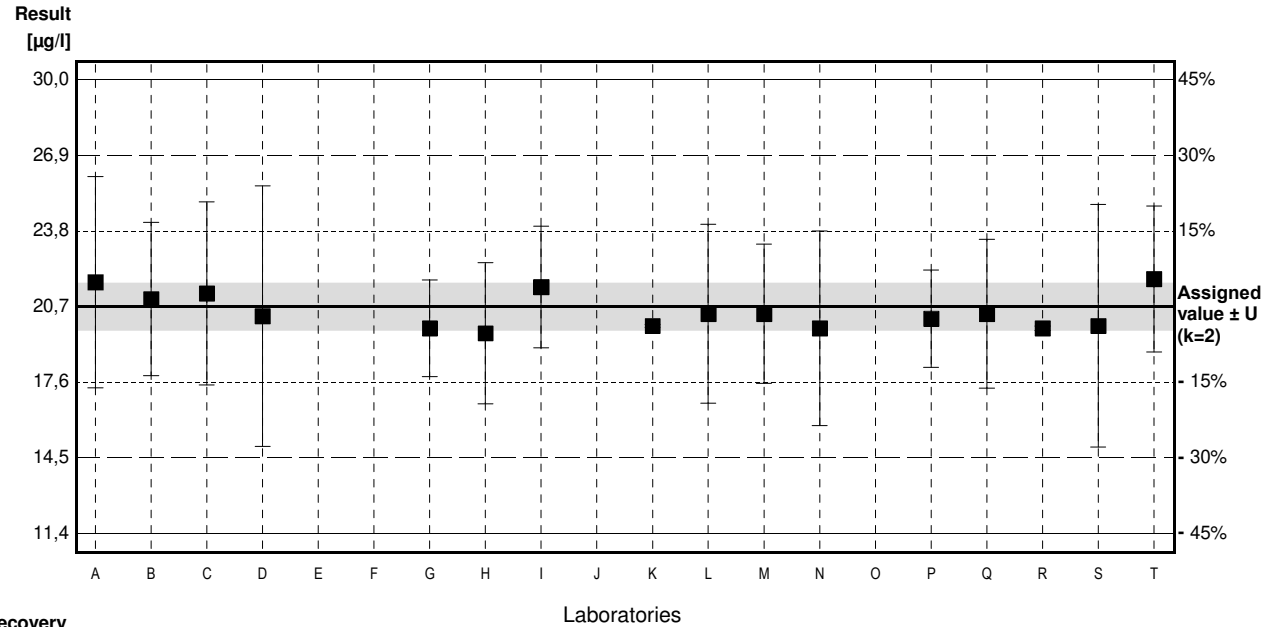
Assigned value $\pm U$ (k=2) 20,7 $\mu\text{g/l}$ \pm 1,0 $\mu\text{g/l}$

IFA result $\pm U$ (k=2) 21,2 $\mu\text{g/l}$ \pm 3,2 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	21,7	4,34	$\mu\text{g/l}$	105%	0,78
B	21,0	3,15	$\mu\text{g/l}$	101%	0,23
C	21,24	3,76	$\mu\text{g/l}$	103%	0,42
D	20,3	5,35	$\mu\text{g/l}$	98%	-0,31
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	19,8	1,98	$\mu\text{g/l}$	96%	-0,70
H	19,6	2,9	$\mu\text{g/l}$	95%	-0,86
I	21,5	2,5	$\mu\text{g/l}$	104%	0,62
J			$\mu\text{g/l}$		
K	19,9	0,058	$\mu\text{g/l}$	96%	-0,62
L	20,4	3,67	$\mu\text{g/l}$	99%	-0,23
M	20,4	2,86	$\mu\text{g/l}$	99%	-0,23
N	19,8	4,0	$\mu\text{g/l}$	96%	-0,70
O			$\mu\text{g/l}$		
P	20,2008	2,0	$\mu\text{g/l}$	98%	-0,39
Q	20,4	3,06	$\mu\text{g/l}$	99%	-0,23
R	19,8	0,091	$\mu\text{g/l}$	96%	-0,70
S	19,9	4,98	$\mu\text{g/l}$	96%	-0,62
T	21,83	3,0	$\mu\text{g/l}$	105%	0,88

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	20,5 \pm 0,5	20,5 \pm 0,5	$\mu\text{g/l}$
Recov. \pm CI(99%)	99,0 \pm 2,6	99,0 \pm 2,6	%
SD between labs	0,7	0,7	$\mu\text{g/l}$
RSD between labs	3,6	3,6	%
n for calculation	16	16	



Sample M181B

Parameter Zinc

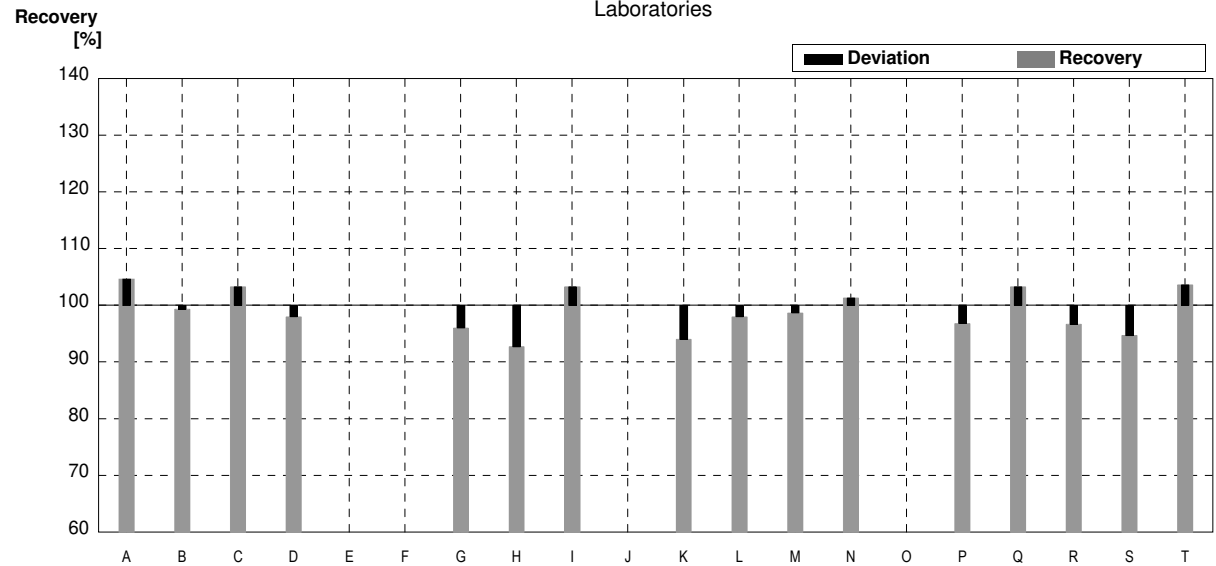
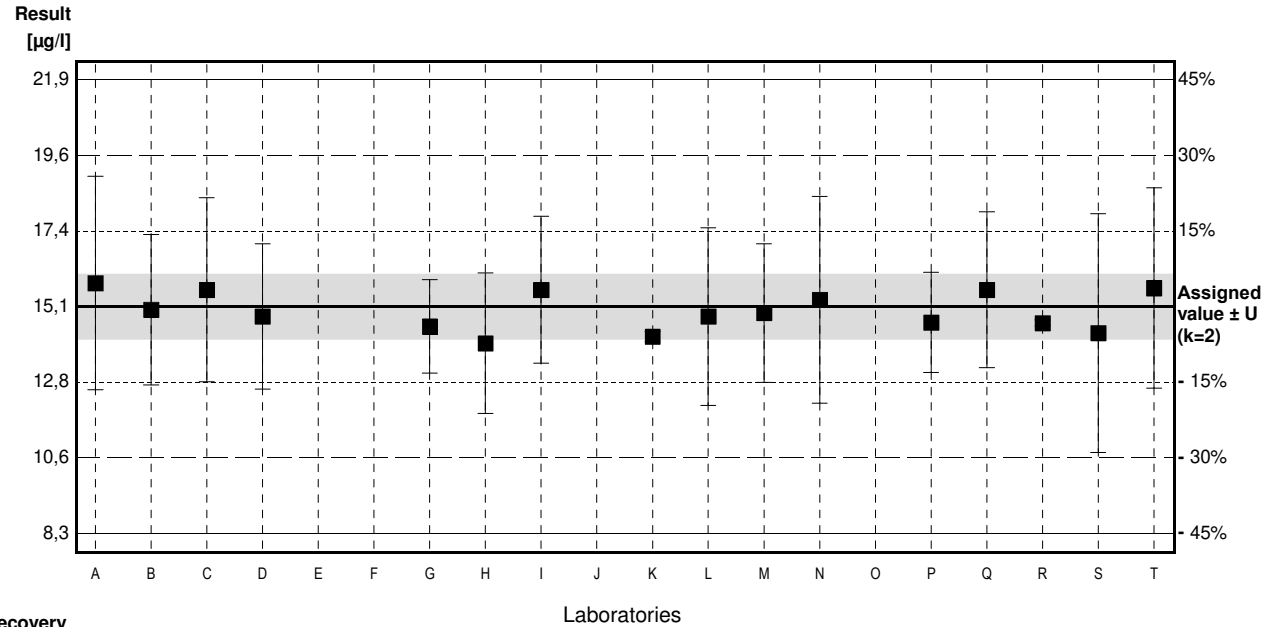
Assigned value $\pm U$ (k=2) 15,1 $\mu\text{g/l}$ \pm 1,0 $\mu\text{g/l}$

IFA result $\pm U$ (k=2) 15,4 $\mu\text{g/l}$ \pm 2,6 $\mu\text{g/l}$

Stability test $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	15,8	3,2	$\mu\text{g/l}$	105%	0,75
B	15,0	2,25	$\mu\text{g/l}$	99%	-0,11
C	15,60	2,76	$\mu\text{g/l}$	103%	0,53
D	14,8	2,18	$\mu\text{g/l}$	98%	-0,32
E			$\mu\text{g/l}$		
F			$\mu\text{g/l}$		
G	14,5	1,4	$\mu\text{g/l}$	96%	-0,64
H	14,0	2,1	$\mu\text{g/l}$	93%	-1,17
I	15,6	2,2	$\mu\text{g/l}$	103%	0,53
J			$\mu\text{g/l}$		
K	14,2	0,153	$\mu\text{g/l}$	94%	-0,96
L	14,8	2,66	$\mu\text{g/l}$	98%	-0,32
M	14,9	2,08	$\mu\text{g/l}$	99%	-0,21
N	15,3	3,1	$\mu\text{g/l}$	101%	0,21
O			$\mu\text{g/l}$		
P	14,6199	1,5	$\mu\text{g/l}$	97%	-0,51
Q	15,6	2,34	$\mu\text{g/l}$	103%	0,53
R	14,6	0,094	$\mu\text{g/l}$	97%	-0,53
S	14,3	3,58	$\mu\text{g/l}$	95%	-0,85
T	15,65	3,0	$\mu\text{g/l}$	104%	0,59

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	15,0 \pm 0,4	15,0 \pm 0,4	$\mu\text{g/l}$
Recov. \pm CI(99%)	99,0 \pm 2,8	99,0 \pm 2,8	%
SD between labs	0,6	0,6	$\mu\text{g/l}$
RSD between labs	3,9	3,9	%
n for calculation	16	16	





Labororientierte Auswertung
Laboratory Oriented Part

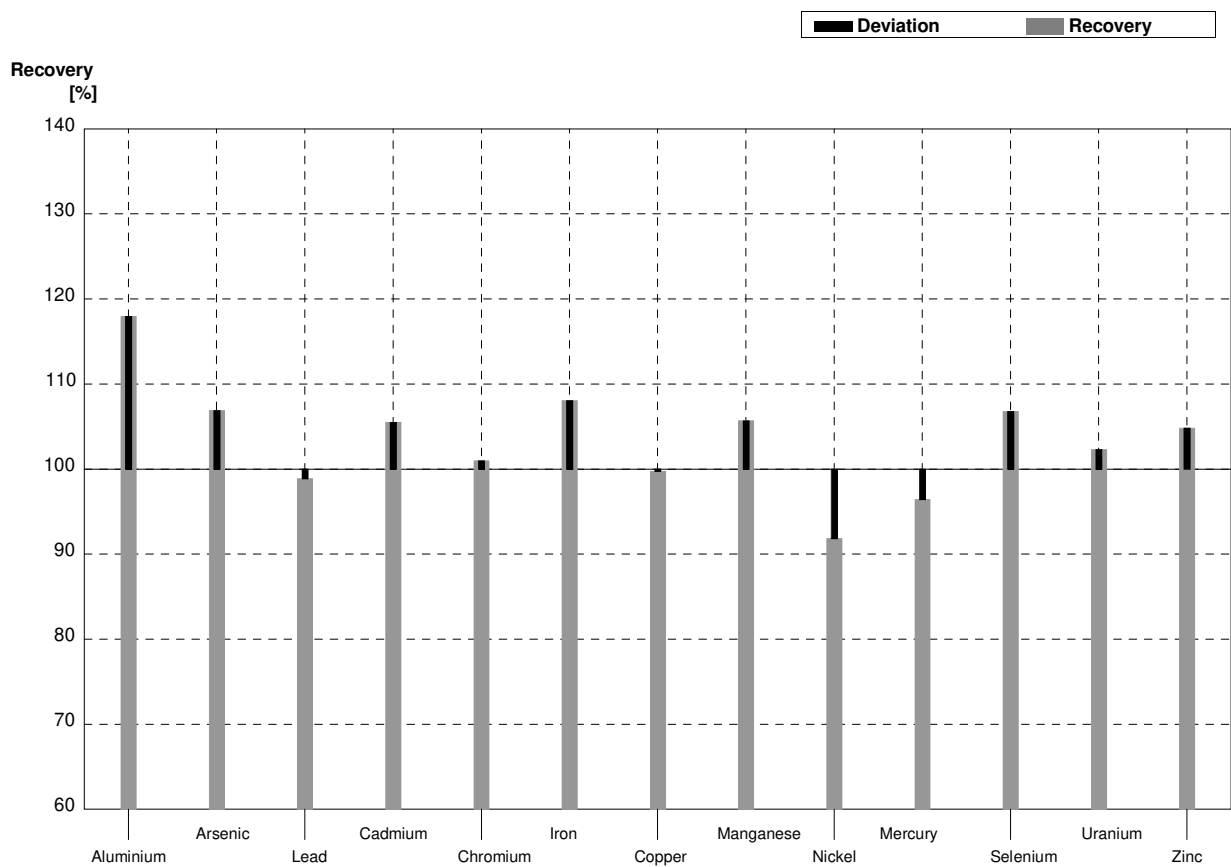
Eignungsprüfungsrunde / Proficiency testing round
M181

Metalle / Metals

Versand / Dispatch: 16.03.2026

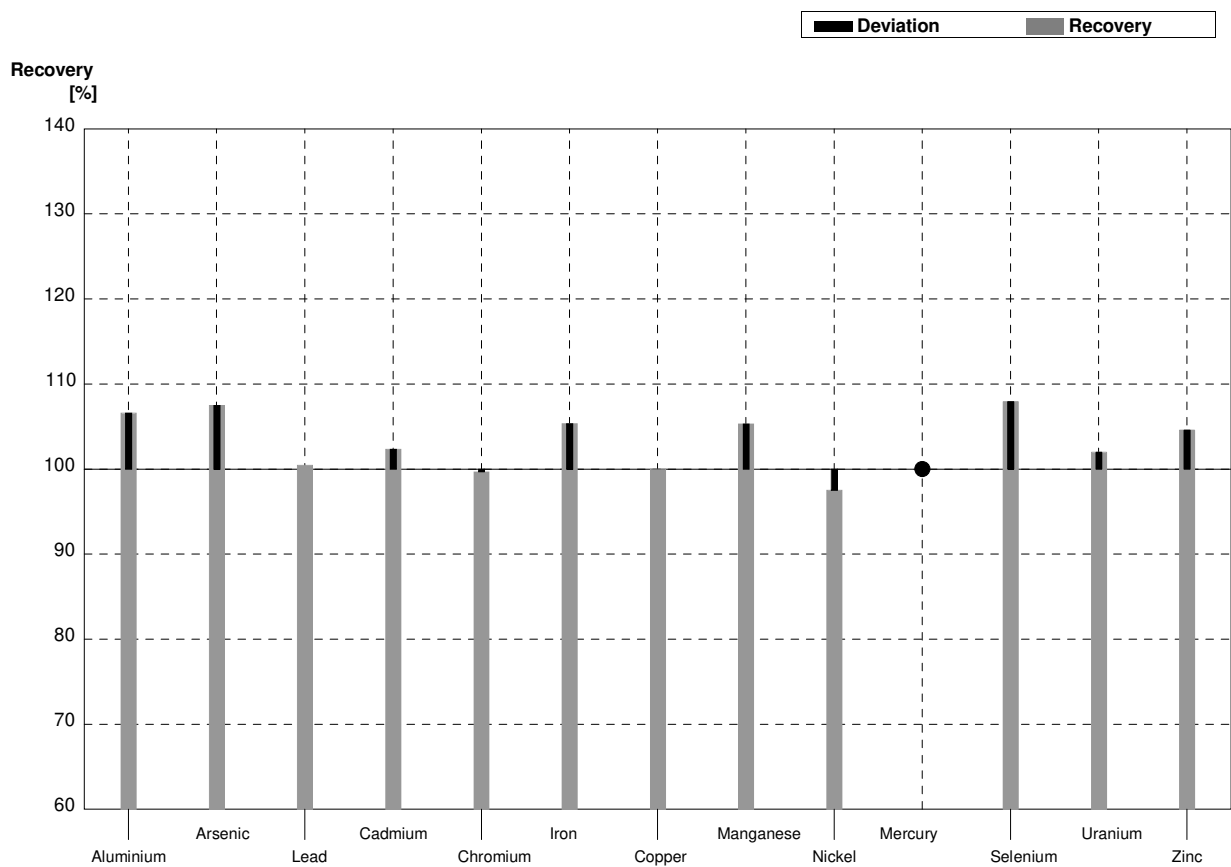
Sample M181A
Laboratory A

Parameter	Assigned value	$\pm U$ (k=2)	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	15,5	3,1	$\mu\text{g/l}$	118%
Arsenic	2,591	0,019	2,77	0,55	$\mu\text{g/l}$	107%
Lead	2,71	0,02	2,68	0,27	$\mu\text{g/l}$	99%
Cadmium	0,635	0,005	0,67	0,07	$\mu\text{g/l}$	106%
Chromium	2,99	0,02	3,02	0,45	$\mu\text{g/l}$	101%
Iron	22,67	0,16	24,5	4,9	$\mu\text{g/l}$	108%
Copper	4,00	0,03	3,99	0,80	$\mu\text{g/l}$	100%
Manganese	19,96	0,12	21,1	4,2	$\mu\text{g/l}$	106%
Nickel	2,21	0,03	2,03	0,51	$\mu\text{g/l}$	92%
Mercury	1,120	0,015	1,08	0,22	$\mu\text{g/l}$	96%
Selenium	1,92	0,02	2,05	0,51	$\mu\text{g/l}$	107%
Uranium	1,505	0,013	1,54	0,31	$\mu\text{g/l}$	102%
Zinc	20,7	1,0	21,7	4,34	$\mu\text{g/l}$	105%



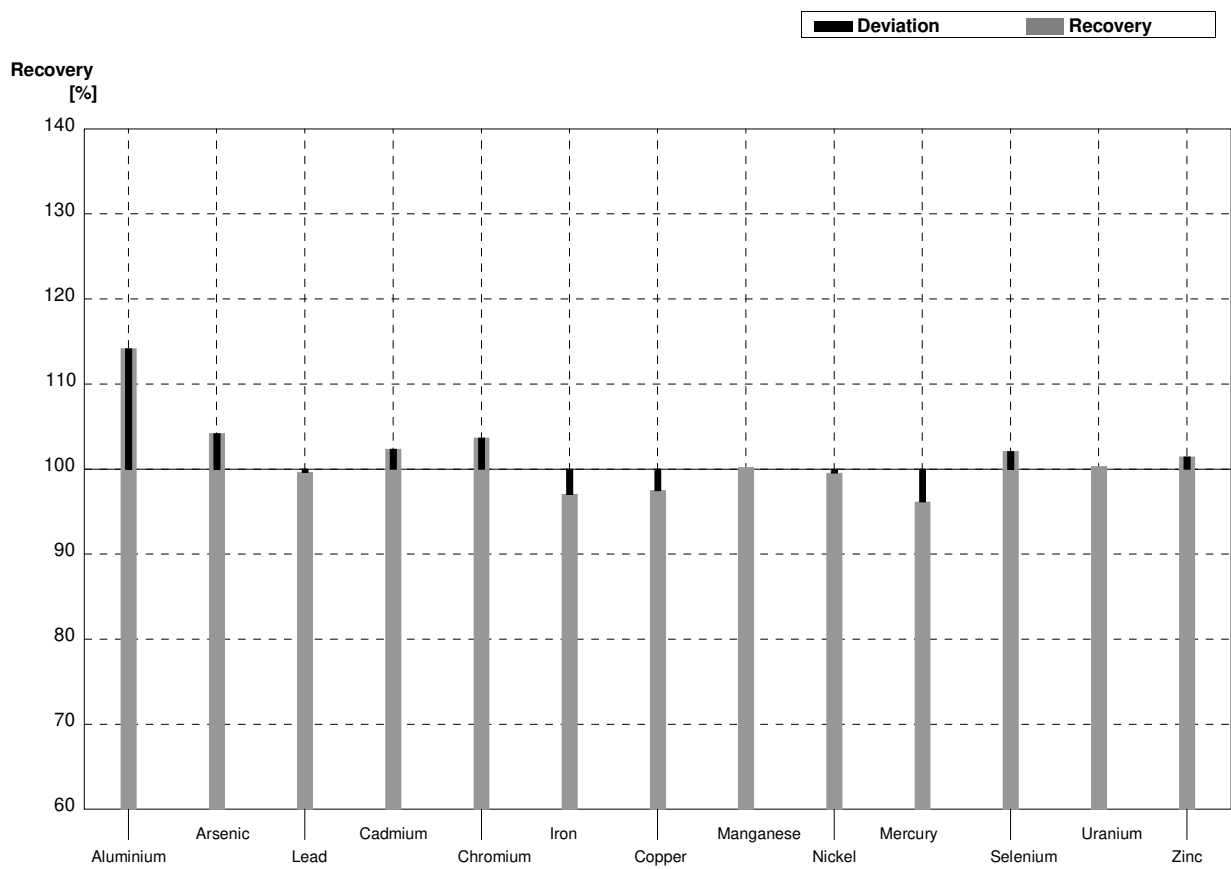
Sample M181B
Laboratory A

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	45,1	9,0	$\mu\text{g/l}$	107%
Arsenic	1,507	0,014	1,62	0,32	$\mu\text{g/l}$	107%
Lead	6,47	0,04	6,5	0,7	$\mu\text{g/l}$	100%
Cadmium	1,231	0,011	1,26	0,13	$\mu\text{g/l}$	102%
Chromium	1,906	0,015	1,90	0,29	$\mu\text{g/l}$	100%
Iron	56,0	0,2	59	12	$\mu\text{g/l}$	105%
Copper	2,08	0,03	2,08	0,42	$\mu\text{g/l}$	100%
Manganese	35,60	0,17	37,5	7,5	$\mu\text{g/l}$	105%
Nickel	5,64	0,04	5,5	1,4	$\mu\text{g/l}$	98%
Mercury	<0,1		<0,100		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,58	0,65	$\mu\text{g/l}$	108%
Uranium	2,99	0,02	3,05	0,61	$\mu\text{g/l}$	102%
Zinc	15,1	1,0	15,8	3,2	$\mu\text{g/l}$	105%



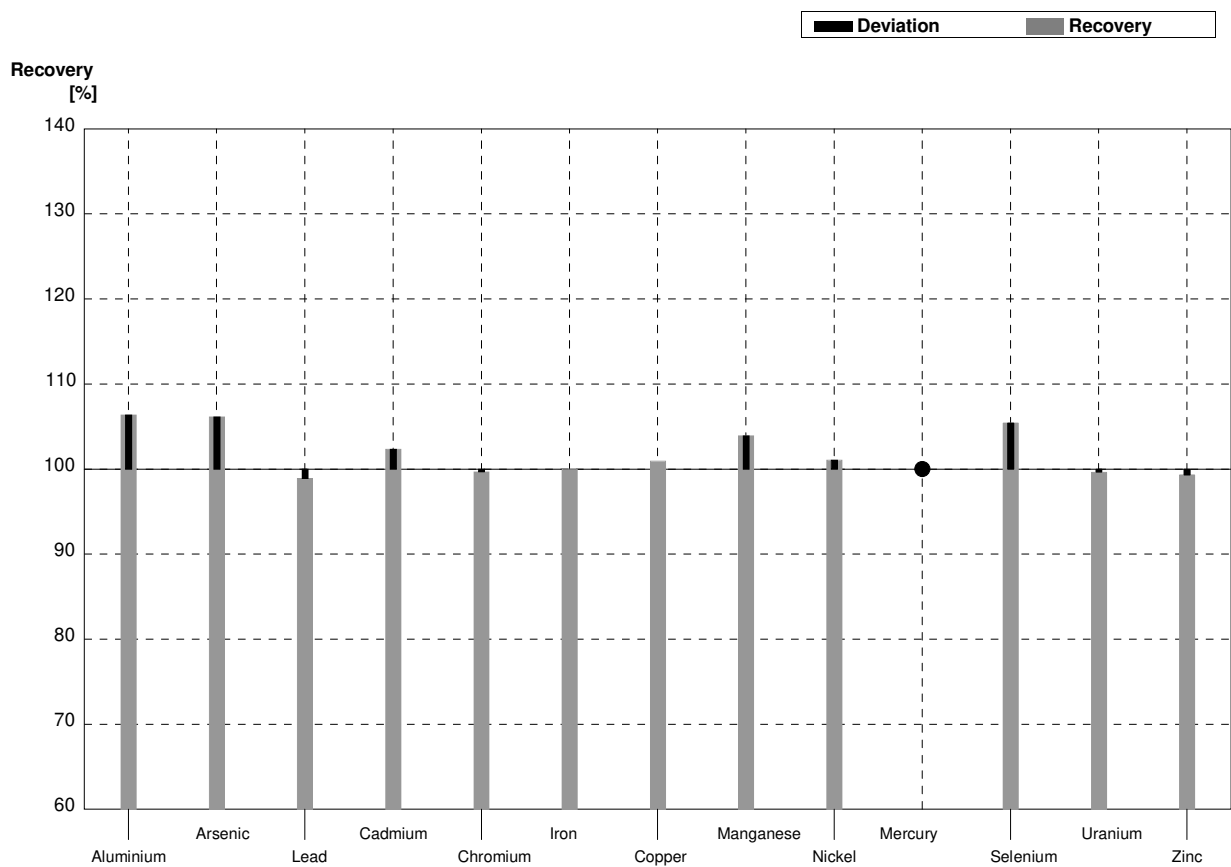
Sample M181A
Laboratory B

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	15,0	2,25	$\mu\text{g/l}$	114%
Arsenic	2,591	0,019	2,70	0,405	$\mu\text{g/l}$	104%
Lead	2,71	0,02	2,70	0,405	$\mu\text{g/l}$	100%
Cadmium	0,635	0,005	0,65	0,0975	$\mu\text{g/l}$	102%
Chromium	2,99	0,02	3,10	0,465	$\mu\text{g/l}$	104%
Iron	22,67	0,16	22,0	5,72	$\mu\text{g/l}$	97%
Copper	4,00	0,03	3,90	0,585	$\mu\text{g/l}$	98%
Manganese	19,96	0,12	20,0	2,00	$\mu\text{g/l}$	100%
Nickel	2,21	0,03	2,20	0,330	$\mu\text{g/l}$	100%
Mercury	1,120	0,015	1,077	0,1616	$\mu\text{g/l}$	96%
Selenium	1,92	0,02	1,96	0,294	$\mu\text{g/l}$	102%
Uranium	1,505	0,013	1,51	0,227	$\mu\text{g/l}$	100%
Zinc	20,7	1,0	21,0	3,15	$\mu\text{g/l}$	101%



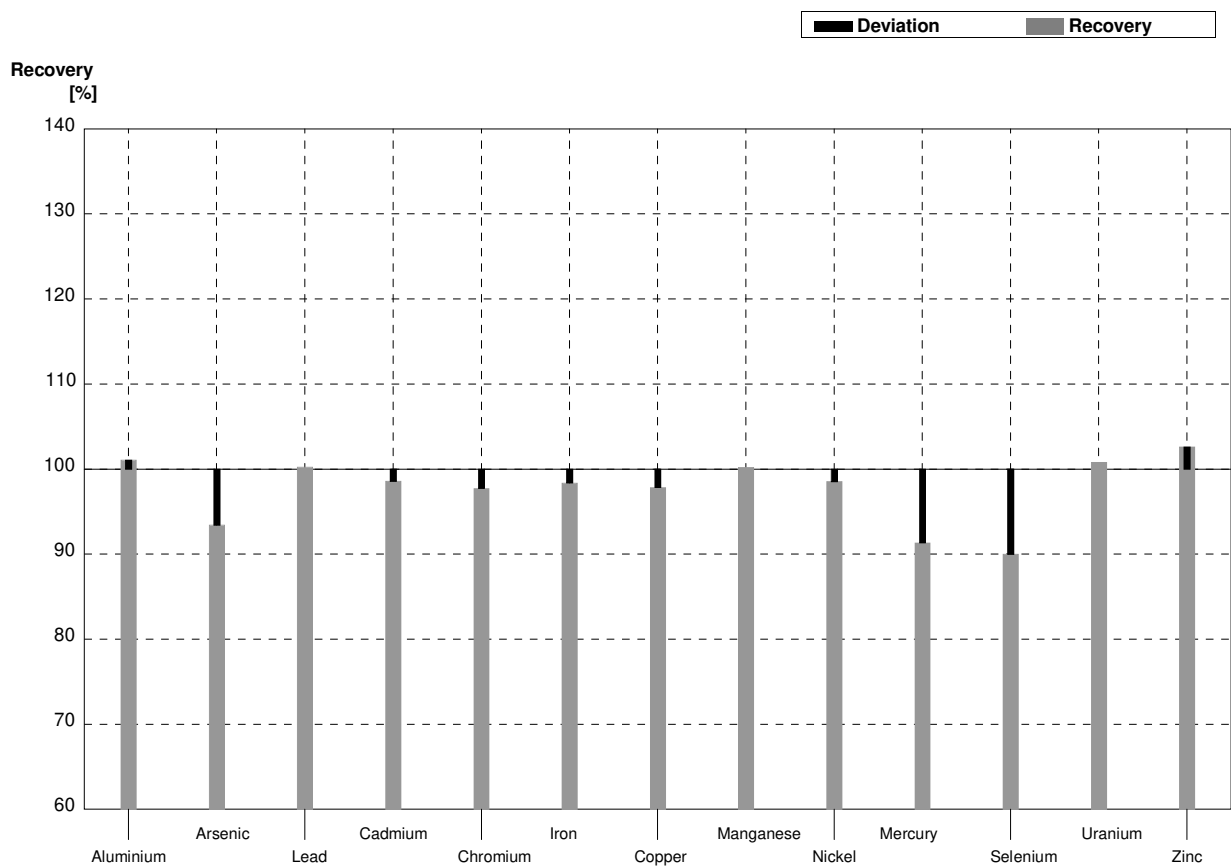
Sample M181B
Laboratory B

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	45,0	6,75	$\mu\text{g/l}$	106%
Arsenic	1,507	0,014	1,60	0,240	$\mu\text{g/l}$	106%
Lead	6,47	0,04	6,40	0,960	$\mu\text{g/l}$	99%
Cadmium	1,231	0,011	1,26	0,189	$\mu\text{g/l}$	102%
Chromium	1,906	0,015	1,90	0,285	$\mu\text{g/l}$	100%
Iron	56,0	0,2	56,0	14,56	$\mu\text{g/l}$	100%
Copper	2,08	0,03	2,10	0,315	$\mu\text{g/l}$	101%
Manganese	35,60	0,17	37,0	3,70	$\mu\text{g/l}$	104%
Nickel	5,64	0,04	5,70	0,855	$\mu\text{g/l}$	101%
Mercury	<0,1		<0,001		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,52	0,378	$\mu\text{g/l}$	105%
Uranium	2,99	0,02	2,98	0,447	$\mu\text{g/l}$	100%
Zinc	15,1	1,0	15,0	2,25	$\mu\text{g/l}$	99%



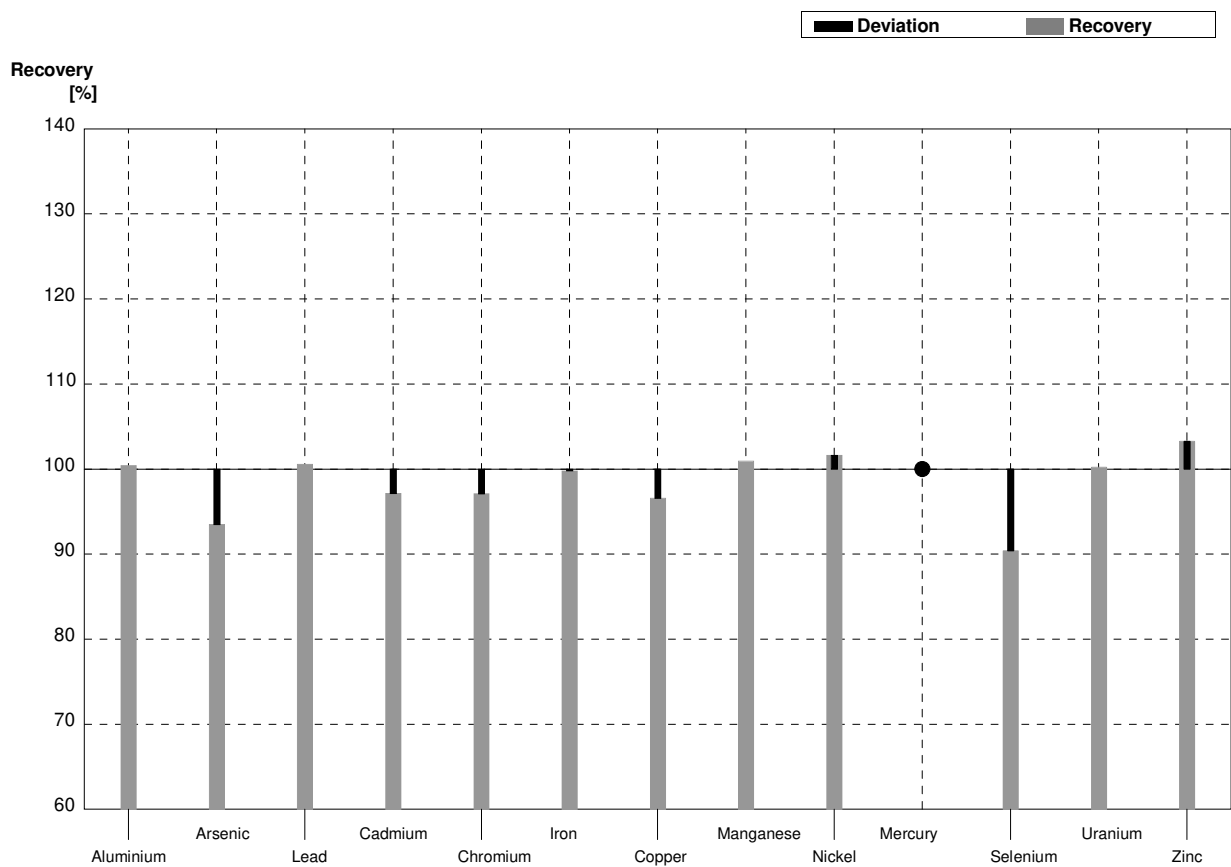
Sample M181A
Laboratory C

Parameter	Assigned value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	13,14	0,17	13,283	2,15	µg/l	101%
Arsenic	2,591	0,019	2,421	0,38	µg/l	93%
Lead	2,71	0,02	2,717	0,33	µg/l	100%
Cadmium	0,635	0,005	0,626	0,05	µg/l	99%
Chromium	2,99	0,02	2,922	0,21	µg/l	98%
Iron	22,67	0,16	22,3	2,27	µg/l	98%
Copper	4,00	0,03	3,914	0,44	µg/l	98%
Manganese	19,96	0,12	19,997	1,66	µg/l	100%
Nickel	2,21	0,03	2,178	0,21	µg/l	99%
Mercury	1,120	0,015	1,023	0,05	µg/l	91%
Selenium	1,92	0,02	1,728	0,15	µg/l	90%
Uranium	1,505	0,013	1,517	0,22	µg/l	101%
Zinc	20,7	1,0	21,24	3,76	µg/l	103%



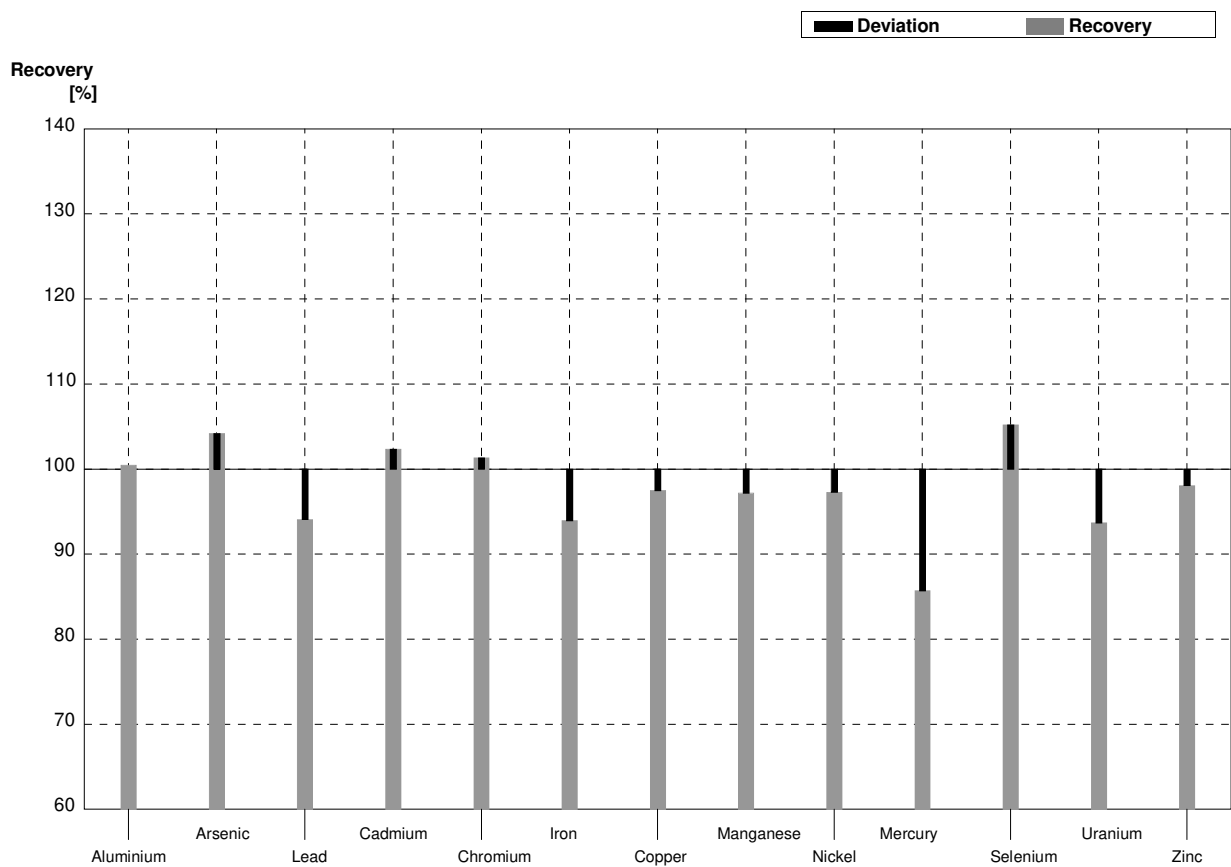
Sample M181B
Laboratory C

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	42,487	6,88	$\mu\text{g/l}$	100%
Arsenic	1,507	0,014	1,409	0,22	$\mu\text{g/l}$	93%
Lead	6,47	0,04	6,509	0,79	$\mu\text{g/l}$	101%
Cadmium	1,231	0,011	1,196	0,1	$\mu\text{g/l}$	97%
Chromium	1,906	0,015	1,851	0,14	$\mu\text{g/l}$	97%
Iron	56,0	0,2	55,887	5,7	$\mu\text{g/l}$	100%
Copper	2,08	0,03	2,009	0,23	$\mu\text{g/l}$	97%
Manganese	35,60	0,17	35,935	2,98	$\mu\text{g/l}$	101%
Nickel	5,64	0,04	5,732	0,55	$\mu\text{g/l}$	102%
Mercury	<0,1		<0,1		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,161	0,19	$\mu\text{g/l}$	90%
Uranium	2,99	0,02	2,997	0,43	$\mu\text{g/l}$	100%
Zinc	15,1	1,0	15,60	2,76	$\mu\text{g/l}$	103%



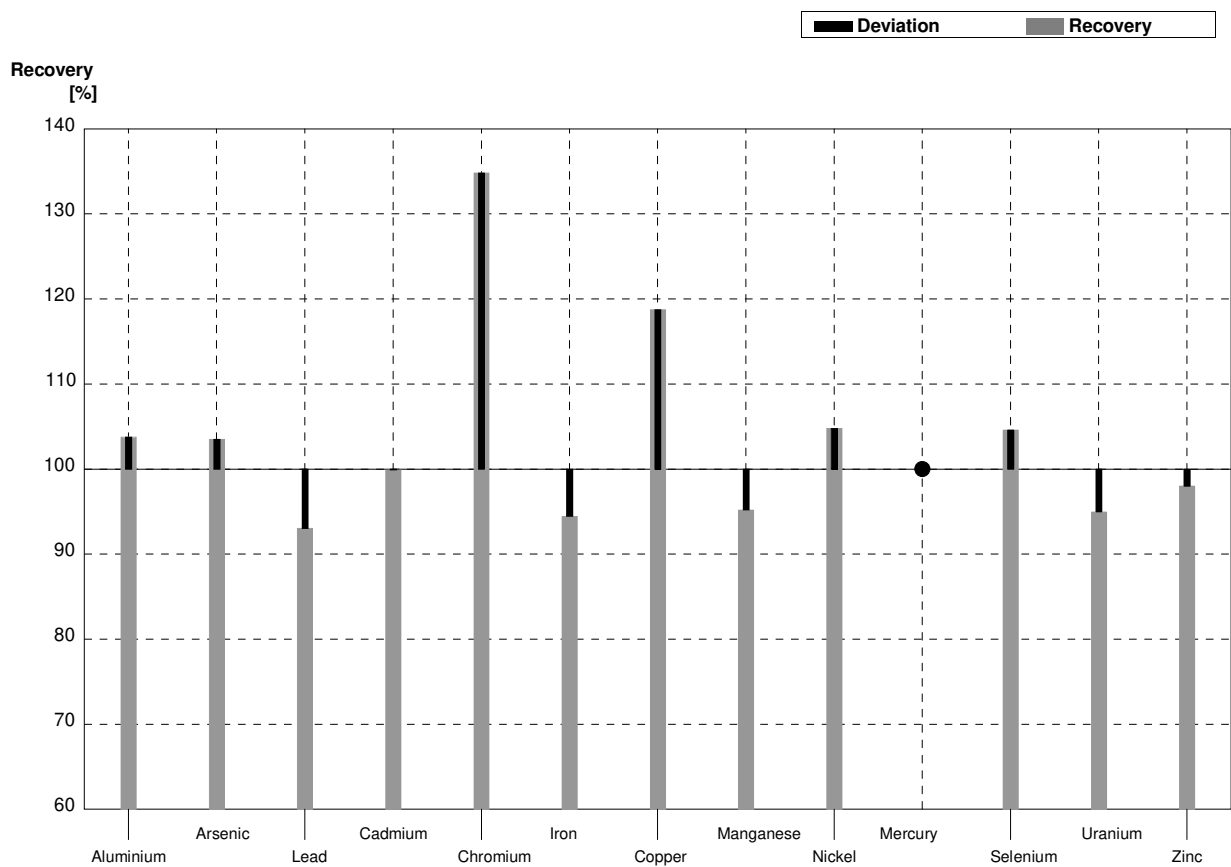
Sample M181A
Laboratory D

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	13,2	1,51	$\mu\text{g/l}$	100%
Arsenic	2,591	0,019	2,70	0,20	$\mu\text{g/l}$	104%
Lead	2,71	0,02	2,55	0,28	$\mu\text{g/l}$	94%
Cadmium	0,635	0,005	0,65		$\mu\text{g/l}$	102%
Chromium	2,99	0,02	3,03		$\mu\text{g/l}$	101%
Iron	22,67	0,16	21,3	1,50	$\mu\text{g/l}$	94%
Copper	4,00	0,03	3,90		$\mu\text{g/l}$	98%
Manganese	19,96	0,12	19,4	1,36	$\mu\text{g/l}$	97%
Nickel	2,21	0,03	2,15	0,23	$\mu\text{g/l}$	97%
Mercury	1,120	0,015	0,96		$\mu\text{g/l}$	86%
Selenium	1,92	0,02	2,02	0,2	$\mu\text{g/l}$	105%
Uranium	1,505	0,013	1,41		$\mu\text{g/l}$	94%
Zinc	20,7	1,0	20,3	5,35	$\mu\text{g/l}$	98%



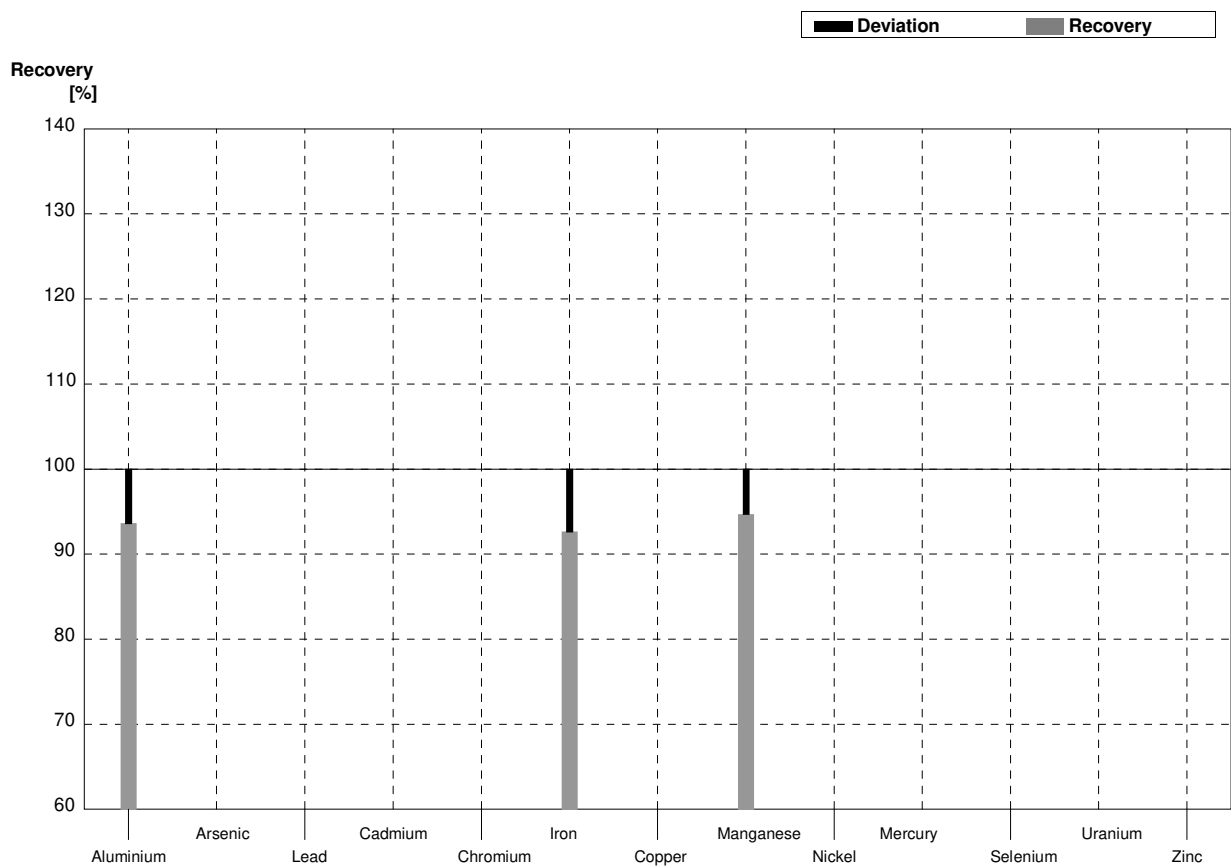
Sample M181B
Laboratory D

Parameter	Assigned value	$\pm U$ (k=2)	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	43,9	6,86	$\mu\text{g/l}$	104%
Arsenic	1,507	0,014	1,56	0,1	$\mu\text{g/l}$	104%
Lead	6,47	0,04	6,02	0,84	$\mu\text{g/l}$	93%
Cadmium	1,231	0,011	1,23	0,11	$\mu\text{g/l}$	100%
Chromium	1,906	0,015	2,57		$\mu\text{g/l}$	135%
Iron	56,0	0,2	52,9	3,55	$\mu\text{g/l}$	94%
Copper	2,08	0,03	2,47		$\mu\text{g/l}$	119%
Manganese	35,60	0,17	33,9	2,10	$\mu\text{g/l}$	95%
Nickel	5,64	0,04	5,91	0,79	$\mu\text{g/l}$	105%
Mercury	<0,1		0,0170		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,50	0,35	$\mu\text{g/l}$	105%
Uranium	2,99	0,02	2,84	0,18	$\mu\text{g/l}$	95%
Zinc	15,1	1,0	14,8	2,18	$\mu\text{g/l}$	98%



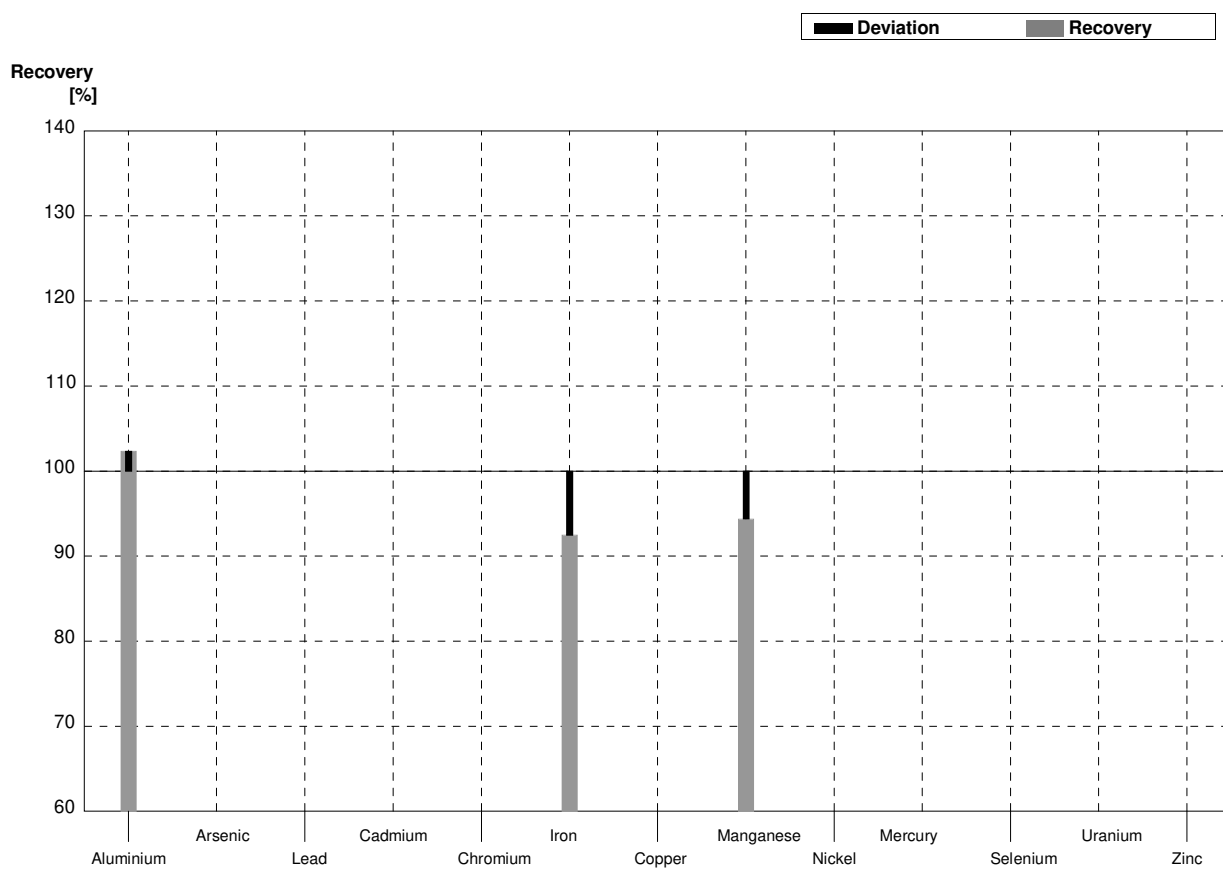
Sample M181A
Laboratory E

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	12,3	3,6	$\mu\text{g/l}$	94%
Arsenic	2,591	0,019			$\mu\text{g/l}$	
Lead	2,71	0,02			$\mu\text{g/l}$	
Cadmium	0,635	0,005			$\mu\text{g/l}$	
Chromium	2,99	0,02			$\mu\text{g/l}$	
Iron	22,67	0,16	21,0	3,6	$\mu\text{g/l}$	93%
Copper	4,00	0,03			$\mu\text{g/l}$	
Manganese	19,96	0,12	18,9	1,9	$\mu\text{g/l}$	95%
Nickel	2,21	0,03			$\mu\text{g/l}$	
Mercury	1,120	0,015			$\mu\text{g/l}$	
Selenium	1,92	0,02			$\mu\text{g/l}$	
Uranium	1,505	0,013			$\mu\text{g/l}$	
Zinc	20,7	1,0			$\mu\text{g/l}$	



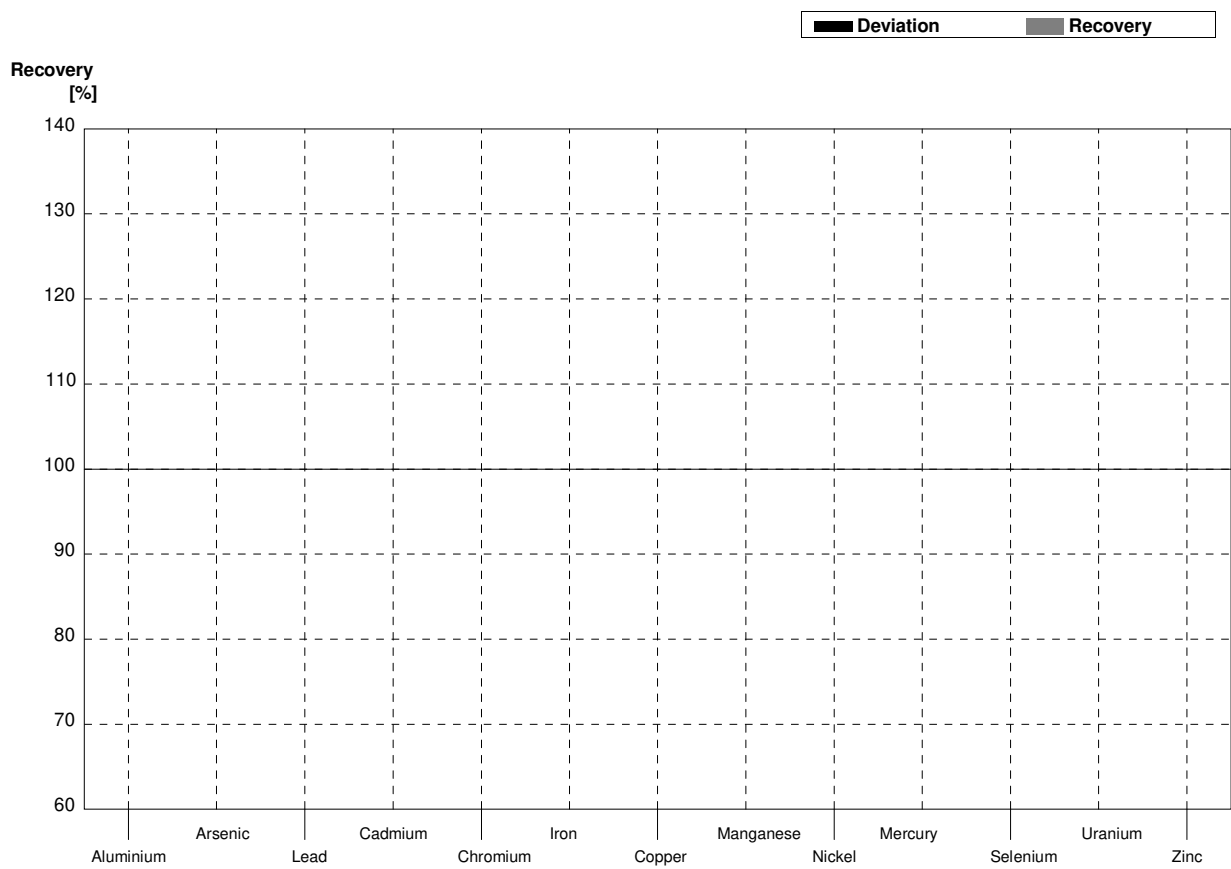
Sample M181B
Laboratory E

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	43,3	6,5	$\mu\text{g/l}$	102%
Arsenic	1,507	0,014			$\mu\text{g/l}$	
Lead	6,47	0,04			$\mu\text{g/l}$	
Cadmium	1,231	0,011			$\mu\text{g/l}$	
Chromium	1,906	0,015			$\mu\text{g/l}$	
Iron	56,0	0,2	51,8	8,8	$\mu\text{g/l}$	93%
Copper	2,08	0,03			$\mu\text{g/l}$	
Manganese	35,60	0,17	33,6	5,0	$\mu\text{g/l}$	94%
Nickel	5,64	0,04			$\mu\text{g/l}$	
Mercury	<0,1				$\mu\text{g/l}$	
Selenium	2,39	0,02			$\mu\text{g/l}$	
Uranium	2,99	0,02			$\mu\text{g/l}$	
Zinc	15,1	1,0			$\mu\text{g/l}$	



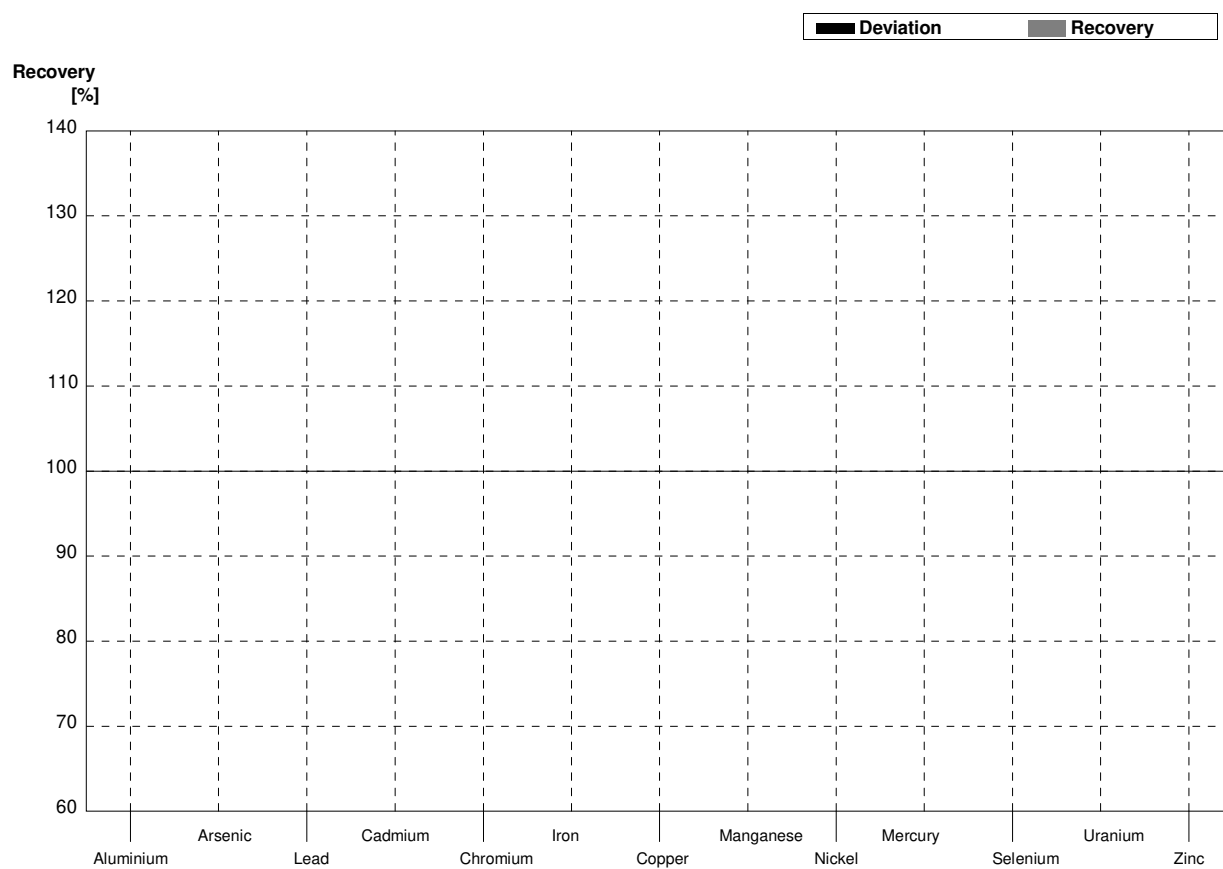
Sample M181A
Laboratory F

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17			$\mu\text{g/l}$	
Arsenic	2,591	0,019			$\mu\text{g/l}$	
Lead	2,71	0,02			$\mu\text{g/l}$	
Cadmium	0,635	0,005			$\mu\text{g/l}$	
Chromium	2,99	0,02			$\mu\text{g/l}$	
Iron	22,67	0,16			$\mu\text{g/l}$	
Copper	4,00	0,03			$\mu\text{g/l}$	
Manganese	19,96	0,12			$\mu\text{g/l}$	
Nickel	2,21	0,03			$\mu\text{g/l}$	
Mercury	1,120	0,015			$\mu\text{g/l}$	
Selenium	1,92	0,02			$\mu\text{g/l}$	
Uranium	1,505	0,013			$\mu\text{g/l}$	
Zinc	20,7	1,0			$\mu\text{g/l}$	



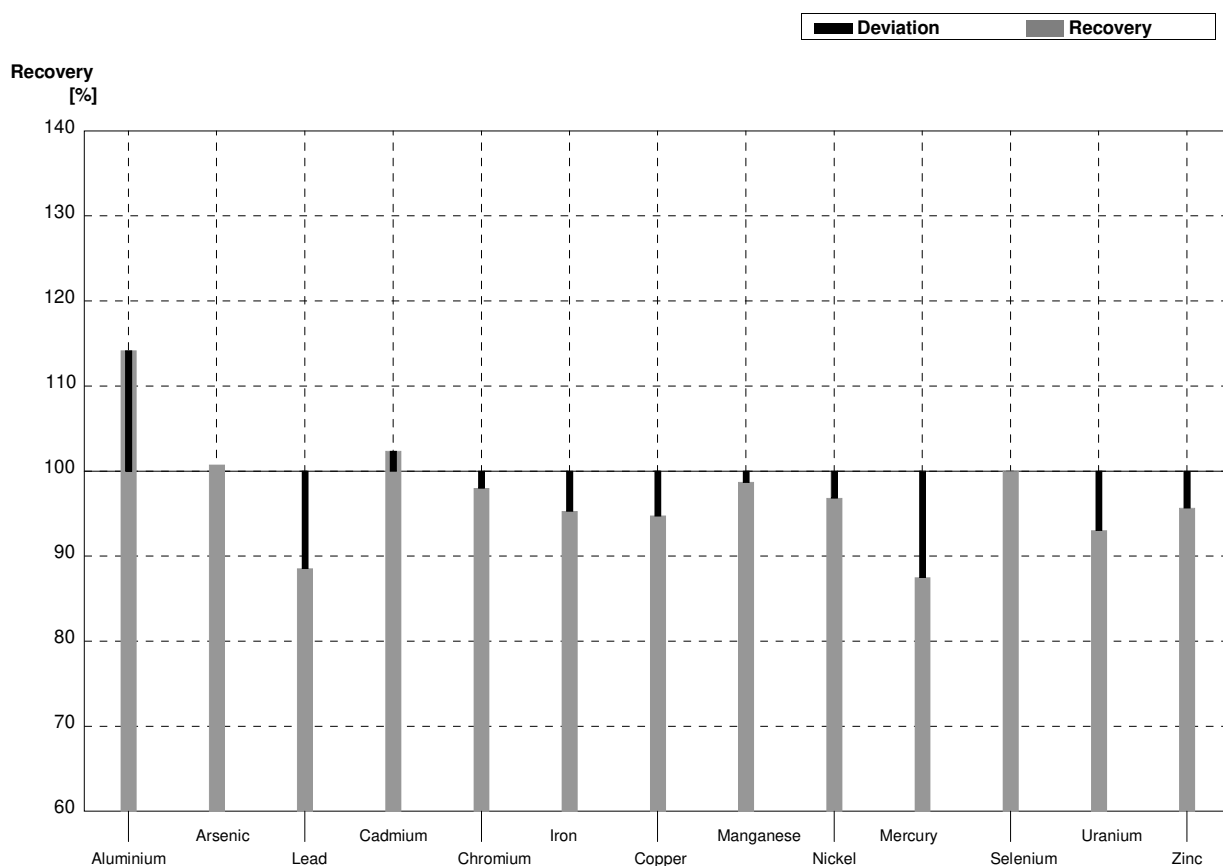
Sample M181B
Laboratory F

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3			$\mu\text{g/l}$	
Arsenic	1,507	0,014			$\mu\text{g/l}$	
Lead	6,47	0,04			$\mu\text{g/l}$	
Cadmium	1,231	0,011			$\mu\text{g/l}$	
Chromium	1,906	0,015			$\mu\text{g/l}$	
Iron	56,0	0,2			$\mu\text{g/l}$	
Copper	2,08	0,03			$\mu\text{g/l}$	
Manganese	35,60	0,17			$\mu\text{g/l}$	
Nickel	5,64	0,04			$\mu\text{g/l}$	
Mercury	<0,1				$\mu\text{g/l}$	
Selenium	2,39	0,02			$\mu\text{g/l}$	
Uranium	2,99	0,02			$\mu\text{g/l}$	
Zinc	15,1	1,0			$\mu\text{g/l}$	



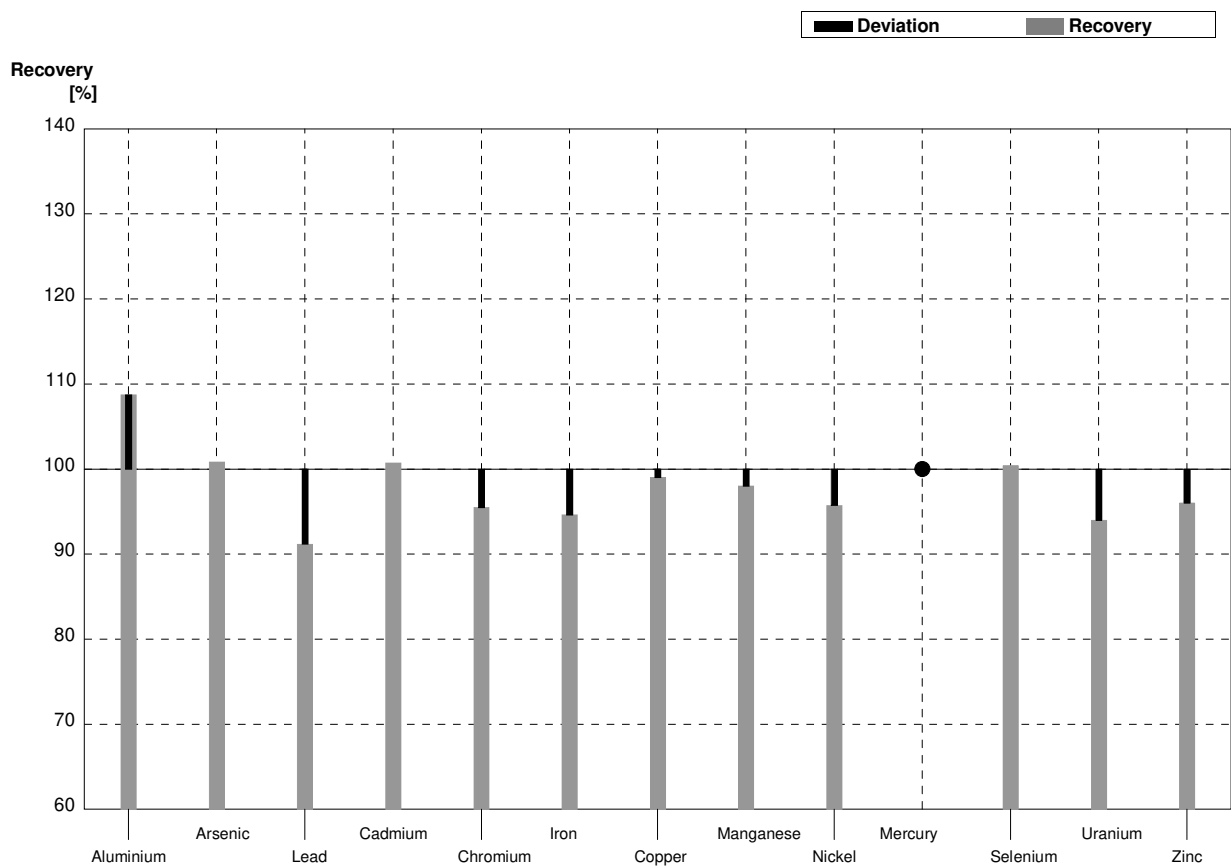
Sample M181A
Laboratory G

Parameter	Assigned value	$\pm U$ (k=2)	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	15,0	1,5	$\mu\text{g/l}$	114%
Arsenic	2,591	0,019	2,61	0,39	$\mu\text{g/l}$	101%
Lead	2,71	0,02	2,40	0,24	$\mu\text{g/l}$	89%
Cadmium	0,635	0,005	0,650	0,065	$\mu\text{g/l}$	102%
Chromium	2,99	0,02	2,93	0,29	$\mu\text{g/l}$	98%
Iron	22,67	0,16	21,6	2,2	$\mu\text{g/l}$	95%
Copper	4,00	0,03	3,79	0,38	$\mu\text{g/l}$	95%
Manganese	19,96	0,12	19,7	2,0	$\mu\text{g/l}$	99%
Nickel	2,21	0,03	2,14	0,21	$\mu\text{g/l}$	97%
Mercury	1,120	0,015	0,980	0,147	$\mu\text{g/l}$	88%
Selenium	1,92	0,02	1,92	0,29	$\mu\text{g/l}$	100%
Uranium	1,505	0,013	1,40	0,14	$\mu\text{g/l}$	93%
Zinc	20,7	1,0	19,8	1,98	$\mu\text{g/l}$	96%



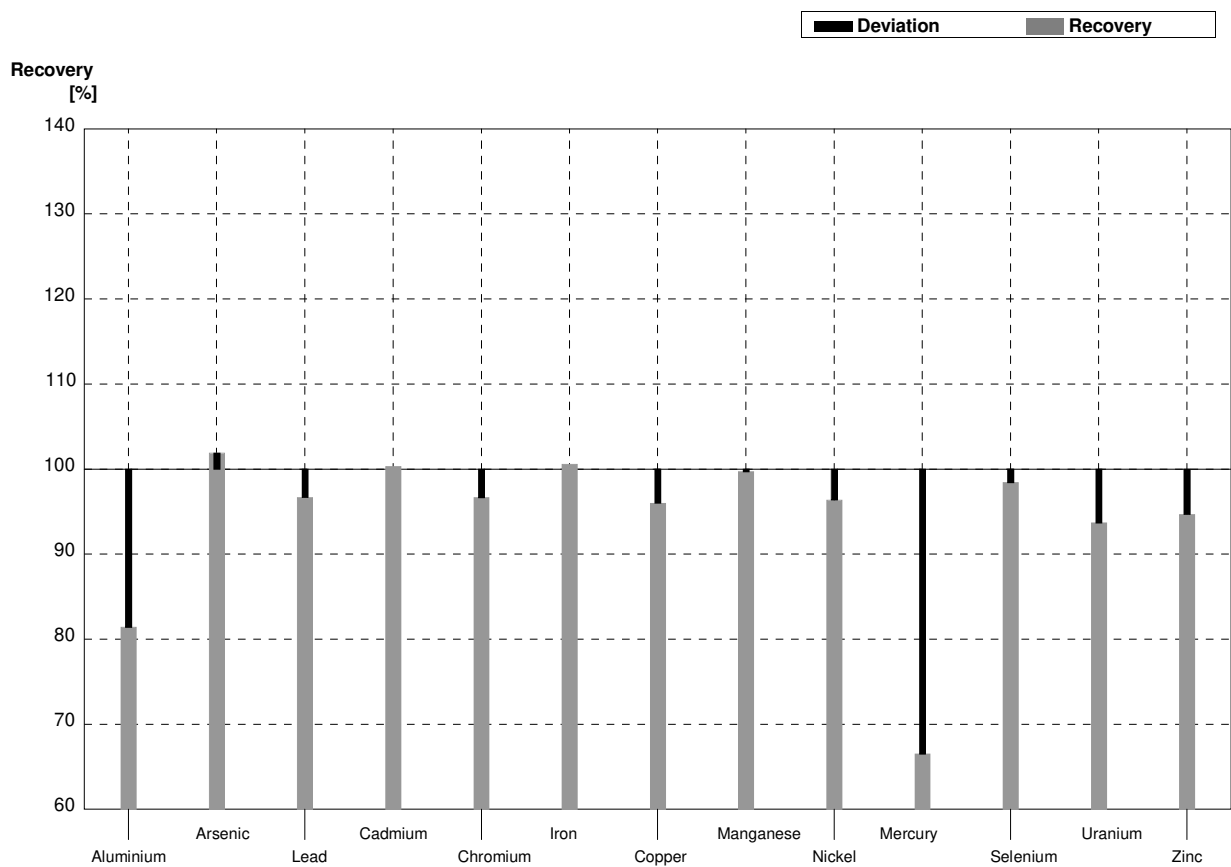
Sample M181B
Laboratory G

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	46,0	4,6	$\mu\text{g/l}$	109%
Arsenic	1,507	0,014	1,52	0,23	$\mu\text{g/l}$	101%
Lead	6,47	0,04	5,90	0,59	$\mu\text{g/l}$	91%
Cadmium	1,231	0,011	1,24	0,12	$\mu\text{g/l}$	101%
Chromium	1,906	0,015	1,82	0,18	$\mu\text{g/l}$	95%
Iron	56,0	0,2	53,0	5,3	$\mu\text{g/l}$	95%
Copper	2,08	0,03	2,06	0,21	$\mu\text{g/l}$	99%
Manganese	35,60	0,17	34,9	3,5	$\mu\text{g/l}$	98%
Nickel	5,64	0,04	5,40	0,54	$\mu\text{g/l}$	96%
Mercury	<0,1		<0,05		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,40	0,36	$\mu\text{g/l}$	100%
Uranium	2,99	0,02	2,81	0,28	$\mu\text{g/l}$	94%
Zinc	15,1	1,0	14,5	1,4	$\mu\text{g/l}$	96%



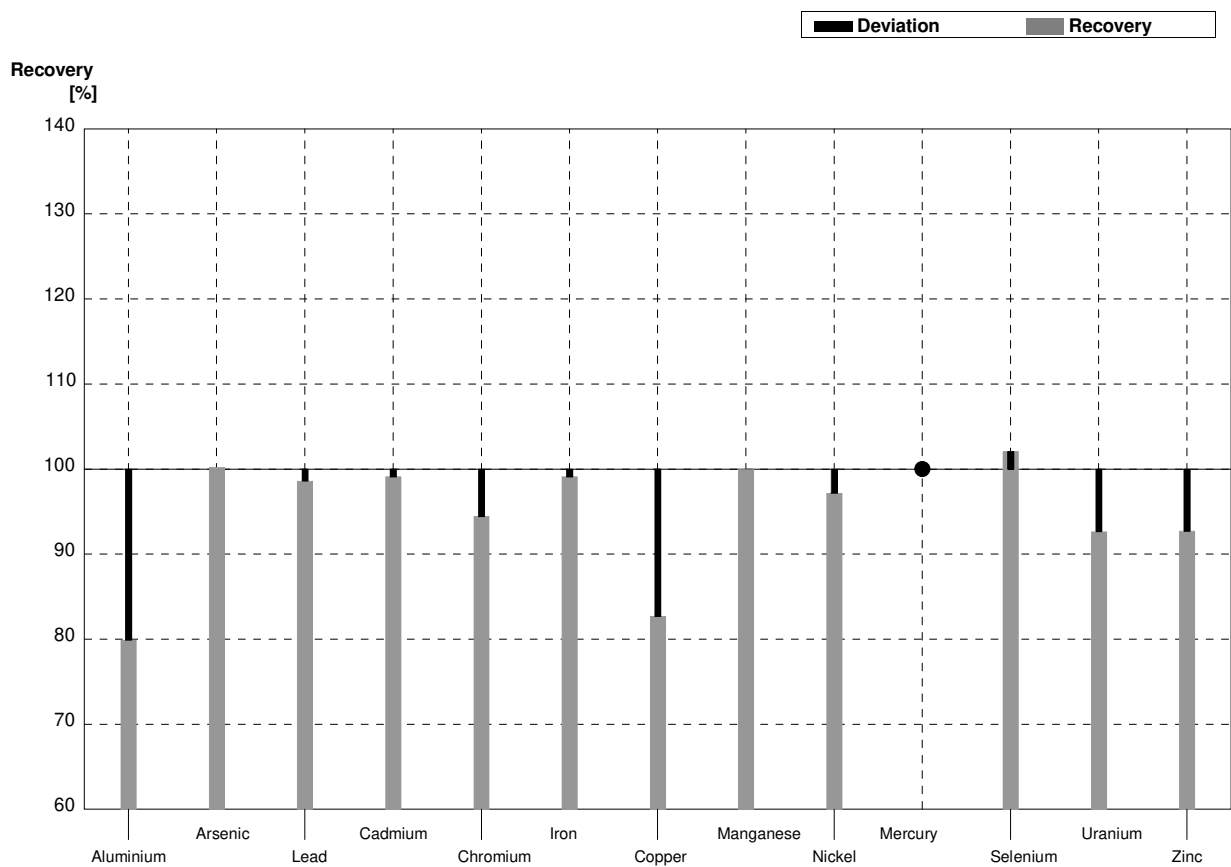
Sample M181A
Laboratory H

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	10,7	2,1	$\mu\text{g/l}$	81%
Arsenic	2,591	0,019	2,64	0,40	$\mu\text{g/l}$	102%
Lead	2,71	0,02	2,62	0,31	$\mu\text{g/l}$	97%
Cadmium	0,635	0,005	0,637	0,076	$\mu\text{g/l}$	100%
Chromium	2,99	0,02	2,89	0,43	$\mu\text{g/l}$	97%
Iron	22,67	0,16	22,8	3,4	$\mu\text{g/l}$	101%
Copper	4,00	0,03	3,84	0,46	$\mu\text{g/l}$	96%
Manganese	19,96	0,12	19,9	2,4	$\mu\text{g/l}$	100%
Nickel	2,21	0,03	2,13	0,23	$\mu\text{g/l}$	96%
Mercury	1,120	0,015	0,745	0,16	$\mu\text{g/l}$	67%
Selenium	1,92	0,02	1,89	0,28	$\mu\text{g/l}$	98%
Uranium	1,505	0,013	1,41	0,21	$\mu\text{g/l}$	94%
Zinc	20,7	1,0	19,6	2,9	$\mu\text{g/l}$	95%



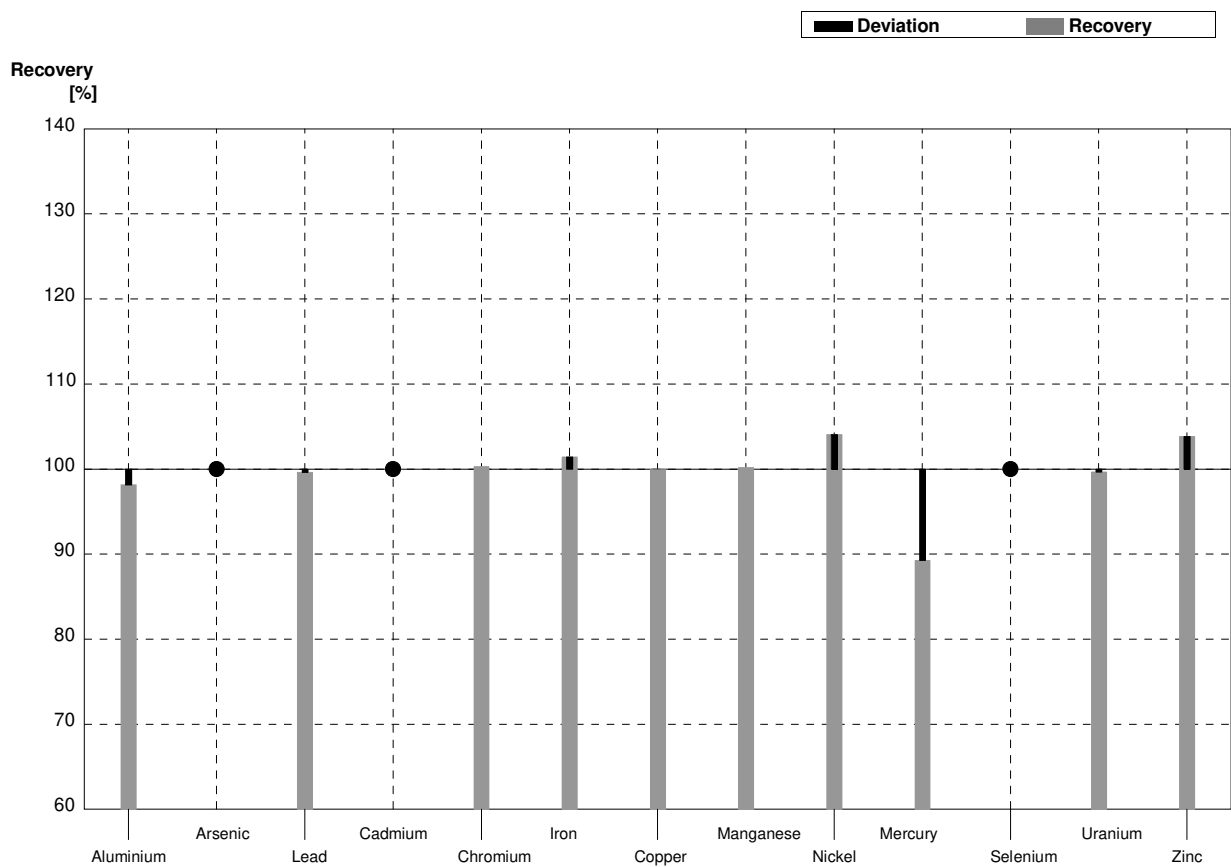
Sample M181B
Laboratory H

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	33,8	6,8	$\mu\text{g/l}$	80%
Arsenic	1,507	0,014	1,51	0,23	$\mu\text{g/l}$	100%
Lead	6,47	0,04	6,38	0,77	$\mu\text{g/l}$	99%
Cadmium	1,231	0,011	1,22	0,15	$\mu\text{g/l}$	99%
Chromium	1,906	0,015	1,80	0,27	$\mu\text{g/l}$	94%
Iron	56,0	0,2	55,5	8,3	$\mu\text{g/l}$	99%
Copper	2,08	0,03	1,72	0,21	$\mu\text{g/l}$	83%
Manganese	35,60	0,17	35,6	4,3	$\mu\text{g/l}$	100%
Nickel	5,64	0,04	5,48	0,60	$\mu\text{g/l}$	97%
Mercury	<0,1		<0,05		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,44	0,37	$\mu\text{g/l}$	102%
Uranium	2,99	0,02	2,77	0,42	$\mu\text{g/l}$	93%
Zinc	15,1	1,0	14,0	2,1	$\mu\text{g/l}$	93%



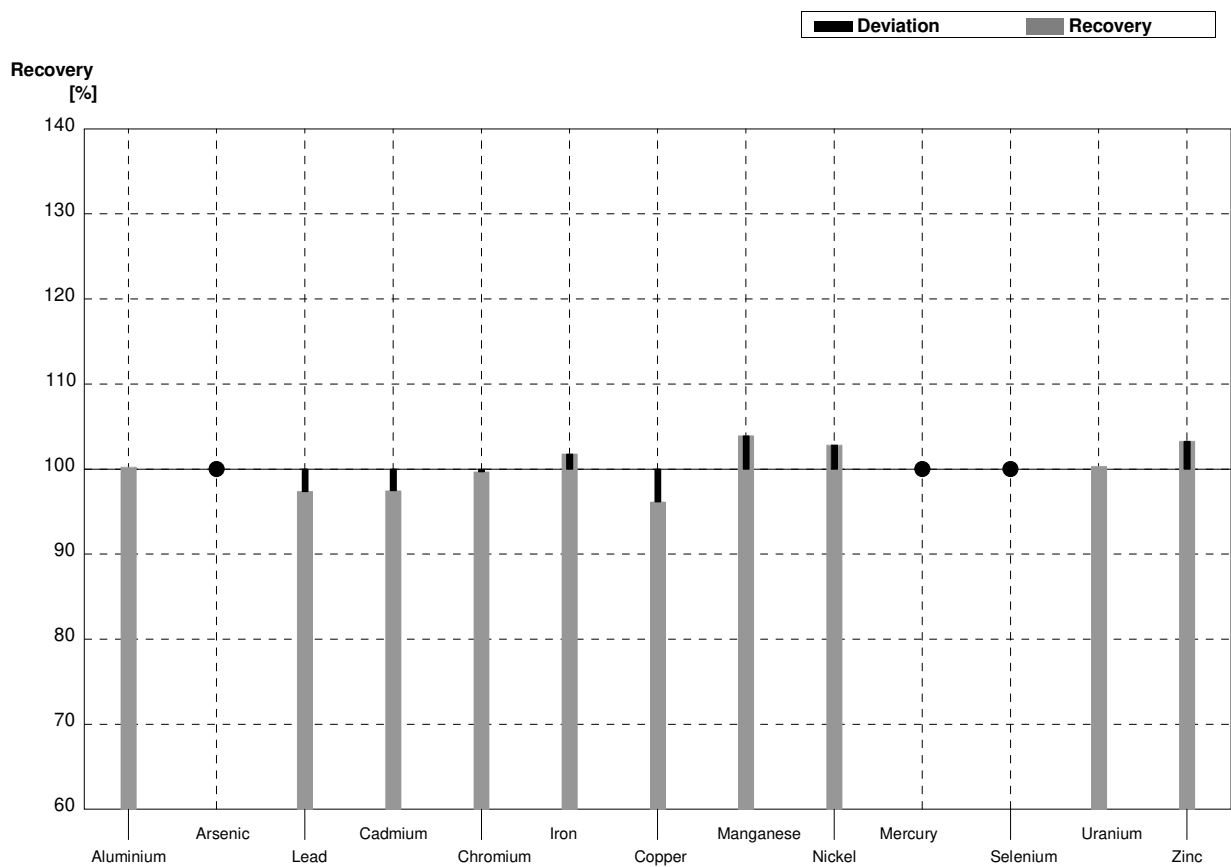
Sample M181A
Laboratory I

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	12,9	1,50	$\mu\text{g/l}$	98%
Arsenic	2,591	0,019	<5		$\mu\text{g/l}$	•
Lead	2,71	0,02	2,70	0,20	$\mu\text{g/l}$	100%
Cadmium	0,635	0,005	<1		$\mu\text{g/l}$	•
Chromium	2,99	0,02	3,00	0,40	$\mu\text{g/l}$	100%
Iron	22,67	0,16	23,0	2,7	$\mu\text{g/l}$	101%
Copper	4,00	0,03	4,00	0,40	$\mu\text{g/l}$	100%
Manganese	19,96	0,12	20,0	1,3	$\mu\text{g/l}$	100%
Nickel	2,21	0,03	2,30	0,20	$\mu\text{g/l}$	104%
Mercury	1,120	0,015	1,00	0,20	$\mu\text{g/l}$	89%
Selenium	1,92	0,02	<3		$\mu\text{g/l}$	•
Uranium	1,505	0,013	1,50	0,2	$\mu\text{g/l}$	100%
Zinc	20,7	1,0	21,5	2,5	$\mu\text{g/l}$	104%



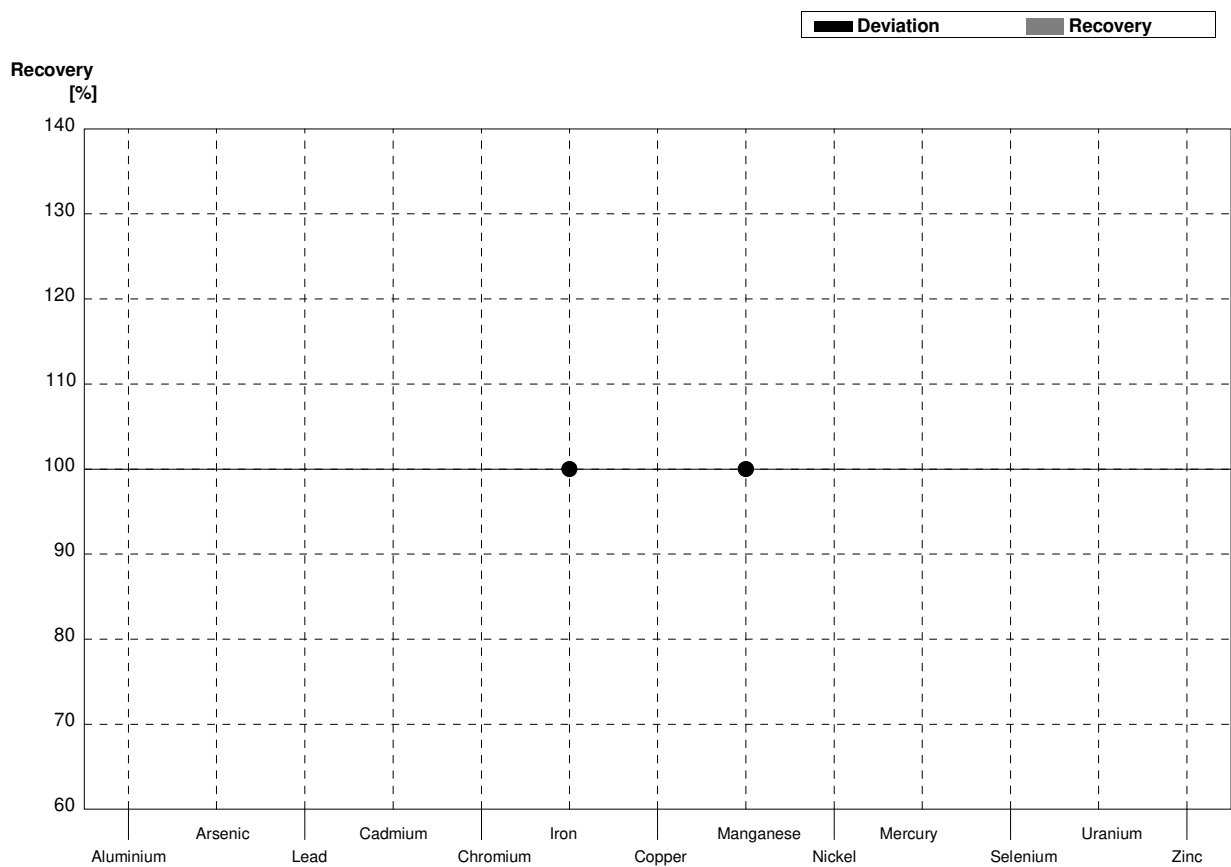
Sample M181B
Laboratory I

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	42,4	4,80	$\mu\text{g/l}$	100%
Arsenic	1,507	0,014	<5		$\mu\text{g/l}$	•
Lead	6,47	0,04	6,3	0,40	$\mu\text{g/l}$	97%
Cadmium	1,231	0,011	1,20	0,10	$\mu\text{g/l}$	97%
Chromium	1,906	0,015	1,90	0,20	$\mu\text{g/l}$	100%
Iron	56,0	0,2	57,0	6,8	$\mu\text{g/l}$	102%
Copper	2,08	0,03	2,00	0,20	$\mu\text{g/l}$	96%
Manganese	35,60	0,17	37,0	2,4	$\mu\text{g/l}$	104%
Nickel	5,64	0,04	5,8	0,50	$\mu\text{g/l}$	103%
Mercury	<0,1		<0,2		$\mu\text{g/l}$	•
Selenium	2,39	0,02	<3		$\mu\text{g/l}$	•
Uranium	2,99	0,02	3,00	0,3	$\mu\text{g/l}$	100%
Zinc	15,1	1,0	15,6	2,2	$\mu\text{g/l}$	103%



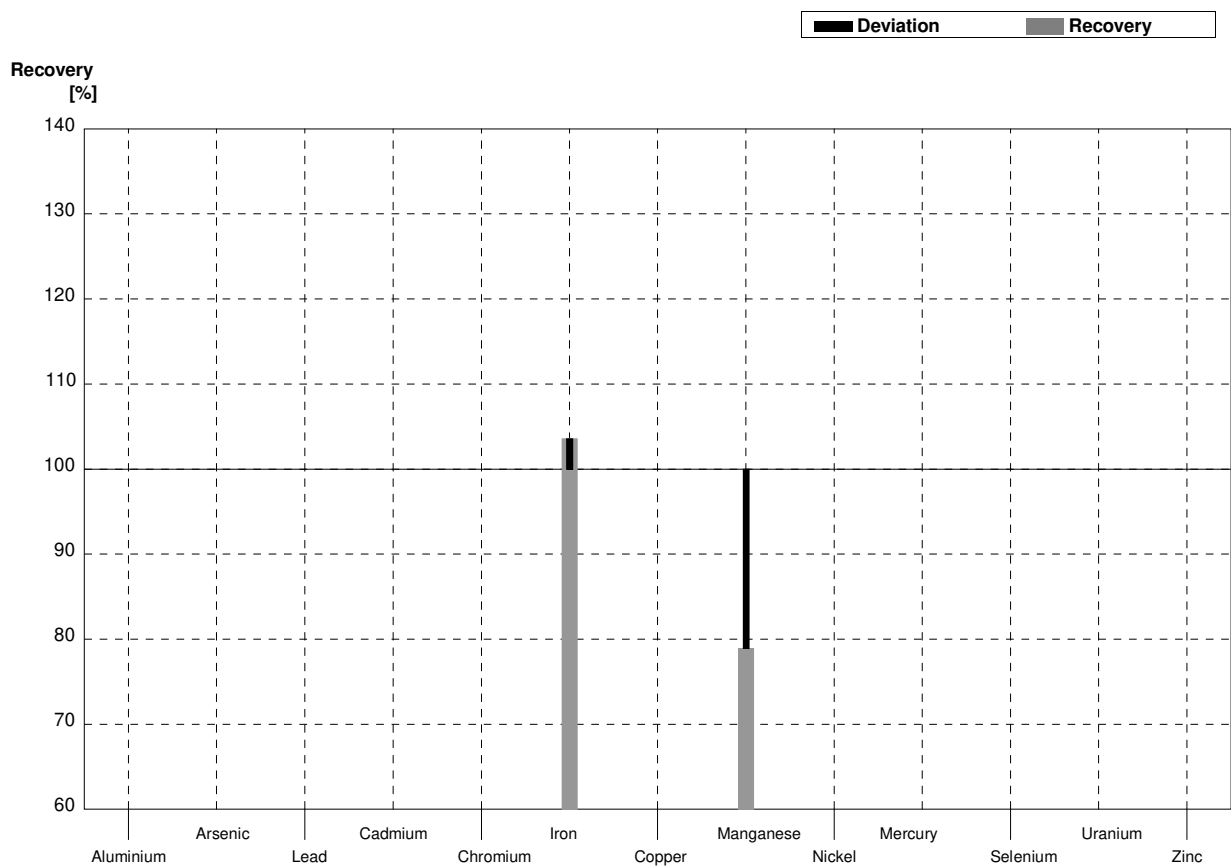
Sample M181A
Laboratory J

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17			$\mu\text{g/l}$	
Arsenic	2,591	0,019			$\mu\text{g/l}$	
Lead	2,71	0,02			$\mu\text{g/l}$	
Cadmium	0,635	0,005			$\mu\text{g/l}$	
Chromium	2,99	0,02			$\mu\text{g/l}$	
Iron	22,67	0,16	<25		$\mu\text{g/l}$	•
Copper	4,00	0,03			$\mu\text{g/l}$	
Manganese	19,96	0,12	<25		$\mu\text{g/l}$	•
Nickel	2,21	0,03			$\mu\text{g/l}$	
Mercury	1,120	0,015			$\mu\text{g/l}$	
Selenium	1,92	0,02			$\mu\text{g/l}$	
Uranium	1,505	0,013			$\mu\text{g/l}$	
Zinc	20,7	1,0			$\mu\text{g/l}$	



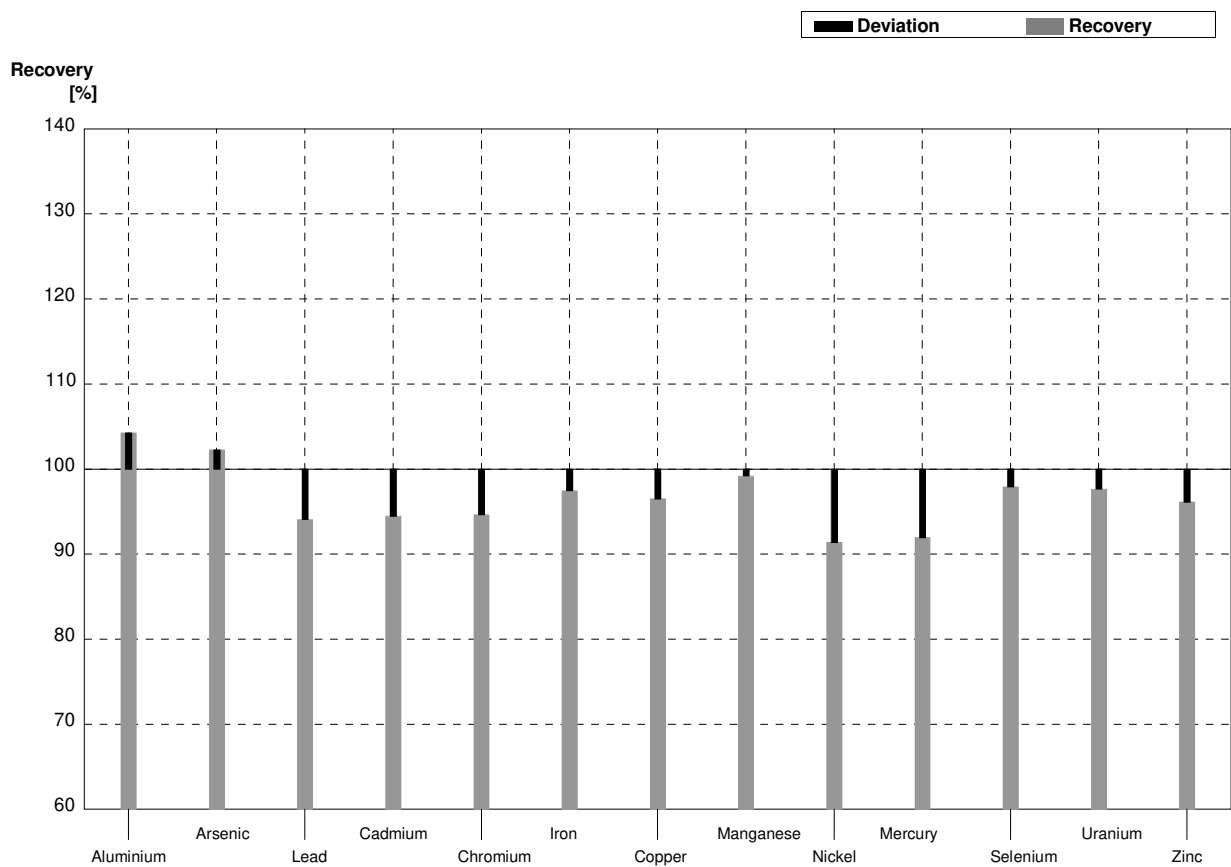
Sample M181B
Laboratory J

Parameter	Assigned value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	42,3	0,3			µg/l	
Arsenic	1,507	0,014			µg/l	
Lead	6,47	0,04			µg/l	
Cadmium	1,231	0,011			µg/l	
Chromium	1,906	0,015			µg/l	
Iron	56,0	0,2	58	5	µg/l	104%
Copper	2,08	0,03			µg/l	
Manganese	35,60	0,17	28,1	2,4	µg/l	79%
Nickel	5,64	0,04			µg/l	
Mercury	<0,1				µg/l	
Selenium	2,39	0,02			µg/l	
Uranium	2,99	0,02			µg/l	
Zinc	15,1	1,0			µg/l	



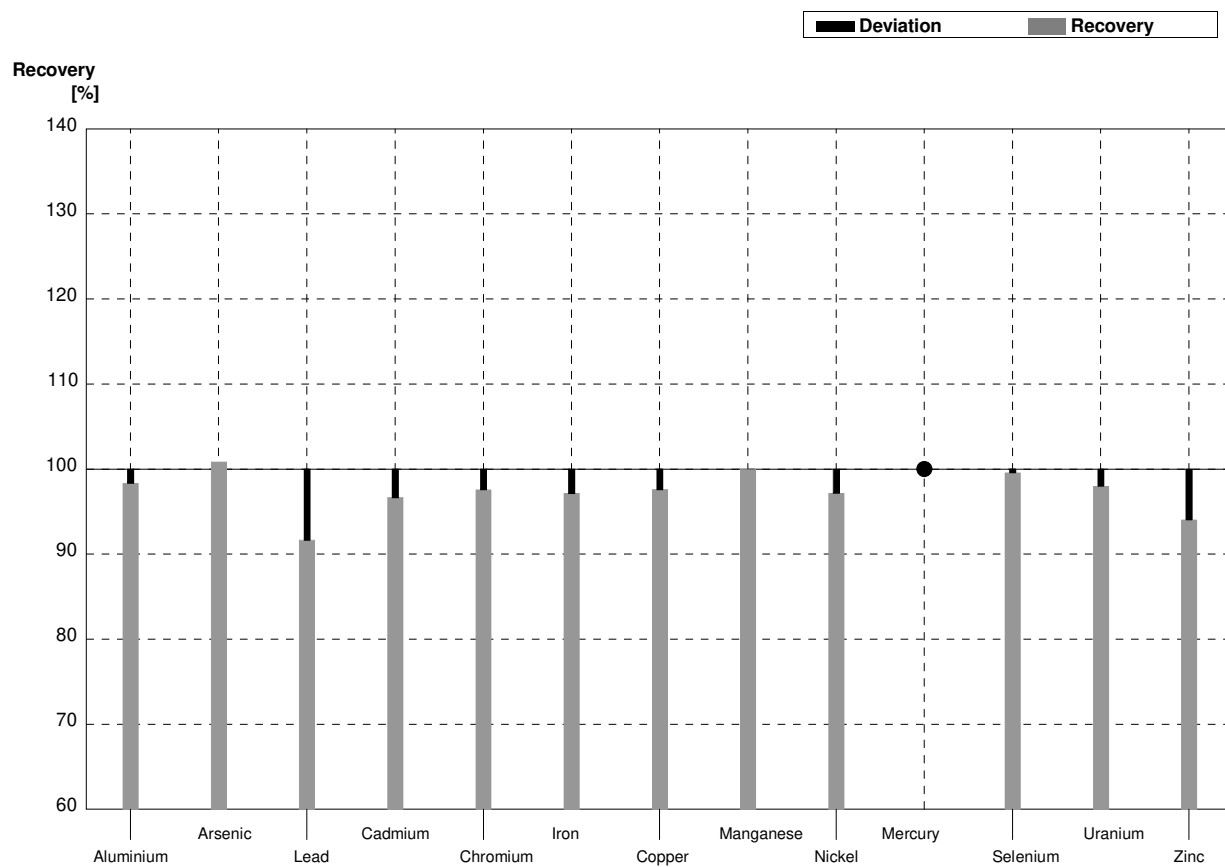
Sample M181A
Laboratory K

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	13,7	0,100	$\mu\text{g/l}$	104%
Arsenic	2,591	0,019	2,65	0,050	$\mu\text{g/l}$	102%
Lead	2,71	0,02	2,55	0,026	$\mu\text{g/l}$	94%
Cadmium	0,635	0,005	0,600	0,017	$\mu\text{g/l}$	94%
Chromium	2,99	0,02	2,83	0,055	$\mu\text{g/l}$	95%
Iron	22,67	0,16	22,1	0,058	$\mu\text{g/l}$	97%
Copper	4,00	0,03	3,86	0,015	$\mu\text{g/l}$	97%
Manganese	19,96	0,12	19,8	0,153	$\mu\text{g/l}$	99%
Nickel	2,21	0,03	2,02	0,020	$\mu\text{g/l}$	91%
Mercury	1,120	0,015	1,03	0,015	$\mu\text{g/l}$	92%
Selenium	1,92	0,02	1,88	0,035	$\mu\text{g/l}$	98%
Uranium	1,505	0,013	1,47	0,025	$\mu\text{g/l}$	98%
Zinc	20,7	1,0	19,9	0,058	$\mu\text{g/l}$	96%



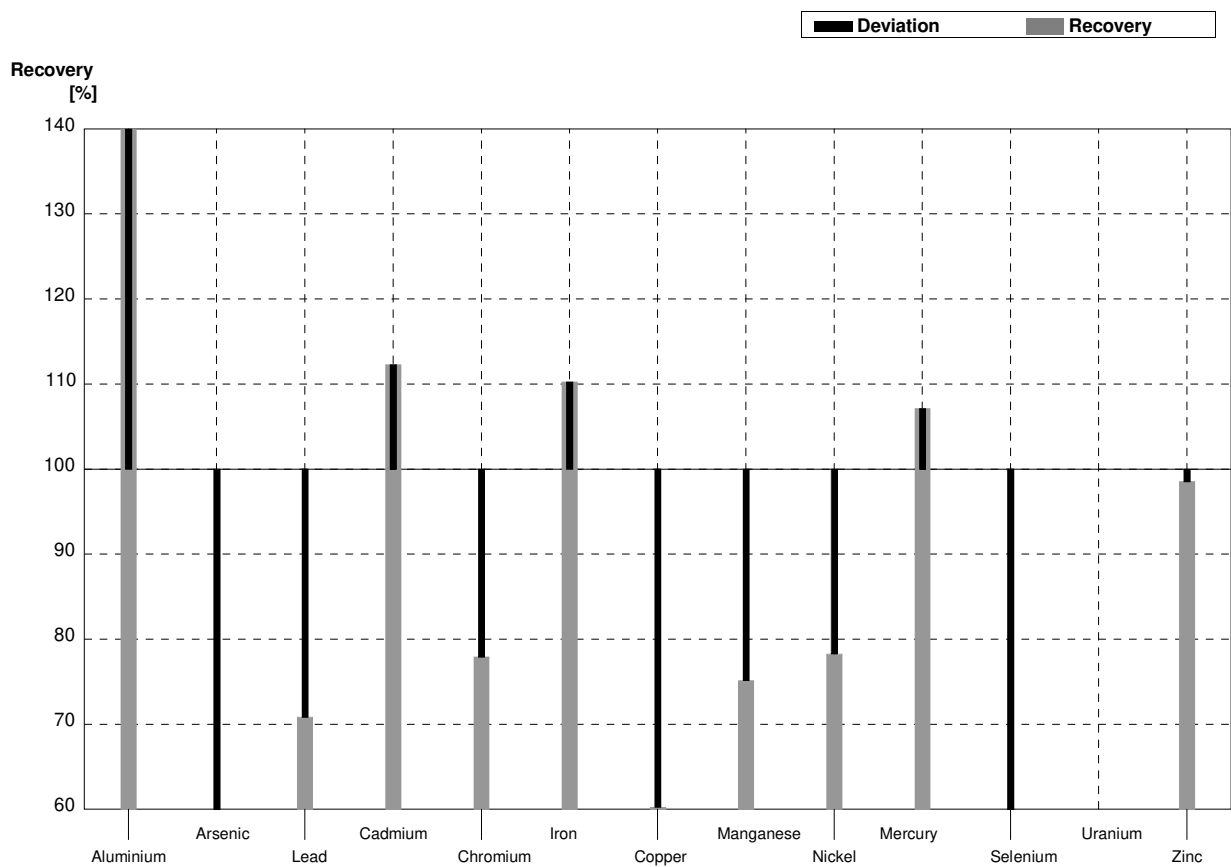
Sample M181B
Laboratory K

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	41,6	0,900	$\mu\text{g/l}$	98%
Arsenic	1,507	0,014	1,52	0,021	$\mu\text{g/l}$	101%
Lead	6,47	0,04	5,93	0,093	$\mu\text{g/l}$	92%
Cadmium	1,231	0,011	1,19	0,015	$\mu\text{g/l}$	97%
Chromium	1,906	0,015	1,86	0,010	$\mu\text{g/l}$	98%
Iron	56,0	0,2	54,4	0,208	$\mu\text{g/l}$	97%
Copper	2,08	0,03	2,03	0,025	$\mu\text{g/l}$	98%
Manganese	35,60	0,17	35,6	0,153	$\mu\text{g/l}$	100%
Nickel	5,64	0,04	5,48	0,035	$\mu\text{g/l}$	97%
Mercury	<0,1		<0,011		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,38	0,085	$\mu\text{g/l}$	100%
Uranium	2,99	0,02	2,93	0,025	$\mu\text{g/l}$	98%
Zinc	15,1	1,0	14,2	0,153	$\mu\text{g/l}$	94%



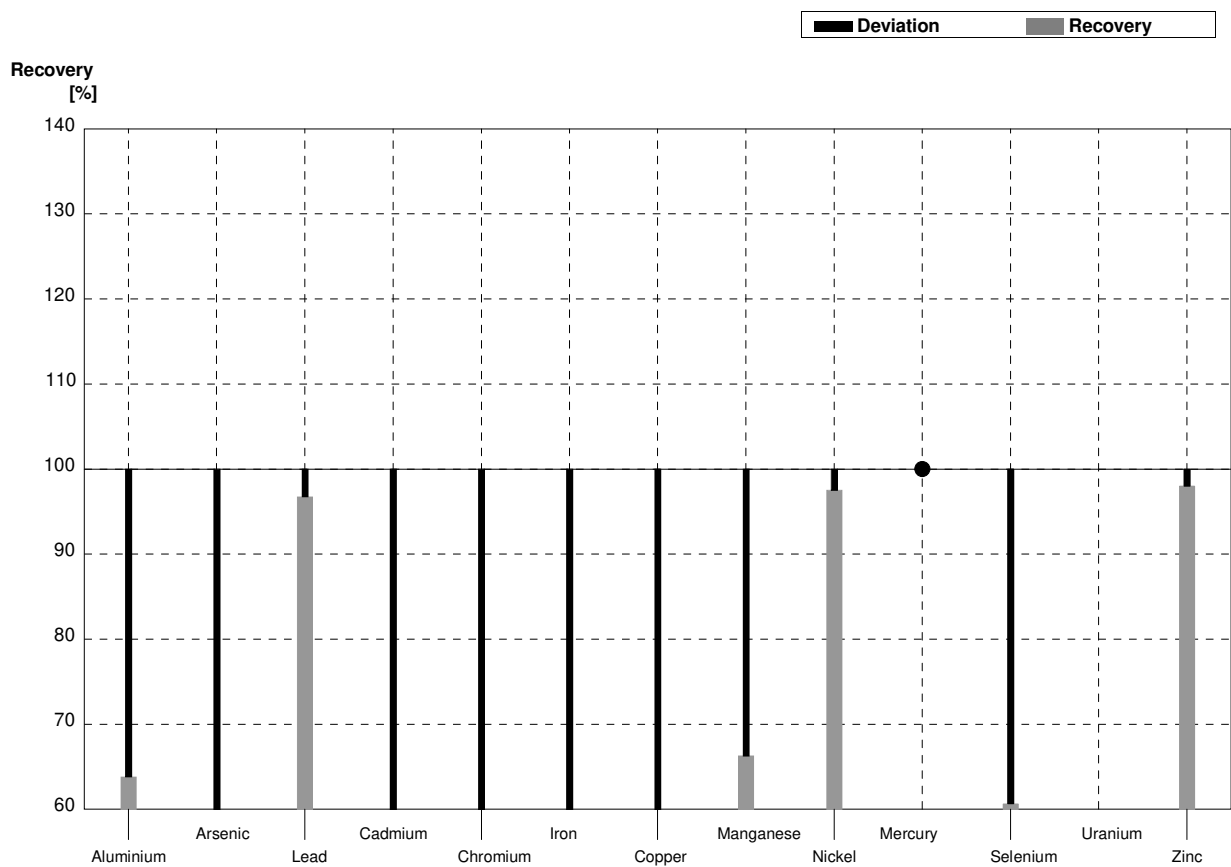
Sample M181A
Laboratory L

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	62,0	8,1	$\mu\text{g/l}$	472%
Arsenic	2,591	0,019	1,49	0,52	$\mu\text{g/l}$	58%
Lead	2,71	0,02	1,92	0,31	$\mu\text{g/l}$	71%
Cadmium	0,635	0,005	0,713	0,164	$\mu\text{g/l}$	112%
Chromium	2,99	0,02	2,33	0,839	$\mu\text{g/l}$	78%
Iron	22,67	0,16	25,0	3,25	$\mu\text{g/l}$	110%
Copper	4,00	0,03	2,41	1,08	$\mu\text{g/l}$	60%
Manganese	19,96	0,12	15,0	3,15	$\mu\text{g/l}$	75%
Nickel	2,21	0,03	1,73	0,450	$\mu\text{g/l}$	78%
Mercury	1,120	0,015	1,20	0,444	$\mu\text{g/l}$	107%
Selenium	1,92	0,02	0,794	0,357	$\mu\text{g/l}$	41%
Uranium	1,505	0,013			$\mu\text{g/l}$	
Zinc	20,7	1,0	20,4	3,67	$\mu\text{g/l}$	99%



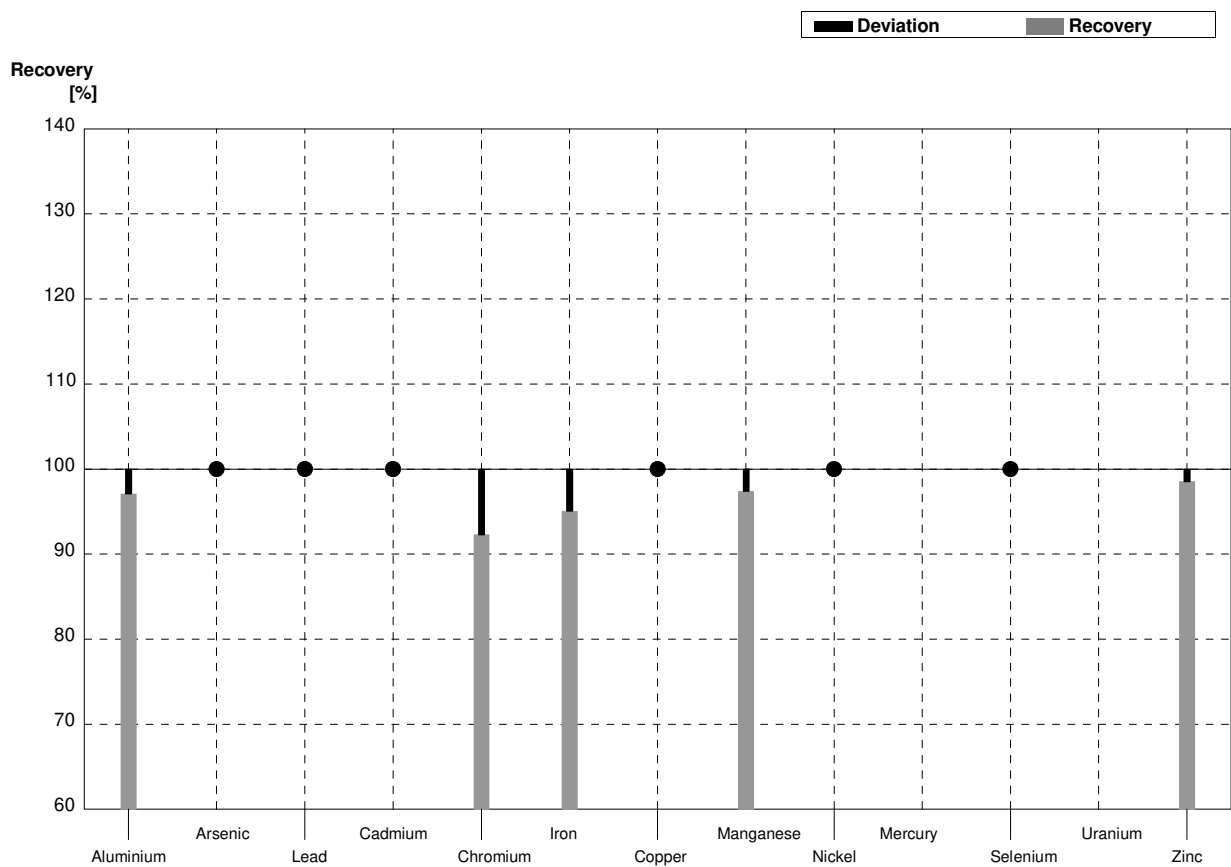
Sample M181B
Laboratory L

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	27,0	3,5	$\mu\text{g/l}$	64%
Arsenic	1,507	0,014	0,138	0,048	$\mu\text{g/l}$	9%
Lead	6,47	0,04	6,26	1,00	$\mu\text{g/l}$	97%
Cadmium	1,231	0,011	0,155	0,036	$\mu\text{g/l}$	13%
Chromium	1,906	0,015	1,12	0,405	$\mu\text{g/l}$	59%
Iron	56,0	0,2	23,5	3,06	$\mu\text{g/l}$	42%
Copper	2,08	0,03	0,563	0,253	$\mu\text{g/l}$	27%
Manganese	35,60	0,17	23,6	4,96	$\mu\text{g/l}$	66%
Nickel	5,64	0,04	5,50	1,43	$\mu\text{g/l}$	98%
Mercury	<0,1		0,107	0,040	$\mu\text{g/l}$	•
Selenium	2,39	0,02	1,45	0,653	$\mu\text{g/l}$	61%
Uranium	2,99	0,02			$\mu\text{g/l}$	
Zinc	15,1	1,0	14,8	2,66	$\mu\text{g/l}$	98%



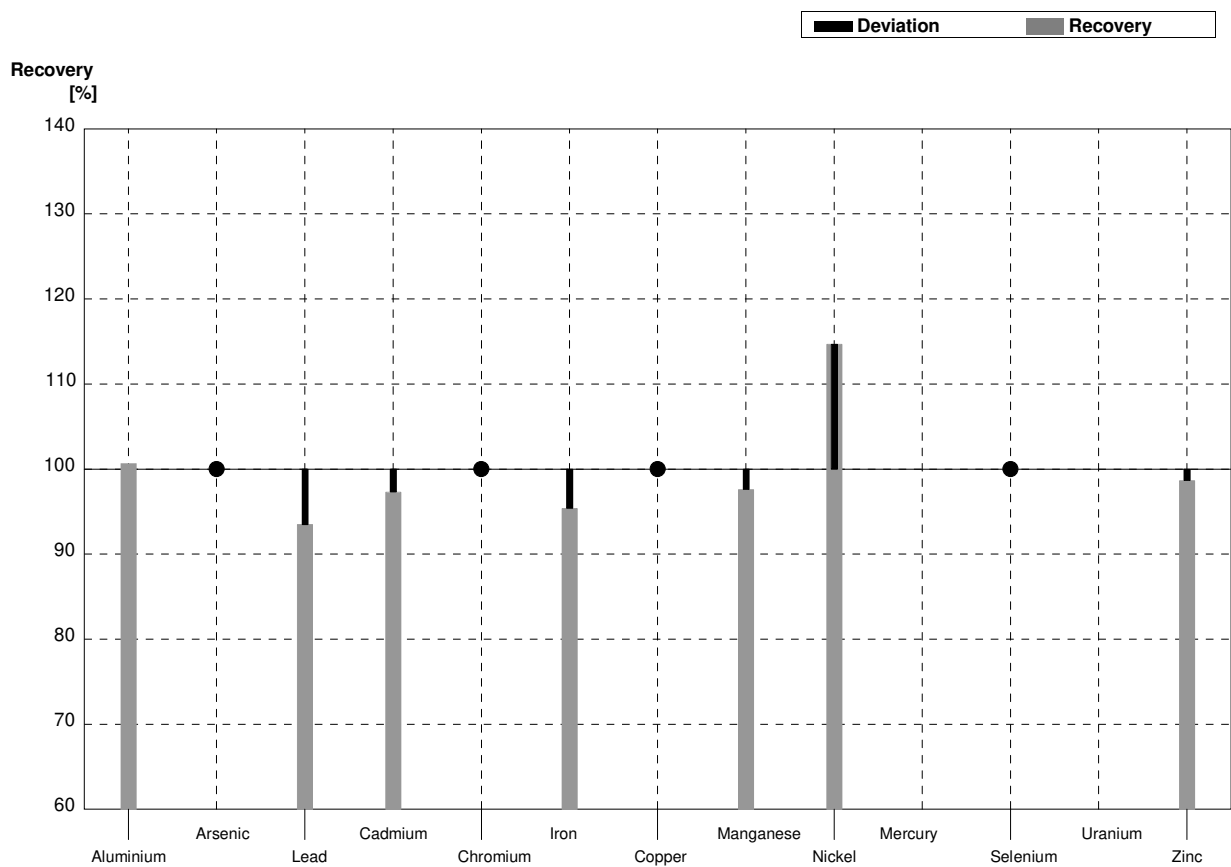
Sample M181A
Laboratory M

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	12,76	1,97	$\mu\text{g/l}$	97%
Arsenic	2,591	0,019	<5		$\mu\text{g/l}$	•
Lead	2,71	0,02	<3		$\mu\text{g/l}$	•
Cadmium	0,635	0,005	<1		$\mu\text{g/l}$	•
Chromium	2,99	0,02	2,76	0,23	$\mu\text{g/l}$	92%
Iron	22,67	0,16	21,55	1,81	$\mu\text{g/l}$	95%
Copper	4,00	0,03	<5		$\mu\text{g/l}$	•
Manganese	19,96	0,12	19,44	1,83	$\mu\text{g/l}$	97%
Nickel	2,21	0,03	<5		$\mu\text{g/l}$	•
Mercury	1,120	0,015			$\mu\text{g/l}$	
Selenium	1,92	0,02	<5		$\mu\text{g/l}$	•
Uranium	1,505	0,013			$\mu\text{g/l}$	
Zinc	20,7	1,0	20,4	2,86	$\mu\text{g/l}$	99%



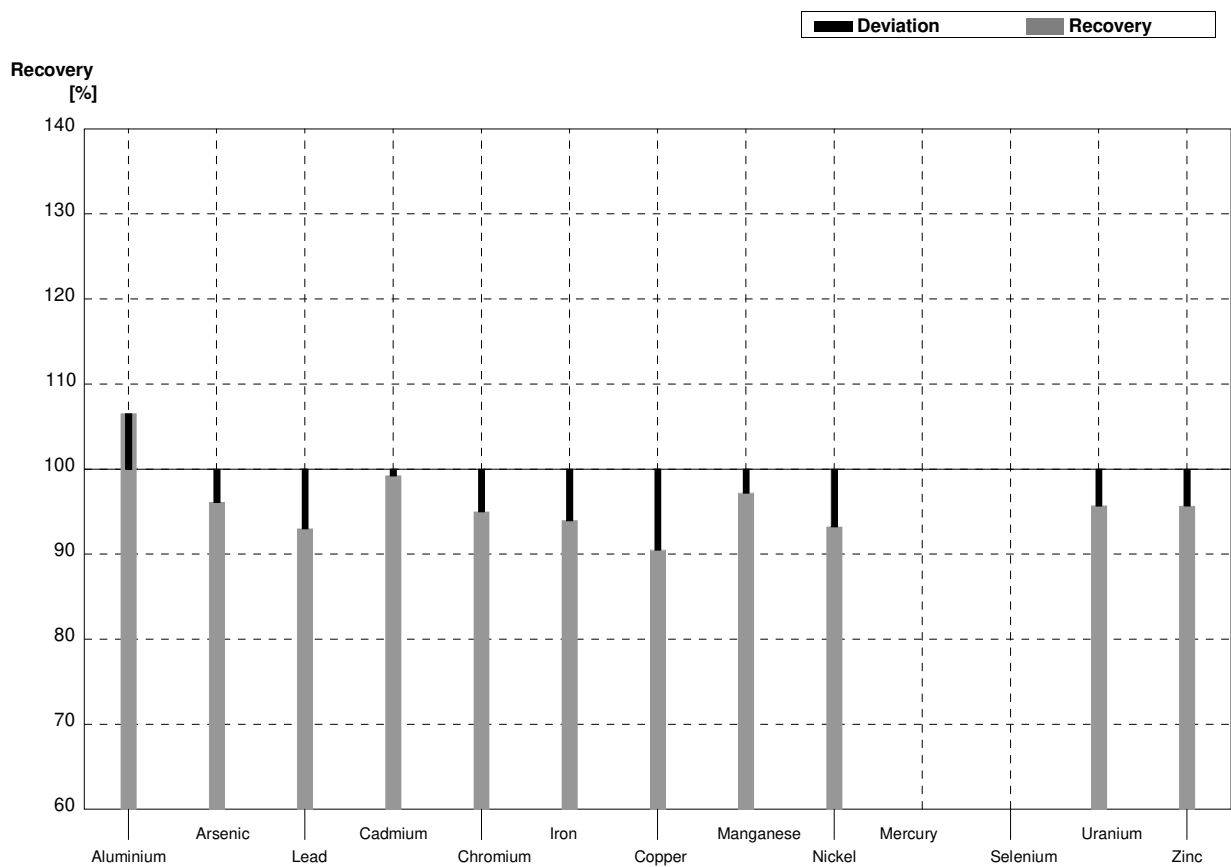
Sample M181B
Laboratory M

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	42,58	6,56	$\mu\text{g/l}$	101%
Arsenic	1,507	0,014	<5		$\mu\text{g/l}$	•
Lead	6,47	0,04	6,05	1,03	$\mu\text{g/l}$	94%
Cadmium	1,231	0,011	1,198	0,085	$\mu\text{g/l}$	97%
Chromium	1,906	0,015	<2		$\mu\text{g/l}$	•
Iron	56,0	0,2	53,43	4,49	$\mu\text{g/l}$	95%
Copper	2,08	0,03	<5		$\mu\text{g/l}$	•
Manganese	35,60	0,17	34,75	3,27	$\mu\text{g/l}$	98%
Nickel	5,64	0,04	6,47	0,80	$\mu\text{g/l}$	115%
Mercury	<0,1				$\mu\text{g/l}$	
Selenium	2,39	0,02	<5		$\mu\text{g/l}$	•
Uranium	2,99	0,02			$\mu\text{g/l}$	
Zinc	15,1	1,0	14,9	2,08	$\mu\text{g/l}$	99%



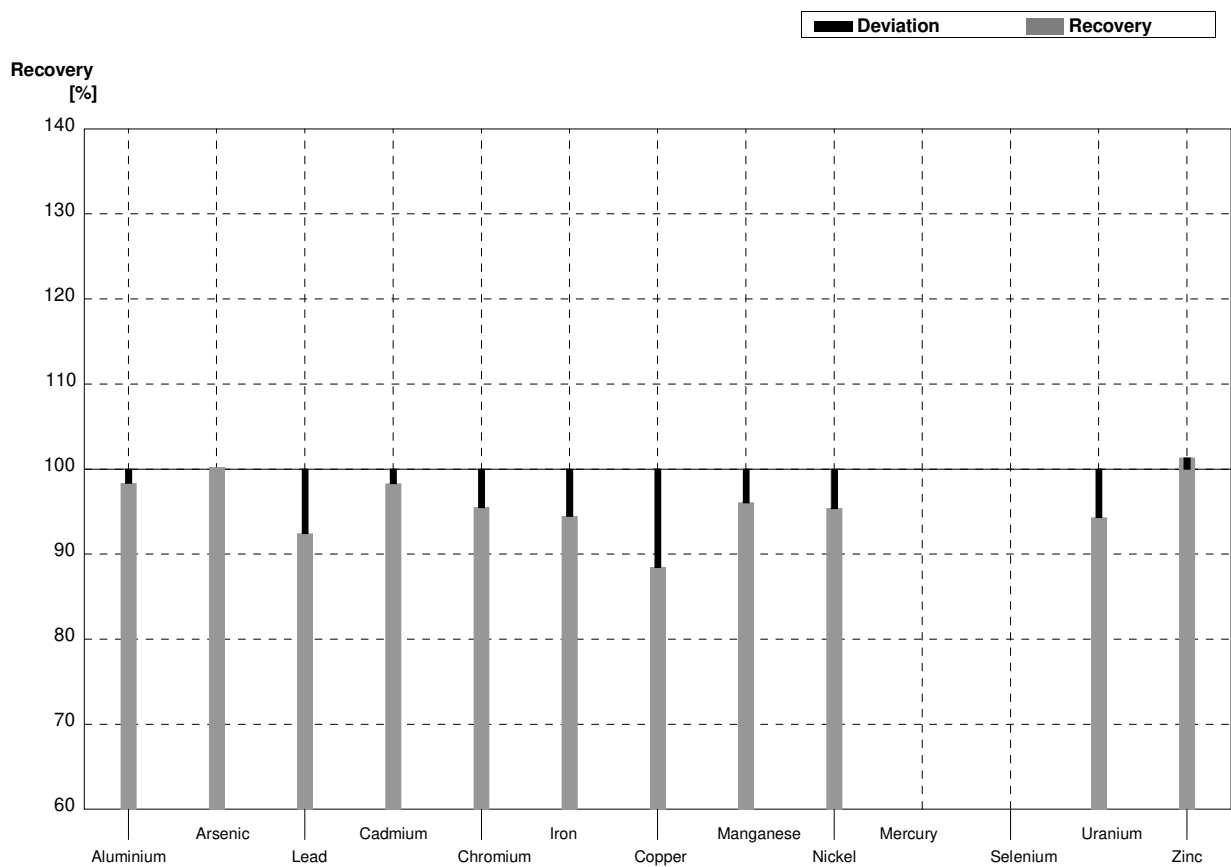
Sample M181A
Laboratory N

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	14,0	2,8	$\mu\text{g/l}$	107%
Arsenic	2,591	0,019	2,49	0,5	$\mu\text{g/l}$	96%
Lead	2,71	0,02	2,52	0,5	$\mu\text{g/l}$	93%
Cadmium	0,635	0,005	0,63	0,1	$\mu\text{g/l}$	99%
Chromium	2,99	0,02	2,84	0,6	$\mu\text{g/l}$	95%
Iron	22,67	0,16	21,3	4,3	$\mu\text{g/l}$	94%
Copper	4,00	0,03	3,62	0,7	$\mu\text{g/l}$	91%
Manganese	19,96	0,12	19,4	3,9	$\mu\text{g/l}$	97%
Nickel	2,21	0,03	2,06	0,4	$\mu\text{g/l}$	93%
Mercury	1,120	0,015			$\mu\text{g/l}$	
Selenium	1,92	0,02			$\mu\text{g/l}$	
Uranium	1,505	0,013	1,44	0,3	$\mu\text{g/l}$	96%
Zinc	20,7	1,0	19,8	4,0	$\mu\text{g/l}$	96%



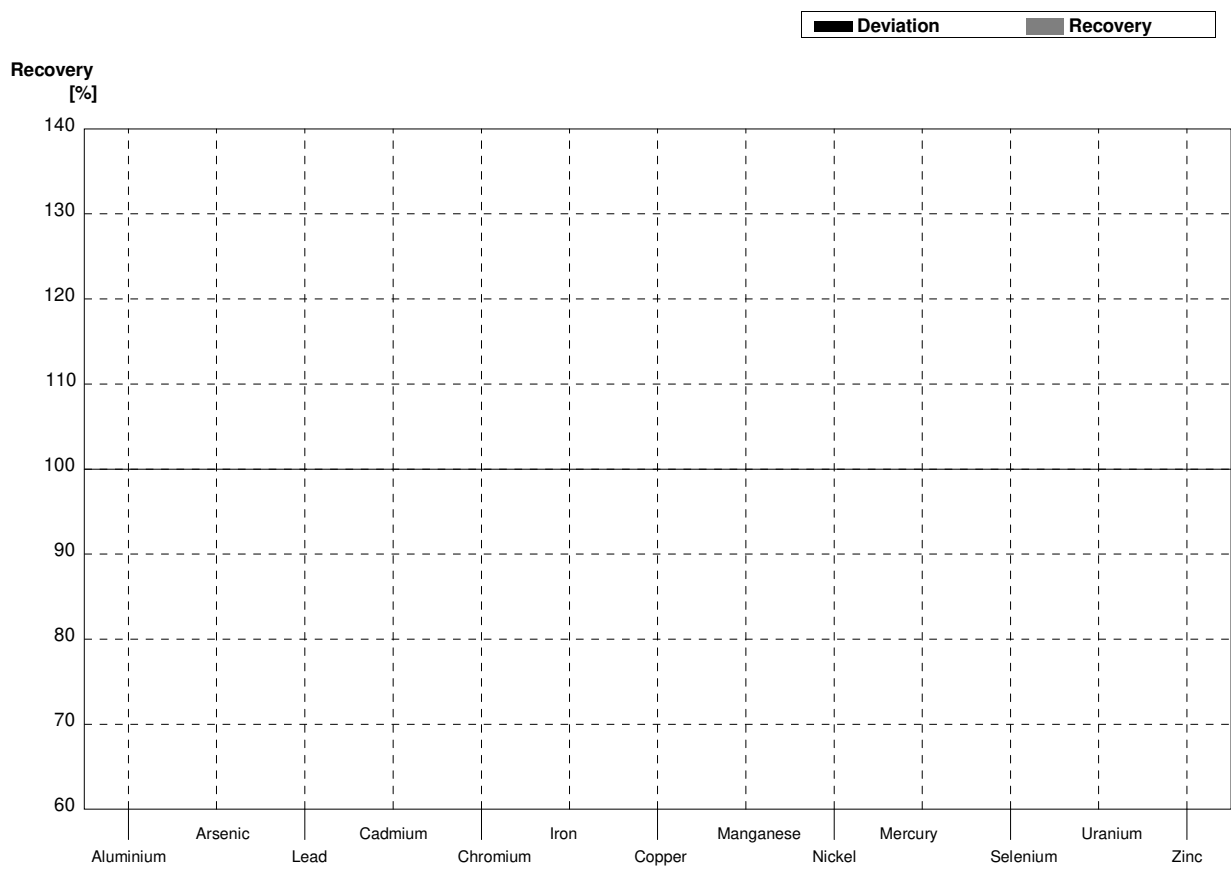
Sample M181B
Laboratory N

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	41,6	8,3	$\mu\text{g/l}$	98%
Arsenic	1,507	0,014	1,51	0,3	$\mu\text{g/l}$	100%
Lead	6,47	0,04	5,98	1,2	$\mu\text{g/l}$	92%
Cadmium	1,231	0,011	1,21	0,2	$\mu\text{g/l}$	98%
Chromium	1,906	0,015	1,82	0,4	$\mu\text{g/l}$	95%
Iron	56,0	0,2	52,9	11	$\mu\text{g/l}$	94%
Copper	2,08	0,03	1,84	0,4	$\mu\text{g/l}$	88%
Manganese	35,60	0,17	34,2	6,8	$\mu\text{g/l}$	96%
Nickel	5,64	0,04	5,38	1,1	$\mu\text{g/l}$	95%
Mercury	<0,1				$\mu\text{g/l}$	
Selenium	2,39	0,02			$\mu\text{g/l}$	
Uranium	2,99	0,02	2,82	0,6	$\mu\text{g/l}$	94%
Zinc	15,1	1,0	15,3	3,1	$\mu\text{g/l}$	101%



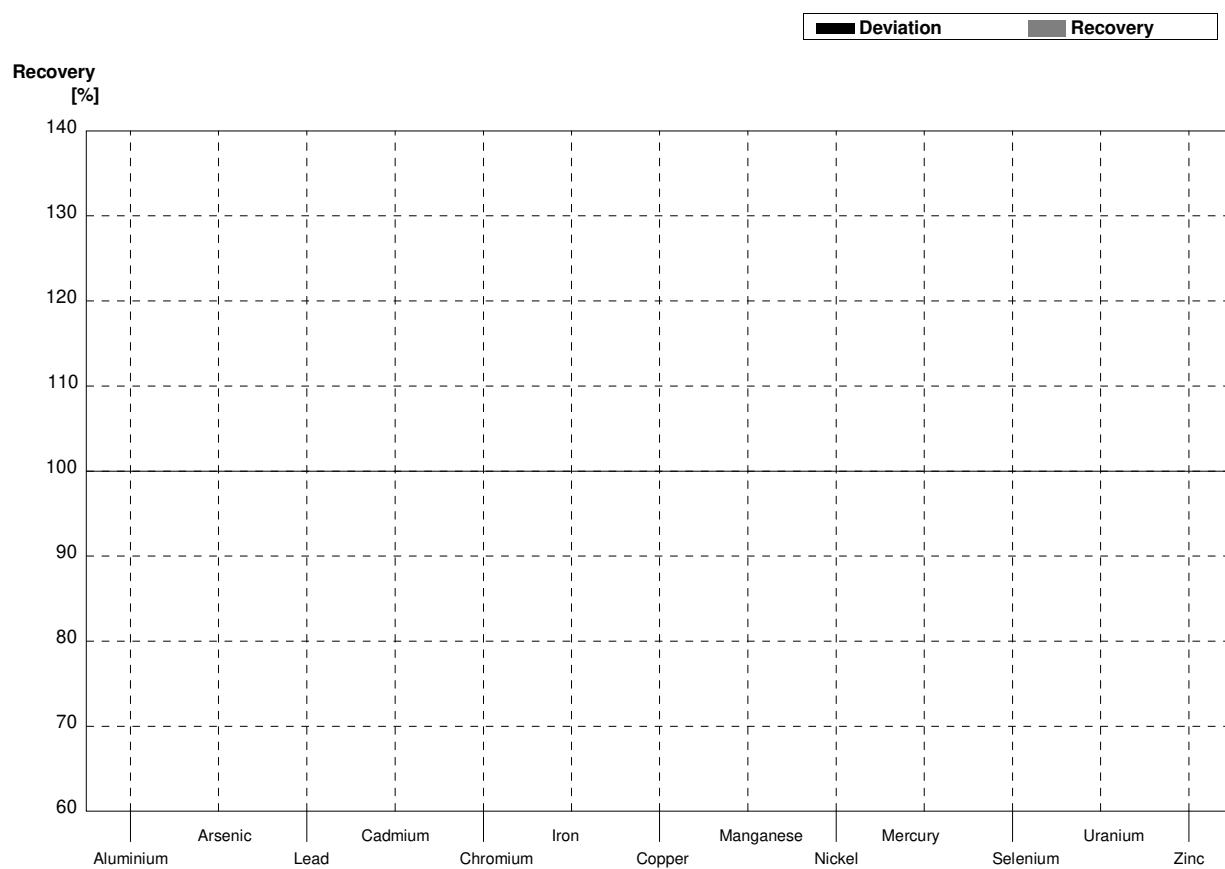
Sample M181A
Laboratory O

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17			$\mu\text{g/l}$	
Arsenic	2,591	0,019			$\mu\text{g/l}$	
Lead	2,71	0,02			$\mu\text{g/l}$	
Cadmium	0,635	0,005			$\mu\text{g/l}$	
Chromium	2,99	0,02			$\mu\text{g/l}$	
Iron	22,67	0,16			$\mu\text{g/l}$	
Copper	4,00	0,03			$\mu\text{g/l}$	
Manganese	19,96	0,12			$\mu\text{g/l}$	
Nickel	2,21	0,03			$\mu\text{g/l}$	
Mercury	1,120	0,015			$\mu\text{g/l}$	
Selenium	1,92	0,02			$\mu\text{g/l}$	
Uranium	1,505	0,013			$\mu\text{g/l}$	
Zinc	20,7	1,0			$\mu\text{g/l}$	



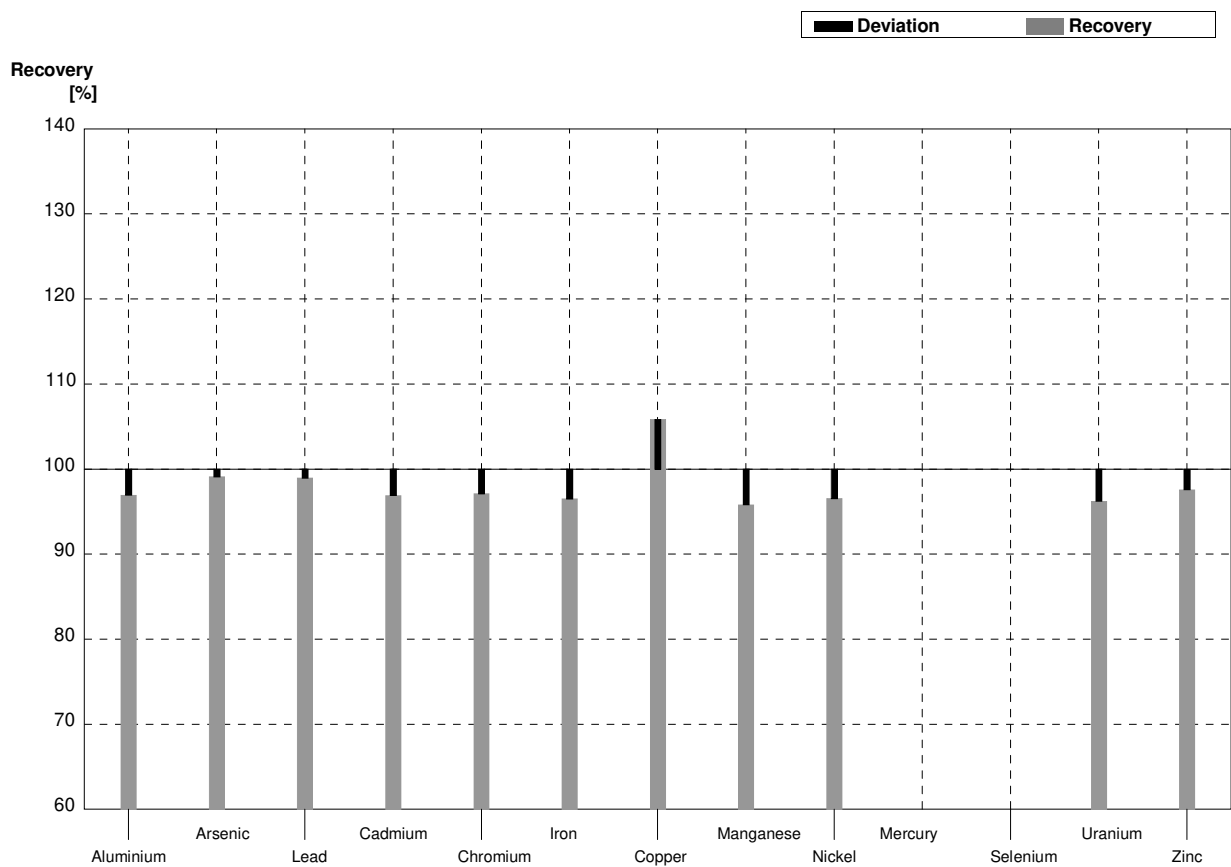
Sample M181B
Laboratory O

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3			$\mu\text{g/l}$	
Arsenic	1,507	0,014			$\mu\text{g/l}$	
Lead	6,47	0,04			$\mu\text{g/l}$	
Cadmium	1,231	0,011			$\mu\text{g/l}$	
Chromium	1,906	0,015			$\mu\text{g/l}$	
Iron	56,0	0,2			$\mu\text{g/l}$	
Copper	2,08	0,03			$\mu\text{g/l}$	
Manganese	35,60	0,17			$\mu\text{g/l}$	
Nickel	5,64	0,04			$\mu\text{g/l}$	
Mercury	<0,1				$\mu\text{g/l}$	
Selenium	2,39	0,02			$\mu\text{g/l}$	
Uranium	2,99	0,02			$\mu\text{g/l}$	
Zinc	15,1	1,0			$\mu\text{g/l}$	



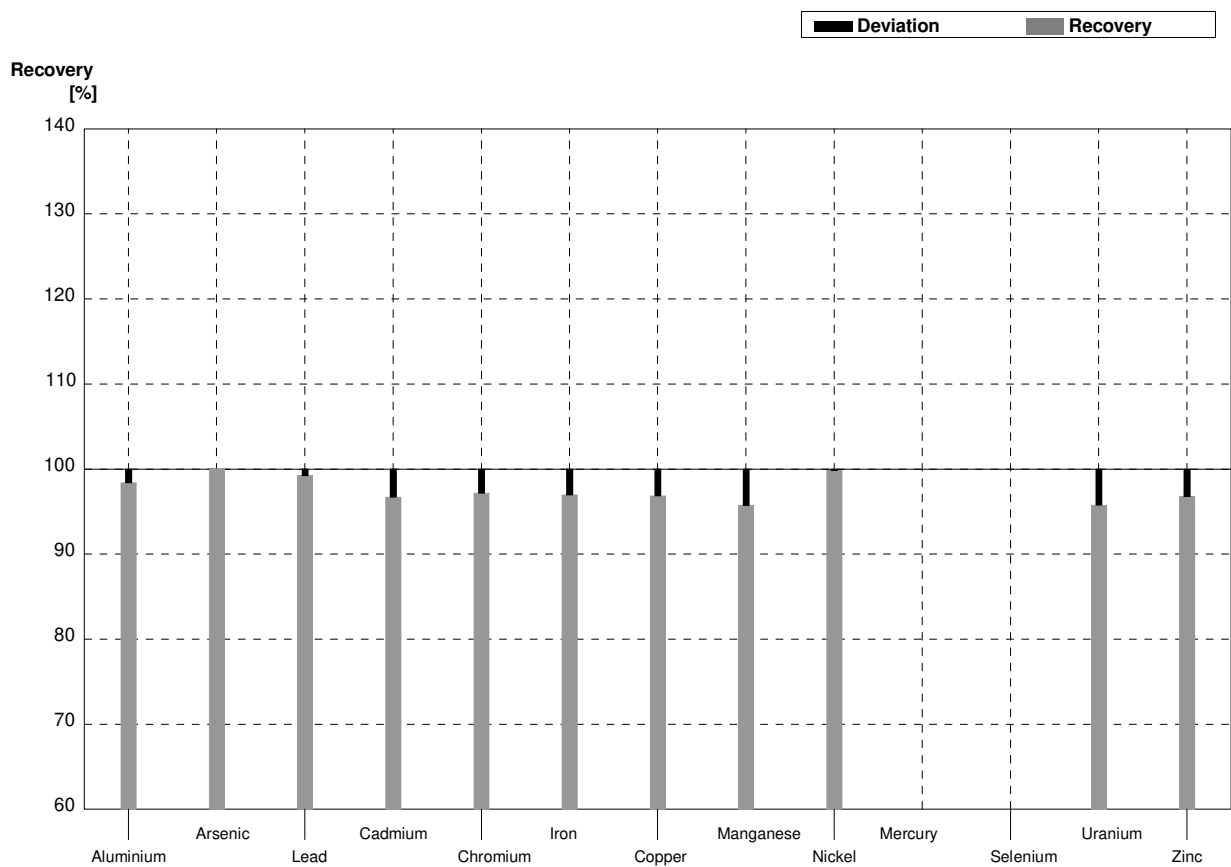
Sample M181A
Laboratory P

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	12,7378	1,284	$\mu\text{g/l}$	97%
Arsenic	2,591	0,019	2,5681	0,258	$\mu\text{g/l}$	99%
Lead	2,71	0,02	2,6815	0,2703	$\mu\text{g/l}$	99%
Cadmium	0,635	0,005	0,6154	0,0619	$\mu\text{g/l}$	97%
Chromium	2,99	0,02	2,9036	0,2936	$\mu\text{g/l}$	97%
Iron	22,67	0,16	21,8769	2,203	$\mu\text{g/l}$	97%
Copper	4,00	0,03	4,2334	0,425	$\mu\text{g/l}$	106%
Manganese	19,96	0,12	19,1263	1,93	$\mu\text{g/l}$	96%
Nickel	2,21	0,03	2,1337	0,214	$\mu\text{g/l}$	97%
Mercury	1,120	0,015			$\mu\text{g/l}$	
Selenium	1,92	0,02			$\mu\text{g/l}$	
Uranium	1,505	0,013	1,4482	0,146	$\mu\text{g/l}$	96%
Zinc	20,7	1,0	20,2008	2,0	$\mu\text{g/l}$	98%



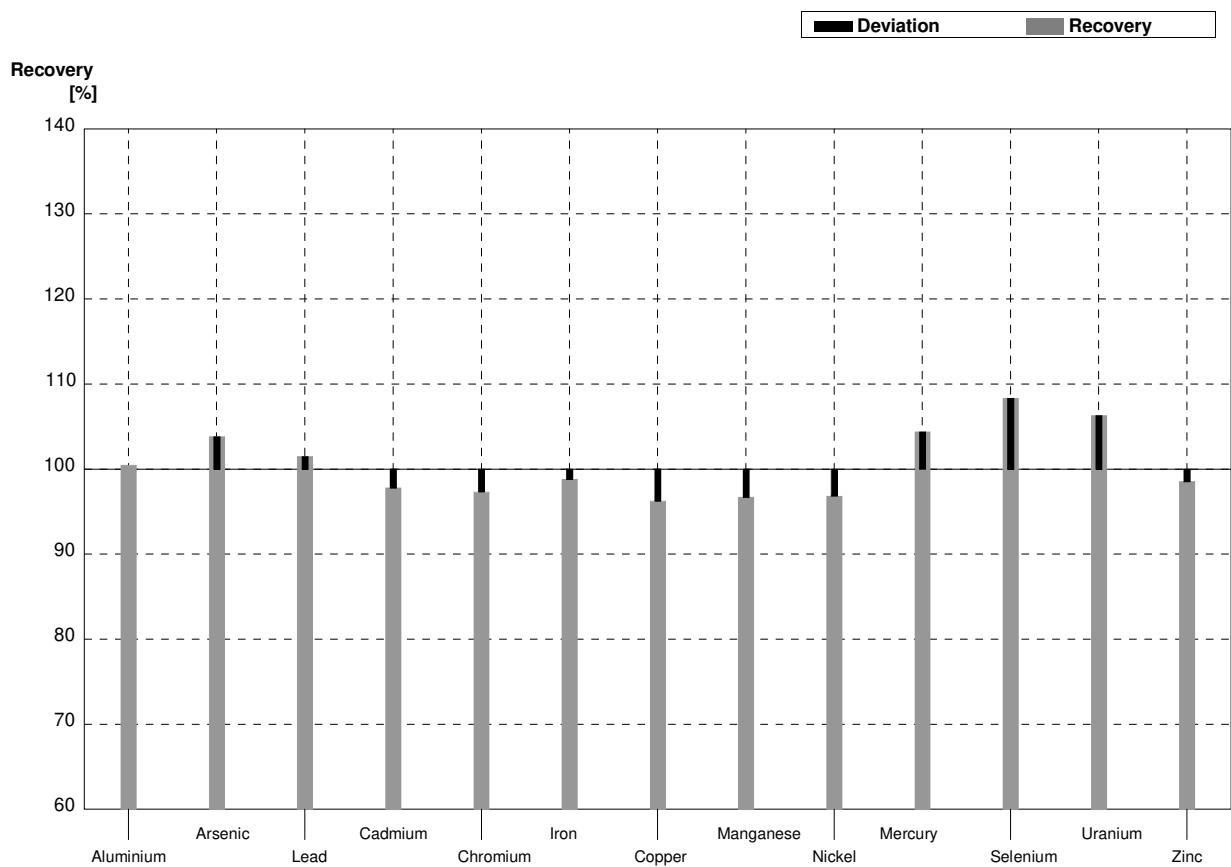
Sample M181B
Laboratory P

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	41,6289	4,196	$\mu\text{g/l}$	98%
Arsenic	1,507	0,014	1,5079	0,152	$\mu\text{g/l}$	100%
Lead	6,47	0,04	6,4216	0,6473	$\mu\text{g/l}$	99%
Cadmium	1,231	0,011	1,1907	0,1197	$\mu\text{g/l}$	97%
Chromium	1,906	0,015	1,8524	0,1873	$\mu\text{g/l}$	97%
Iron	56,0	0,2	54,3083	5,47	$\mu\text{g/l}$	97%
Copper	2,08	0,03	2,0149	0,202	$\mu\text{g/l}$	97%
Manganese	35,60	0,17	34,0889	3,44	$\mu\text{g/l}$	96%
Nickel	5,64	0,04	5,6324	0,566	$\mu\text{g/l}$	100%
Mercury	<0,1				$\mu\text{g/l}$	
Selenium	2,39	0,02			$\mu\text{g/l}$	
Uranium	2,99	0,02	2,8639	0,290	$\mu\text{g/l}$	96%
Zinc	15,1	1,0	14,6199	1,5	$\mu\text{g/l}$	97%



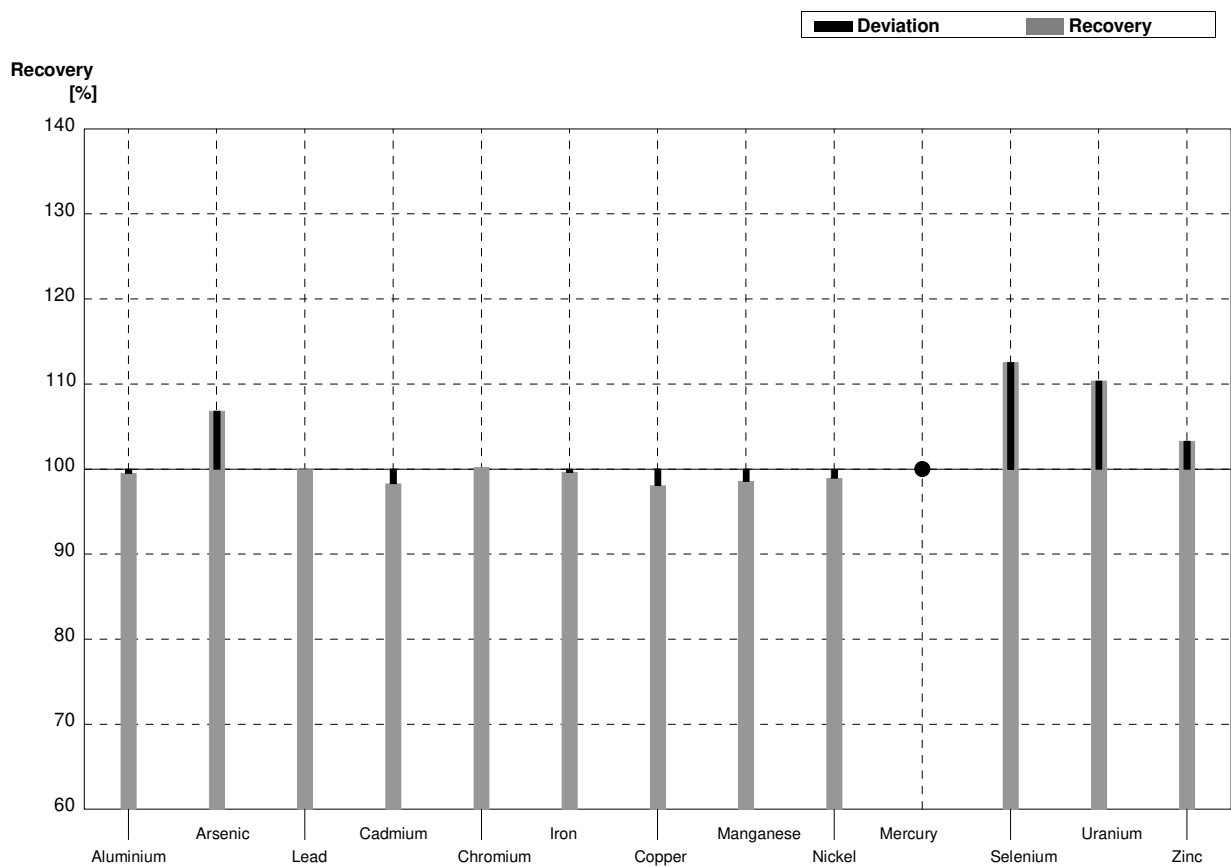
Sample M181A
Laboratory Q

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	13,2	1,98	$\mu\text{g/l}$	100%
Arsenic	2,591	0,019	2,69	0,40	$\mu\text{g/l}$	104%
Lead	2,71	0,02	2,75	0,41	$\mu\text{g/l}$	101%
Cadmium	0,635	0,005	0,621	0,093	$\mu\text{g/l}$	98%
Chromium	2,99	0,02	2,91	0,44	$\mu\text{g/l}$	97%
Iron	22,67	0,16	22,4	3,37	$\mu\text{g/l}$	99%
Copper	4,00	0,03	3,85	0,58	$\mu\text{g/l}$	96%
Manganese	19,96	0,12	19,3	2,89	$\mu\text{g/l}$	97%
Nickel	2,21	0,03	2,14	0,32	$\mu\text{g/l}$	97%
Mercury	1,120	0,015	1,169	0,175	$\mu\text{g/l}$	104%
Selenium	1,92	0,02	2,08	0,31	$\mu\text{g/l}$	108%
Uranium	1,505	0,013	1,60	0,24	$\mu\text{g/l}$	106%
Zinc	20,7	1,0	20,4	3,06	$\mu\text{g/l}$	99%



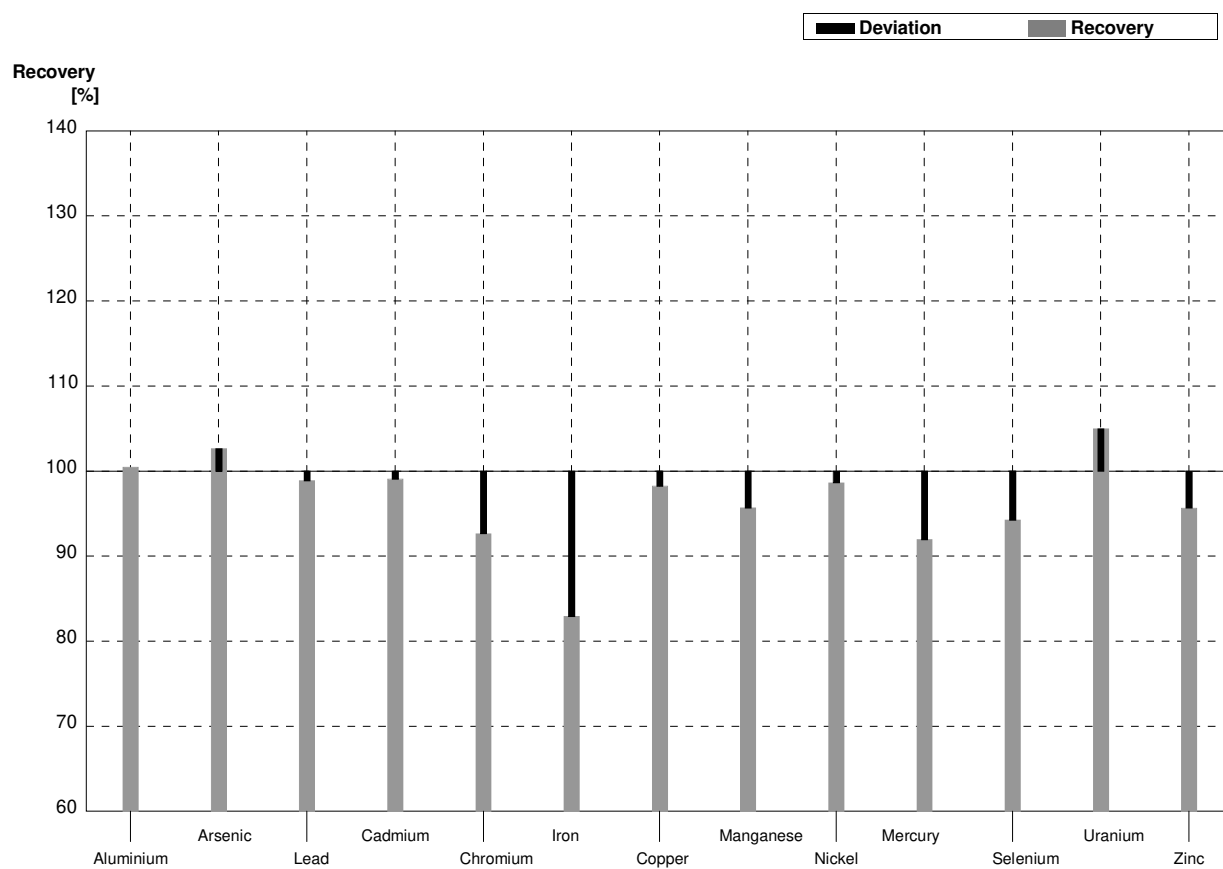
Sample M181B
Laboratory Q

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	42,1	6,32	$\mu\text{g/l}$	100%
Arsenic	1,507	0,014	1,61	0,24	$\mu\text{g/l}$	107%
Lead	6,47	0,04	6,47	0,97	$\mu\text{g/l}$	100%
Cadmium	1,231	0,011	1,21	0,18	$\mu\text{g/l}$	98%
Chromium	1,906	0,015	1,91	0,29	$\mu\text{g/l}$	100%
Iron	56,0	0,2	55,8	8,37	$\mu\text{g/l}$	100%
Copper	2,08	0,03	2,04	0,31	$\mu\text{g/l}$	98%
Manganese	35,60	0,17	35,1	5,26	$\mu\text{g/l}$	99%
Nickel	5,64	0,04	5,58	0,84	$\mu\text{g/l}$	99%
Mercury	<0,1		<0,1		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,69	0,40	$\mu\text{g/l}$	113%
Uranium	2,99	0,02	3,30	0,49	$\mu\text{g/l}$	110%
Zinc	15,1	1,0	15,6	2,34	$\mu\text{g/l}$	103%



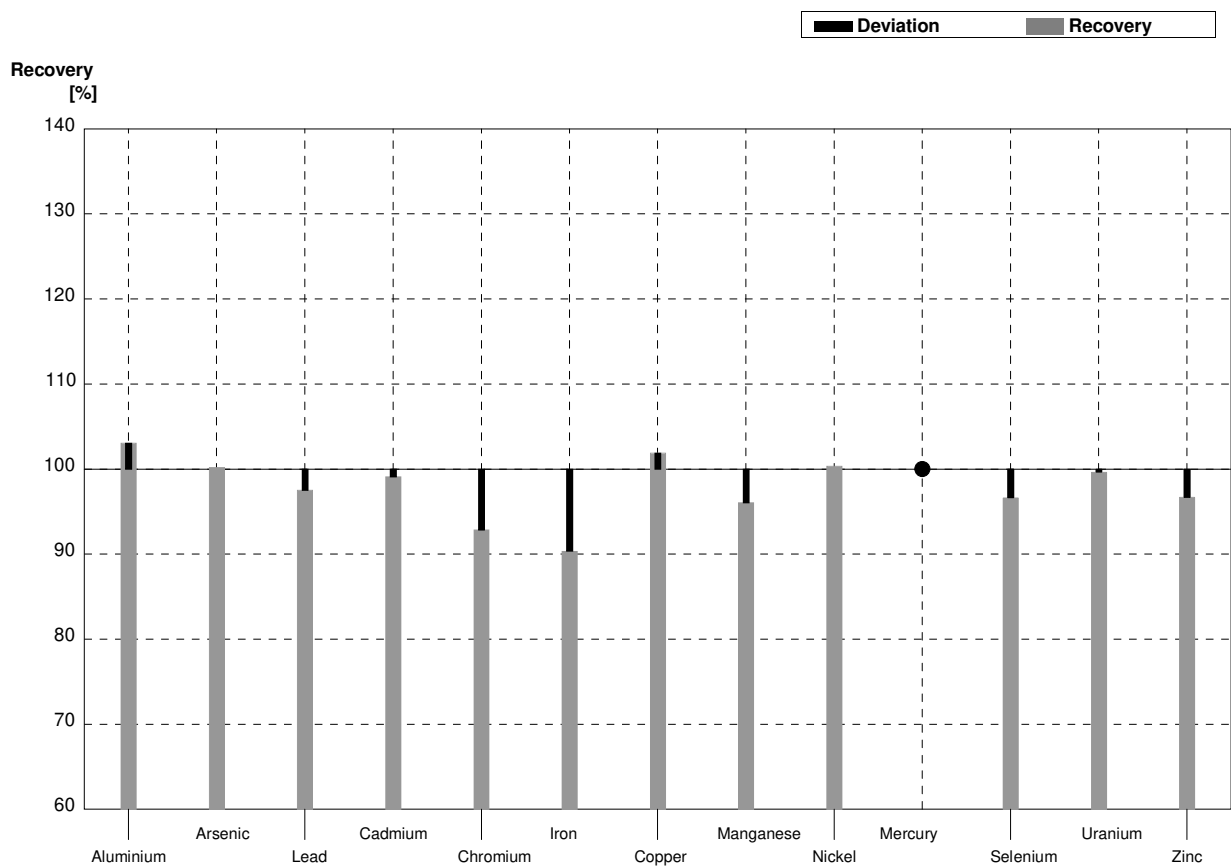
Sample M181A
Laboratory R

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	13,2	0,629	$\mu\text{g/l}$	100%
Arsenic	2,591	0,019	2,66	0,160	$\mu\text{g/l}$	103%
Lead	2,71	0,02	2,68	0,0643	$\mu\text{g/l}$	99%
Cadmium	0,635	0,005	0,629	0,0124	$\mu\text{g/l}$	99%
Chromium	2,99	0,02	2,77	0,115	$\mu\text{g/l}$	93%
Iron	22,67	0,16	18,8	0,698	$\mu\text{g/l}$	83%
Copper	4,00	0,03	3,93	0,103	$\mu\text{g/l}$	98%
Manganese	19,96	0,12	19,1	0,521	$\mu\text{g/l}$	96%
Nickel	2,21	0,03	2,18	0,102	$\mu\text{g/l}$	99%
Mercury	1,120	0,015	1,03	0,0110	$\mu\text{g/l}$	92%
Selenium	1,92	0,02	1,81	0,107	$\mu\text{g/l}$	94%
Uranium	1,505	0,013	1,58	0,0982	$\mu\text{g/l}$	105%
Zinc	20,7	1,0	19,8	0,091	$\mu\text{g/l}$	96%



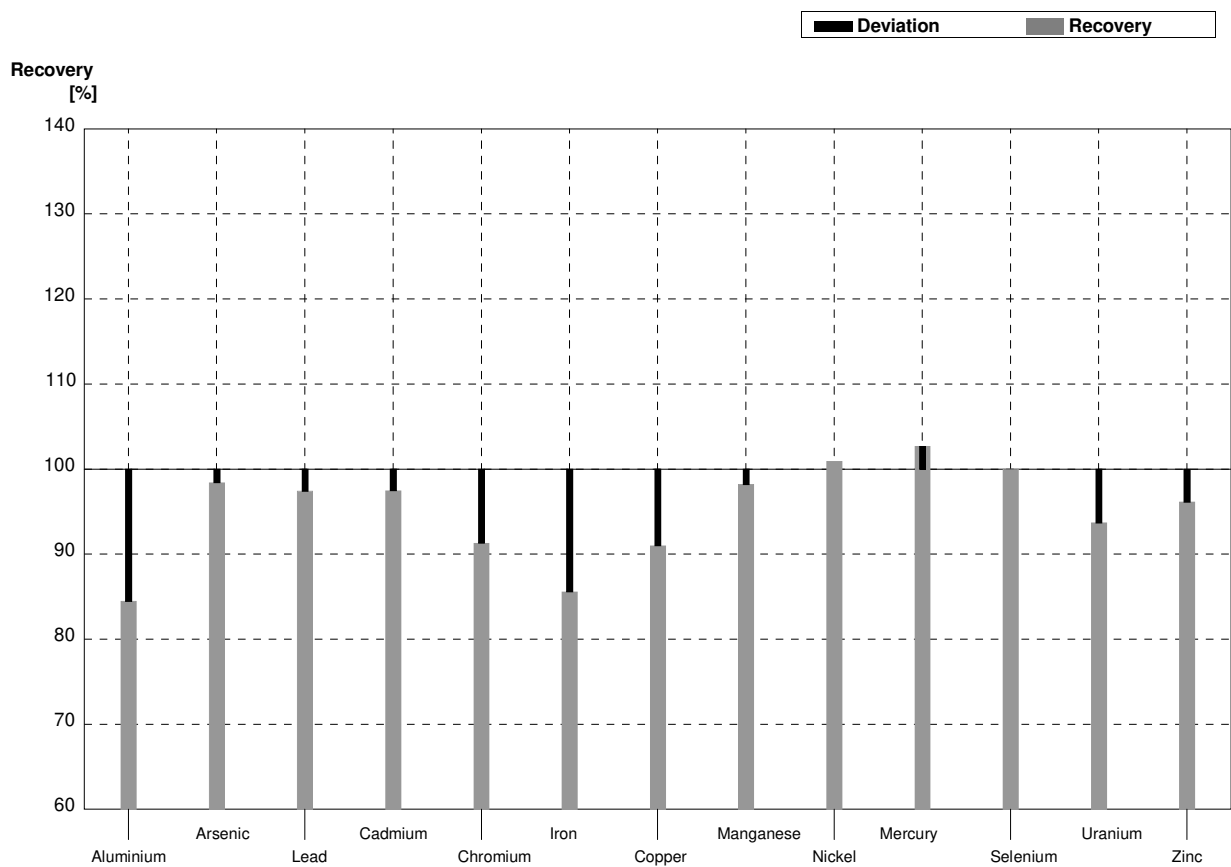
Sample M181B
Laboratory R

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	43,6	0,548	$\mu\text{g/l}$	103%
Arsenic	1,507	0,014	1,51	0,170	$\mu\text{g/l}$	100%
Lead	6,47	0,04	6,31	0,0599	$\mu\text{g/l}$	98%
Cadmium	1,231	0,011	1,22	0,0670	$\mu\text{g/l}$	99%
Chromium	1,906	0,015	1,77	0,122	$\mu\text{g/l}$	93%
Iron	56,0	0,2	50,6	0,622	$\mu\text{g/l}$	90%
Copper	2,08	0,03	2,12	0,111	$\mu\text{g/l}$	102%
Manganese	35,60	0,17	34,2	0,488	$\mu\text{g/l}$	96%
Nickel	5,64	0,04	5,66	0,0911	$\mu\text{g/l}$	100%
Mercury	<0,1		<0,050		$\mu\text{g/l}$	•
Selenium	2,39	0,02	2,31	0,104	$\mu\text{g/l}$	97%
Uranium	2,99	0,02	2,98	0,0911	$\mu\text{g/l}$	100%
Zinc	15,1	1,0	14,6	0,094	$\mu\text{g/l}$	97%



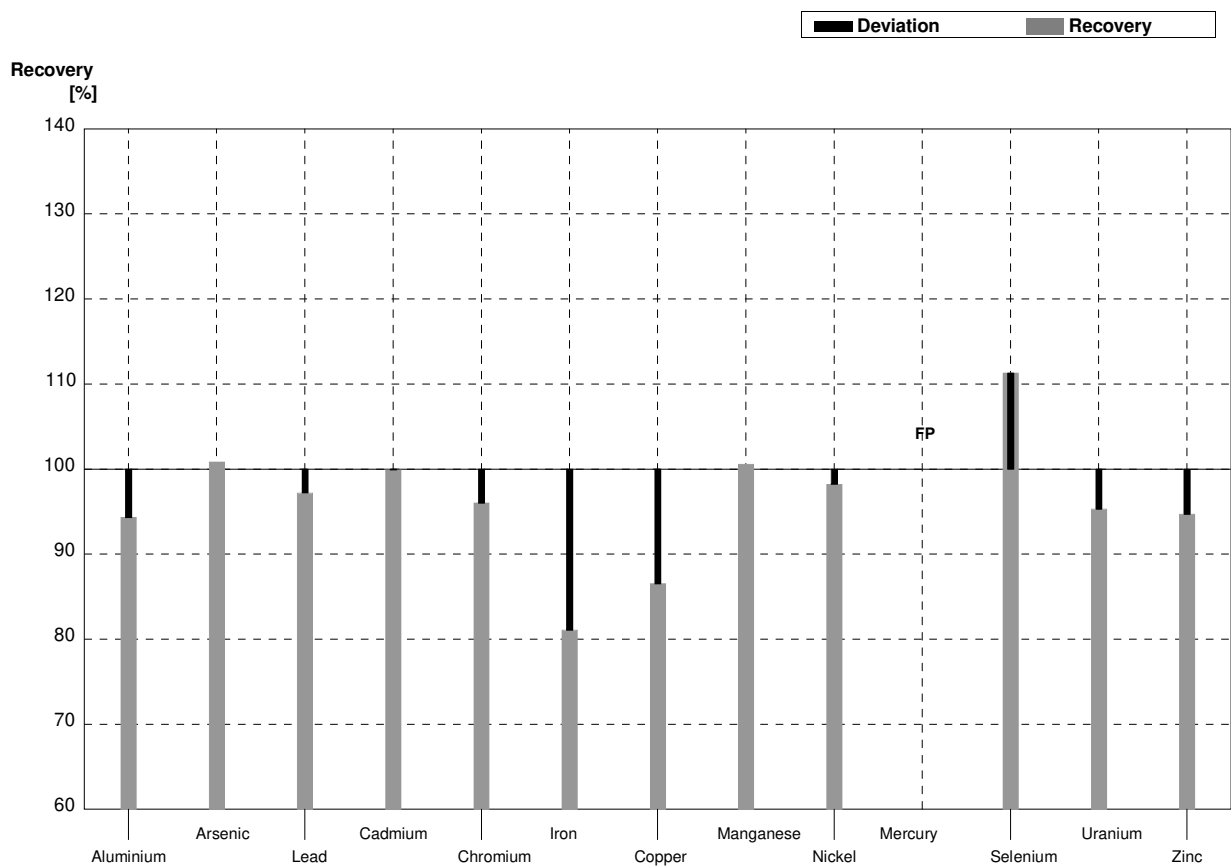
Sample M181A
Laboratory S

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	11,1	2,5	$\mu\text{g/l}$	84%
Arsenic	2,591	0,019	2,55	0,69	$\mu\text{g/l}$	98%
Lead	2,71	0,02	2,64	0,59	$\mu\text{g/l}$	97%
Cadmium	0,635	0,005	0,619	0,14	$\mu\text{g/l}$	97%
Chromium	2,99	0,02	2,73	0,74	$\mu\text{g/l}$	91%
Iron	22,67	0,16	19,4	5,2	$\mu\text{g/l}$	86%
Copper	4,00	0,03	3,64	0,82	$\mu\text{g/l}$	91%
Manganese	19,96	0,12	19,6	5,29	$\mu\text{g/l}$	98%
Nickel	2,21	0,03	2,23	0,50	$\mu\text{g/l}$	101%
Mercury	1,120	0,015	1,15	0,31	$\mu\text{g/l}$	103%
Selenium	1,92	0,02	1,92	0,69	$\mu\text{g/l}$	100%
Uranium	1,505	0,013	1,41	0,38	$\mu\text{g/l}$	94%
Zinc	20,7	1,0	19,9	4,98	$\mu\text{g/l}$	96%



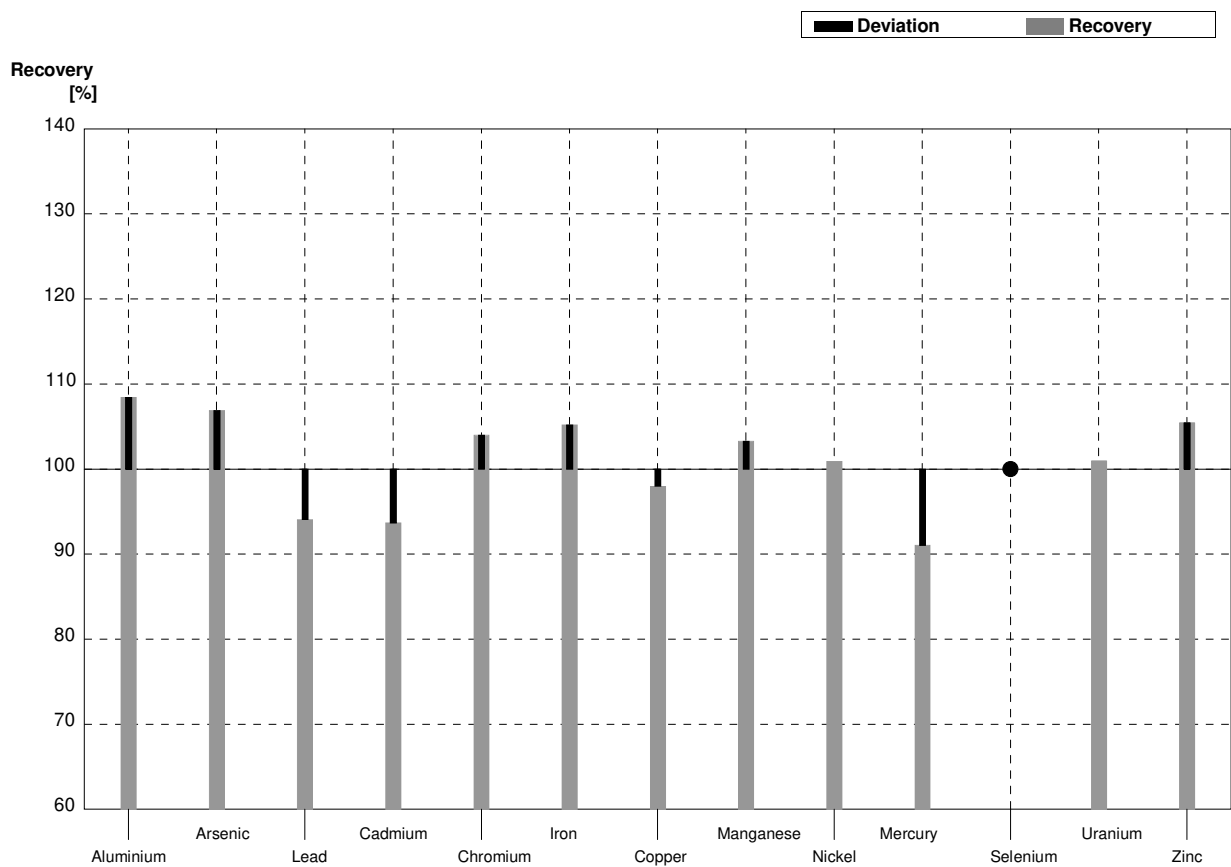
Sample M181B
Laboratory S

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	39,9	8,98	$\mu\text{g/l}$	94%
Arsenic	1,507	0,014	1,52	0,41	$\mu\text{g/l}$	101%
Lead	6,47	0,04	6,29	1,41	$\mu\text{g/l}$	97%
Cadmium	1,231	0,011	1,23	0,28	$\mu\text{g/l}$	100%
Chromium	1,906	0,015	1,83	0,49	$\mu\text{g/l}$	96%
Iron	56,0	0,2	45,4	12,0	$\mu\text{g/l}$	81%
Copper	2,08	0,03	1,80	0,41	$\mu\text{g/l}$	87%
Manganese	35,60	0,17	35,8	9,70	$\mu\text{g/l}$	101%
Nickel	5,64	0,04	5,54	1,25	$\mu\text{g/l}$	98%
Mercury	<0,1		0,150	0,040	$\mu\text{g/l}$	FP
Selenium	2,39	0,02	2,66	0,96	$\mu\text{g/l}$	111%
Uranium	2,99	0,02	2,85	0,77	$\mu\text{g/l}$	95%
Zinc	15,1	1,0	14,3	3,58	$\mu\text{g/l}$	95%



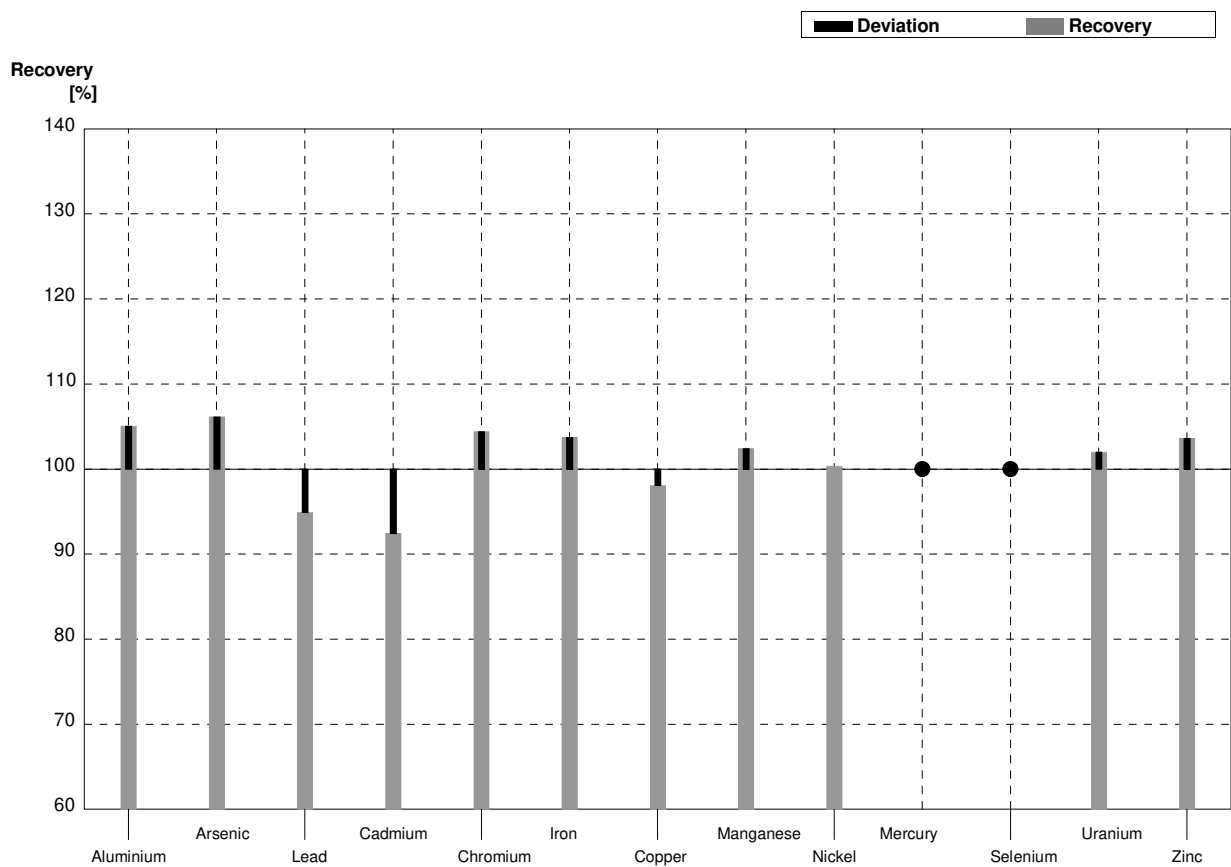
Sample M181A
Laboratory T

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	13,14	0,17	14,25	3,0	$\mu\text{g/l}$	108%
Arsenic	2,591	0,019	2,77	0,40	$\mu\text{g/l}$	107%
Lead	2,71	0,02	2,55	0,40	$\mu\text{g/l}$	94%
Cadmium	0,635	0,005	0,595	0,070	$\mu\text{g/l}$	94%
Chromium	2,99	0,02	3,11	0,40	$\mu\text{g/l}$	104%
Iron	22,67	0,16	23,85	3,0	$\mu\text{g/l}$	105%
Copper	4,00	0,03	3,92	0,70	$\mu\text{g/l}$	98%
Manganese	19,96	0,12	20,62	2,0	$\mu\text{g/l}$	103%
Nickel	2,21	0,03	2,23	0,40	$\mu\text{g/l}$	101%
Mercury	1,120	0,015	1,02	0,2	$\mu\text{g/l}$	91%
Selenium	1,92	0,02	<5,0		$\mu\text{g/l}$	•
Uranium	1,505	0,013	1,52	0,20	$\mu\text{g/l}$	101%
Zinc	20,7	1,0	21,83	3,0	$\mu\text{g/l}$	105%



Sample M181B
Laboratory T

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	42,3	0,3	44,44	8,0	$\mu\text{g/l}$	105%
Arsenic	1,507	0,014	1,60	0,30	$\mu\text{g/l}$	106%
Lead	6,47	0,04	6,14	0,9	$\mu\text{g/l}$	95%
Cadmium	1,231	0,011	1,138	0,1	$\mu\text{g/l}$	92%
Chromium	1,906	0,015	1,99	0,3	$\mu\text{g/l}$	104%
Iron	56,0	0,2	58,10	8,0	$\mu\text{g/l}$	104%
Copper	2,08	0,03	2,04	0,3	$\mu\text{g/l}$	98%
Manganese	35,60	0,17	36,46	4,0	$\mu\text{g/l}$	102%
Nickel	5,64	0,04	5,66	0,9	$\mu\text{g/l}$	100%
Mercury	<0,1		<0,04		$\mu\text{g/l}$	•
Selenium	2,39	0,02	<5,0		$\mu\text{g/l}$	•
Uranium	2,99	0,02	3,05	0,4	$\mu\text{g/l}$	102%
Zinc	15,1	1,0	15,65	3,0	$\mu\text{g/l}$	104%





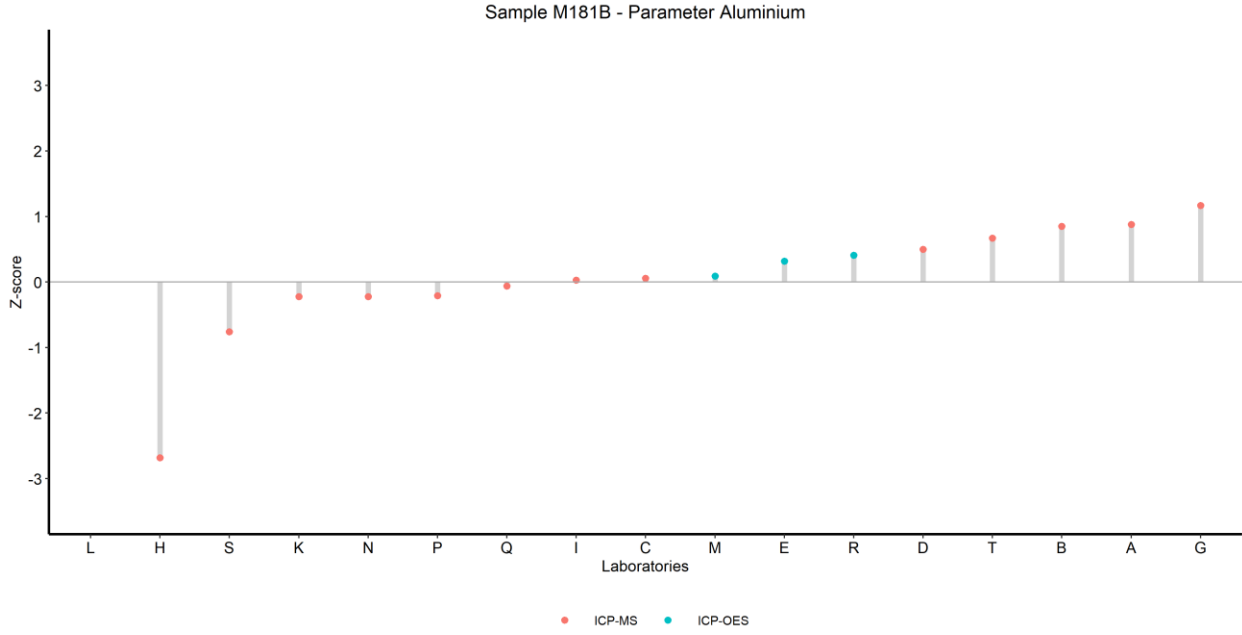
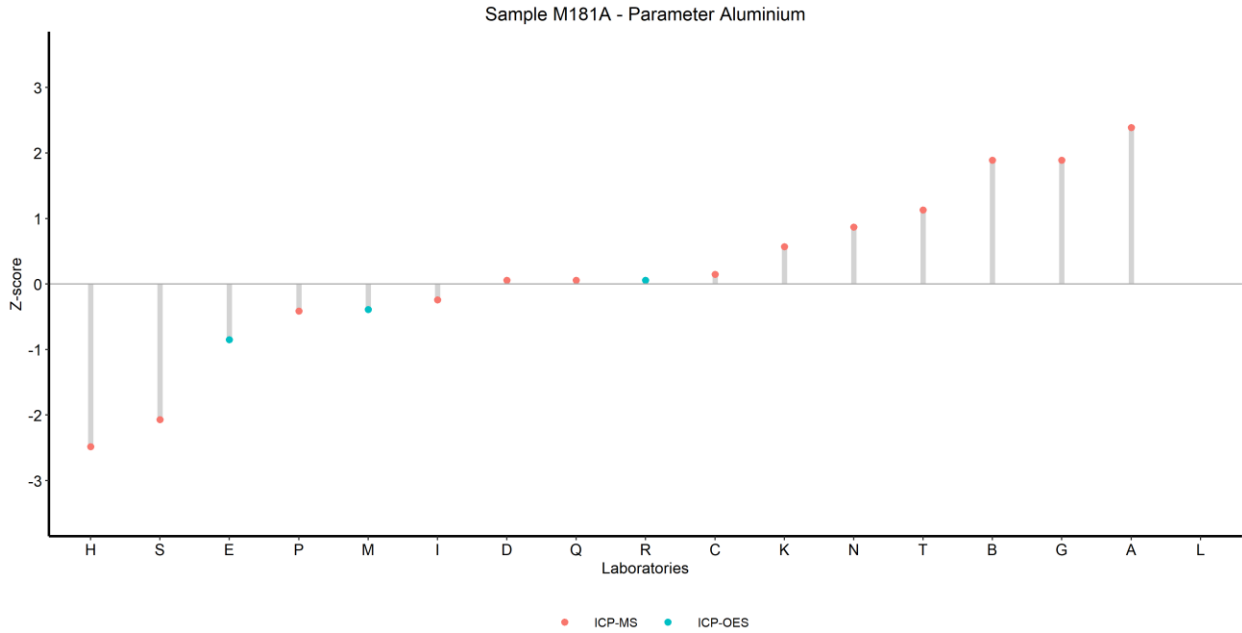
Methodenvergleich
Method comparison

Eignungsprüfungsrunde / Proficiency testing round
M181

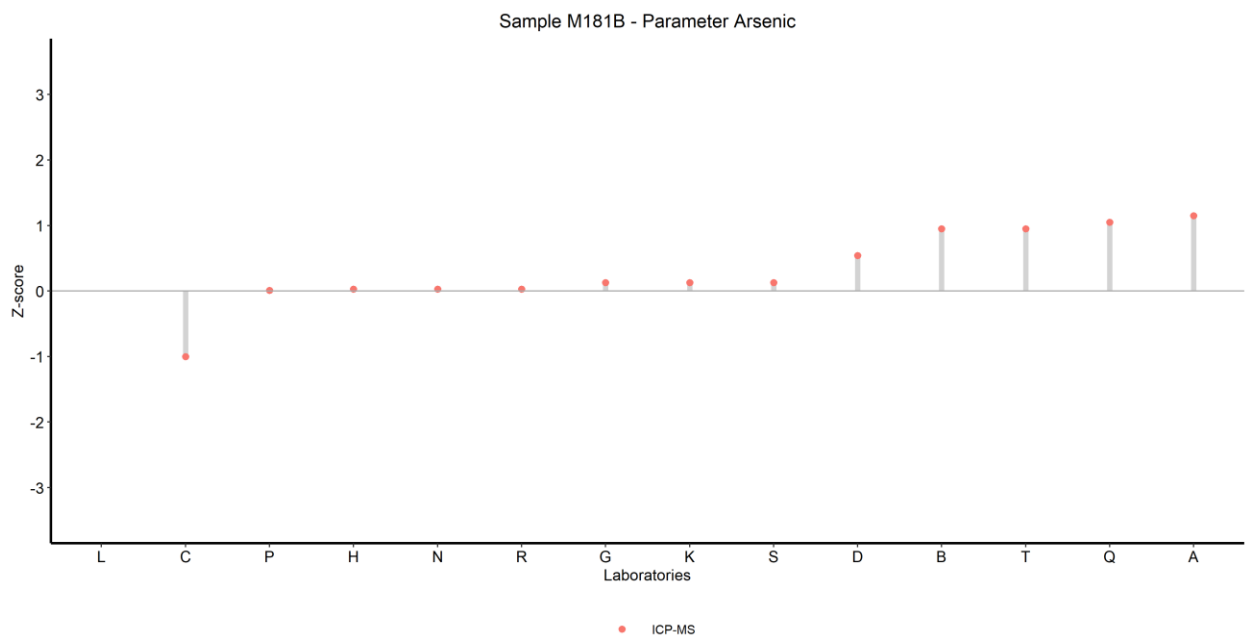
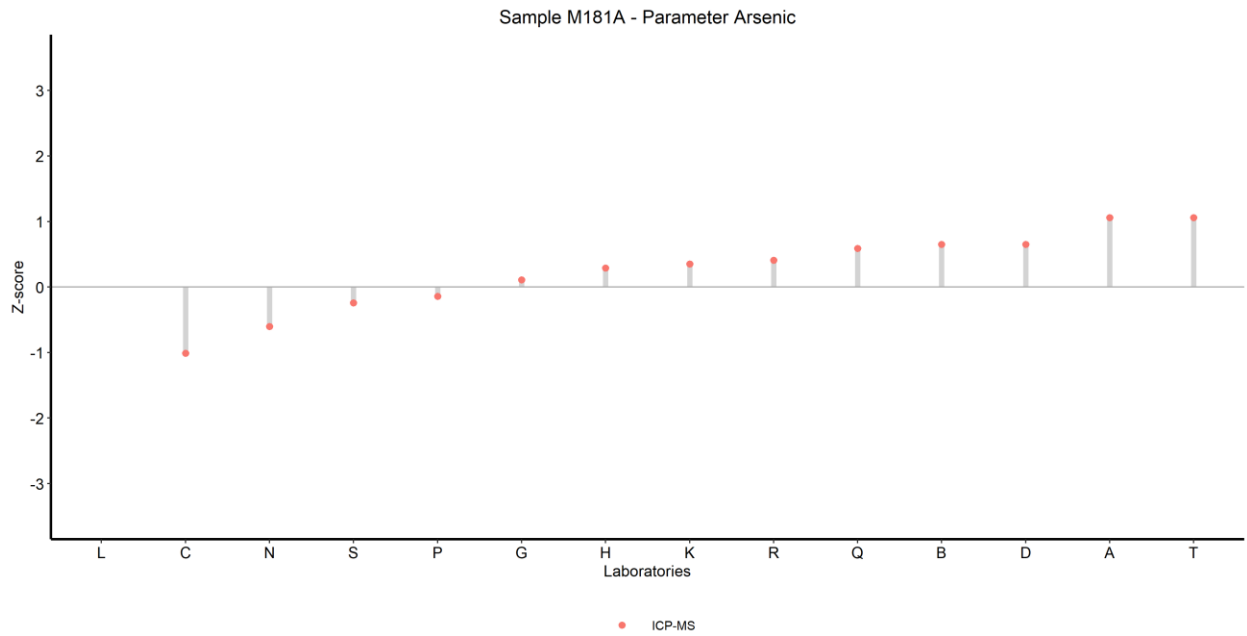
Metalle / Metals

Versand / Dispatch: 16.03.2026

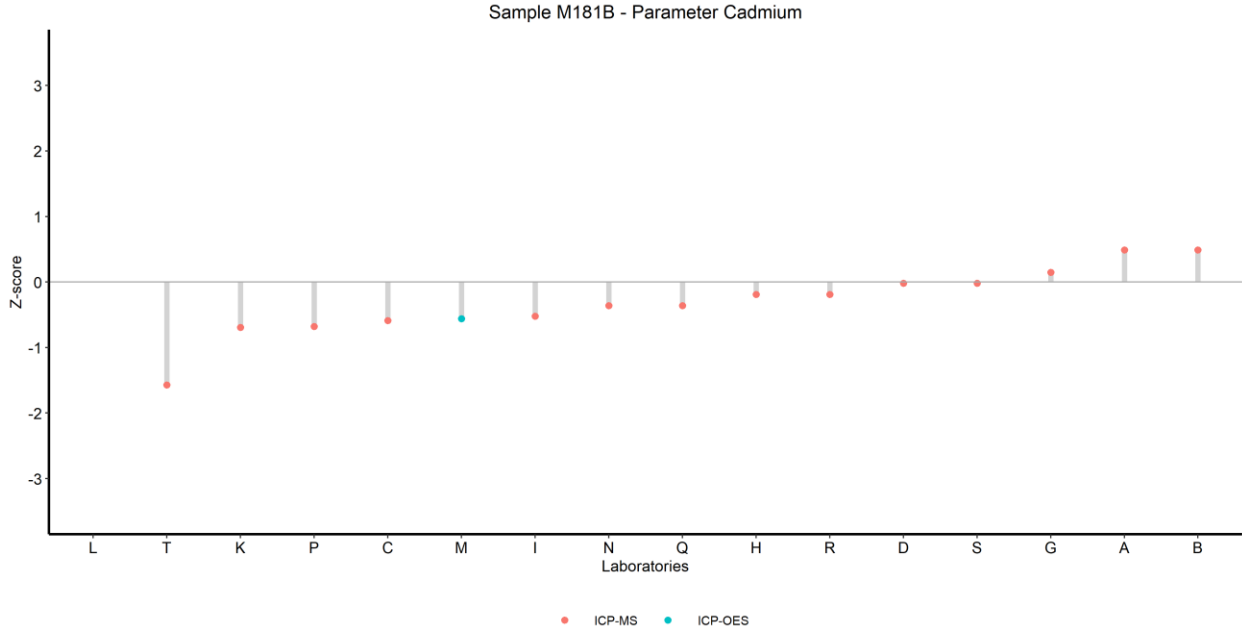
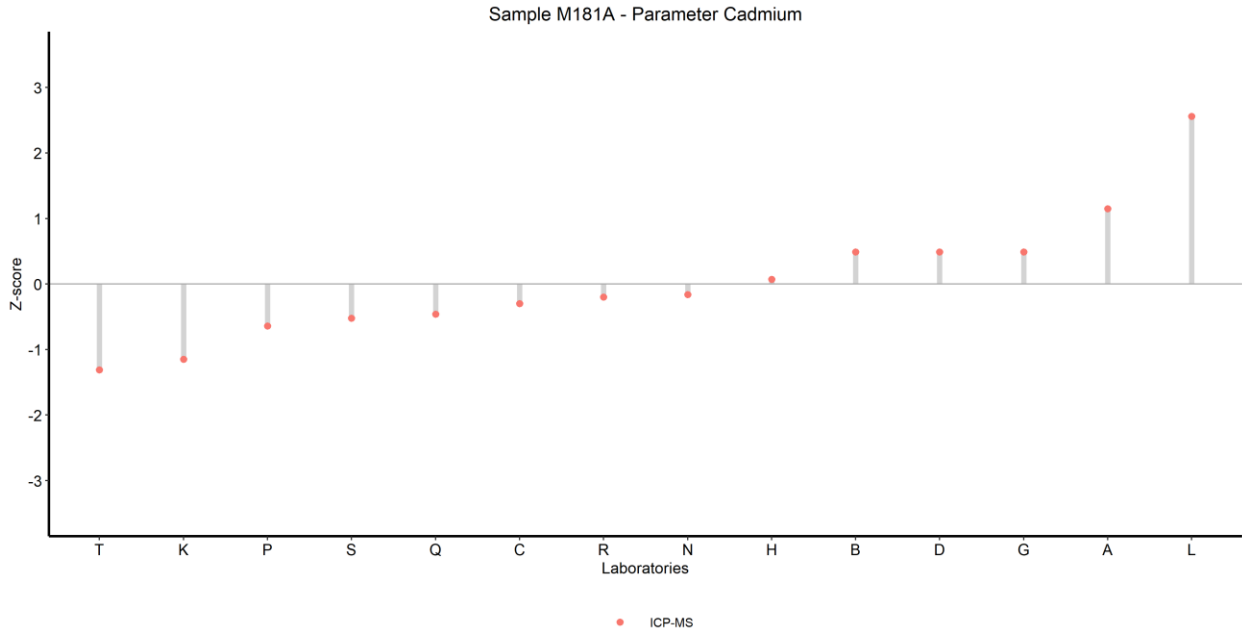
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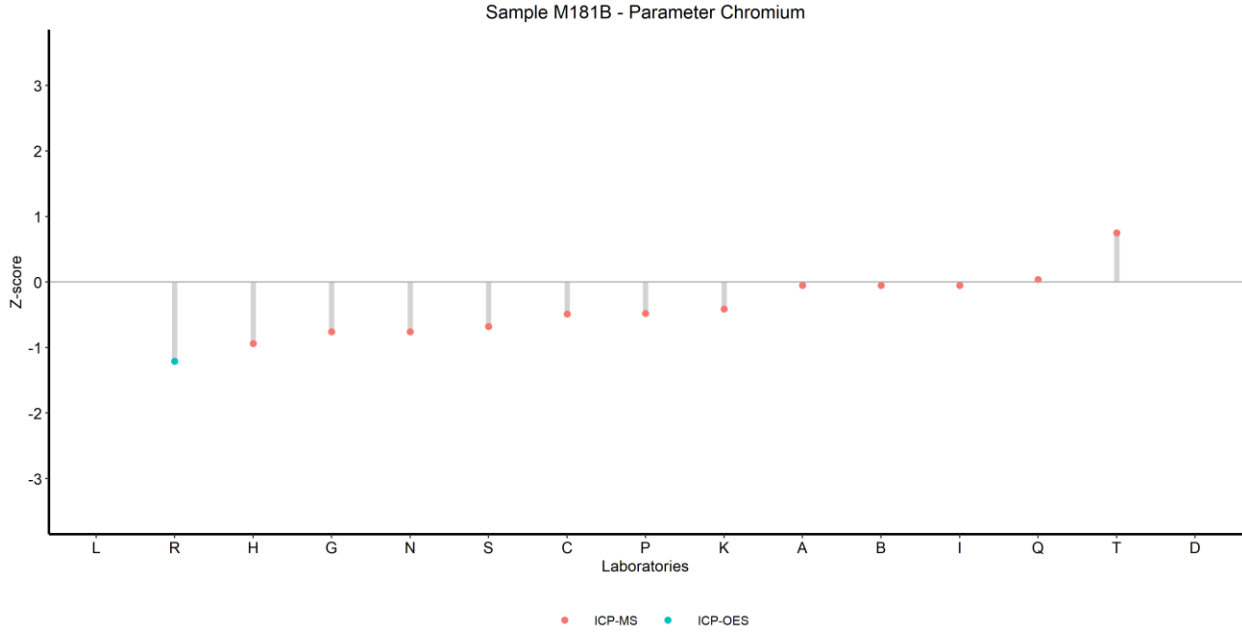
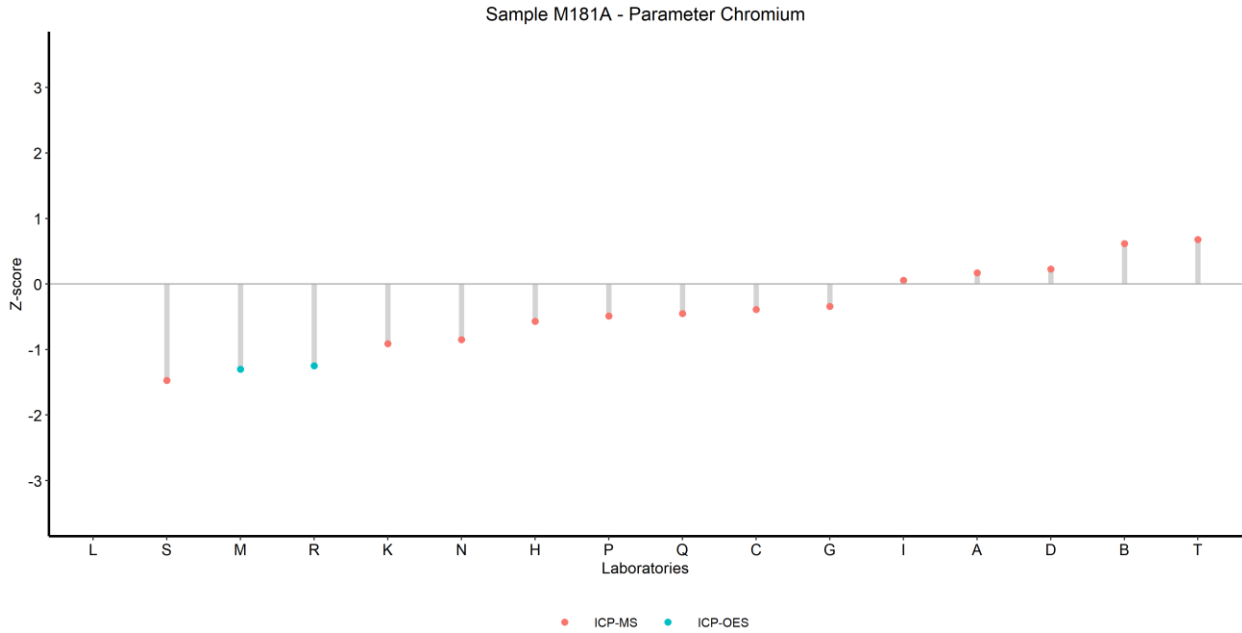
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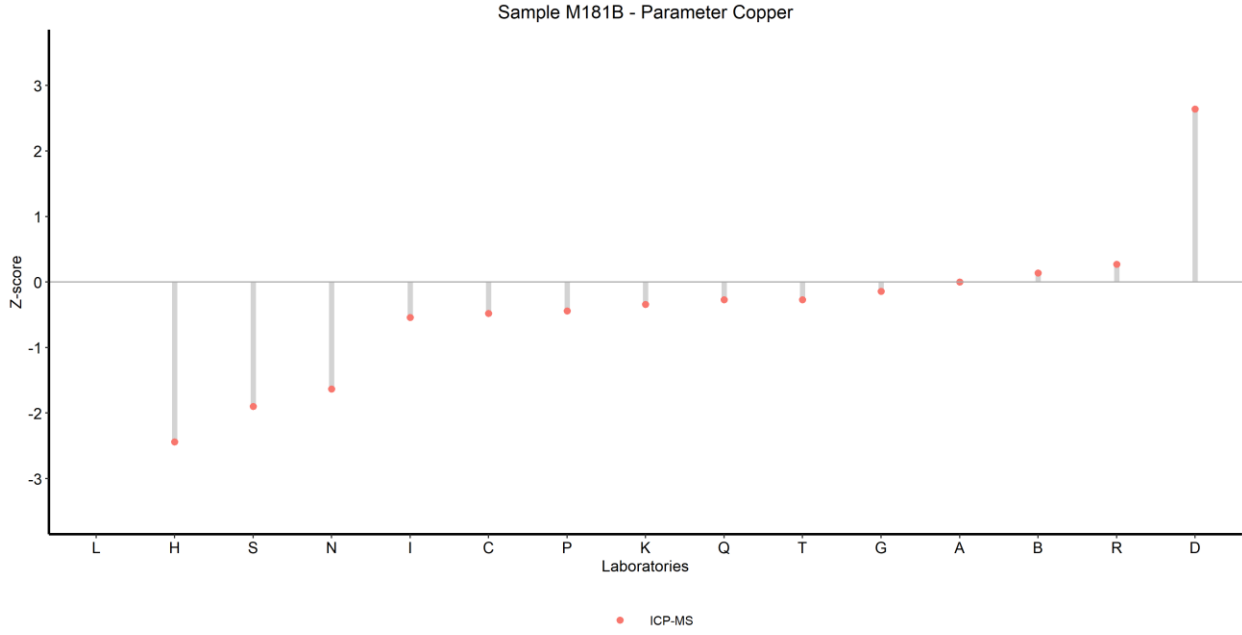
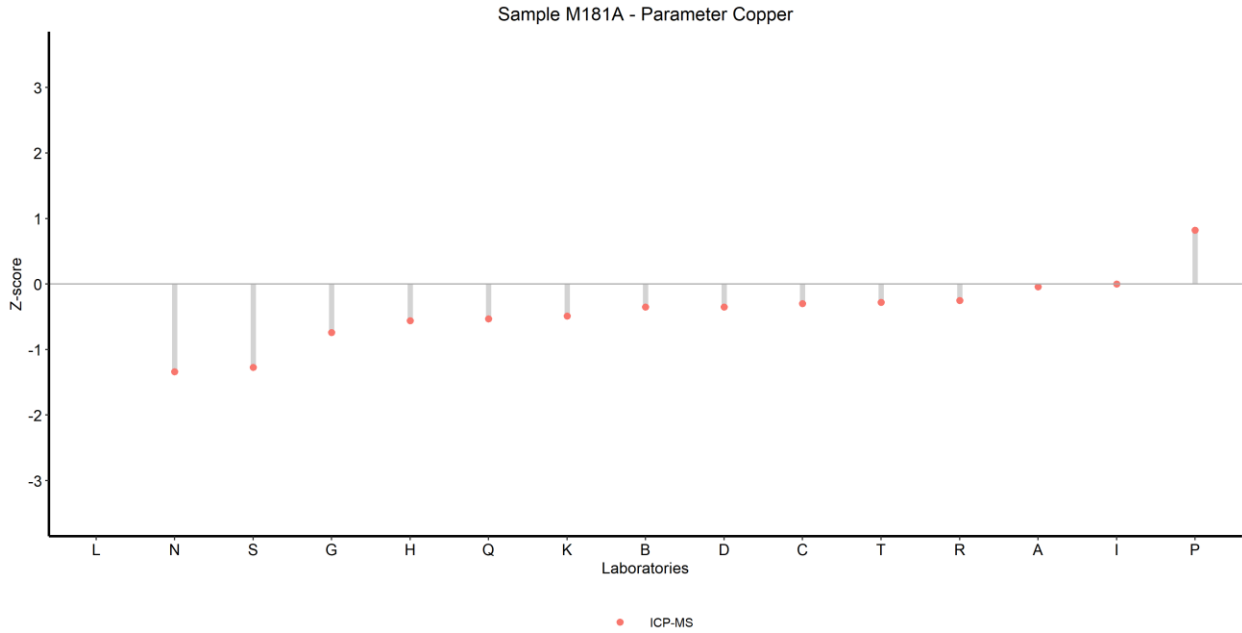
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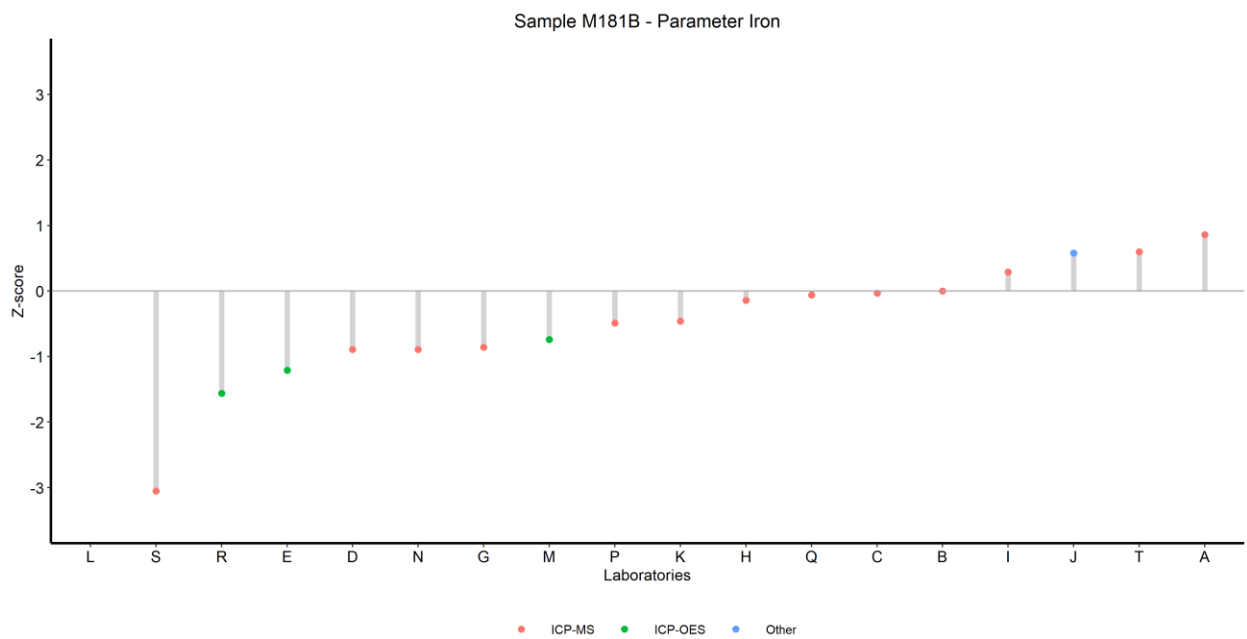
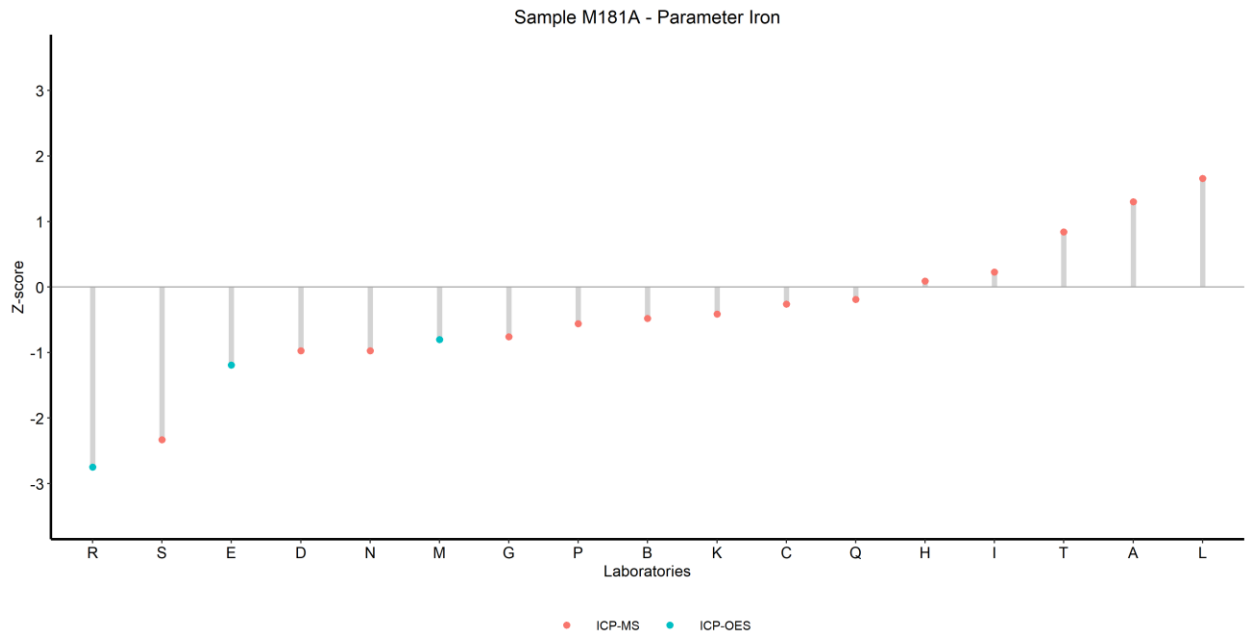
Chromium



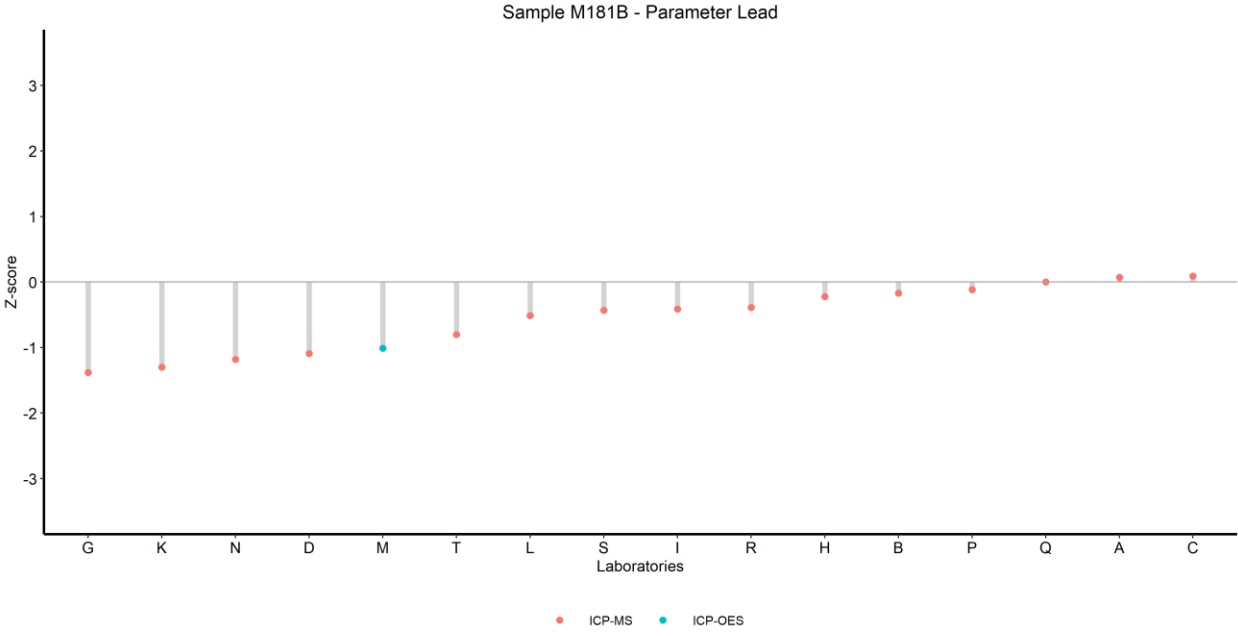
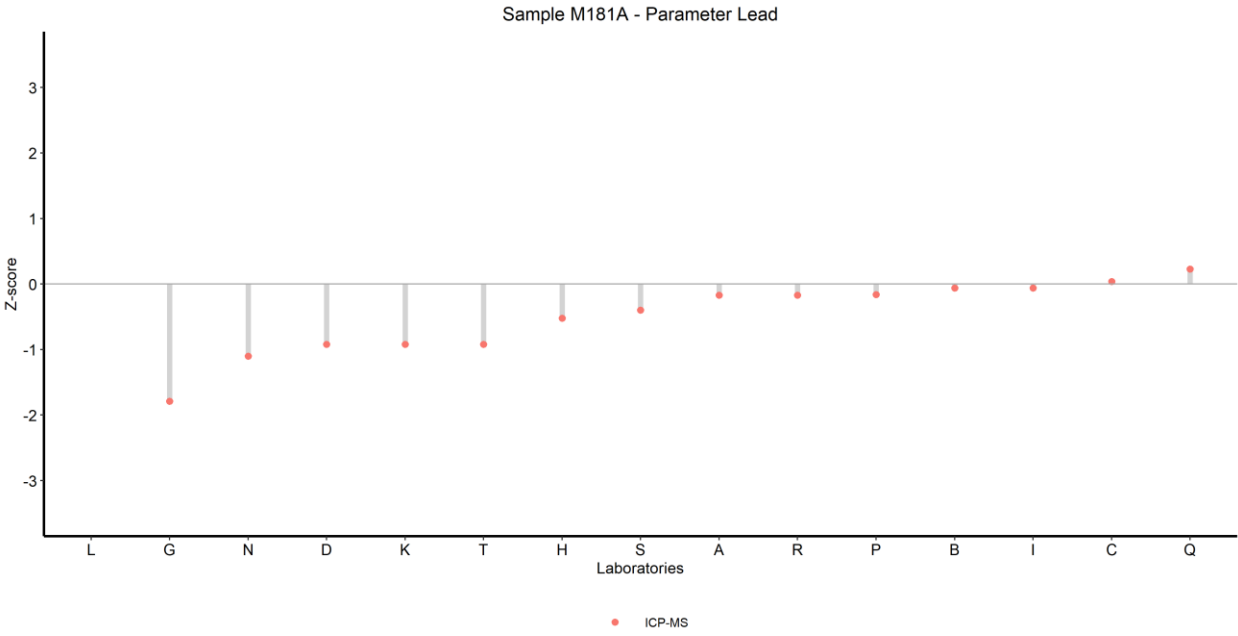
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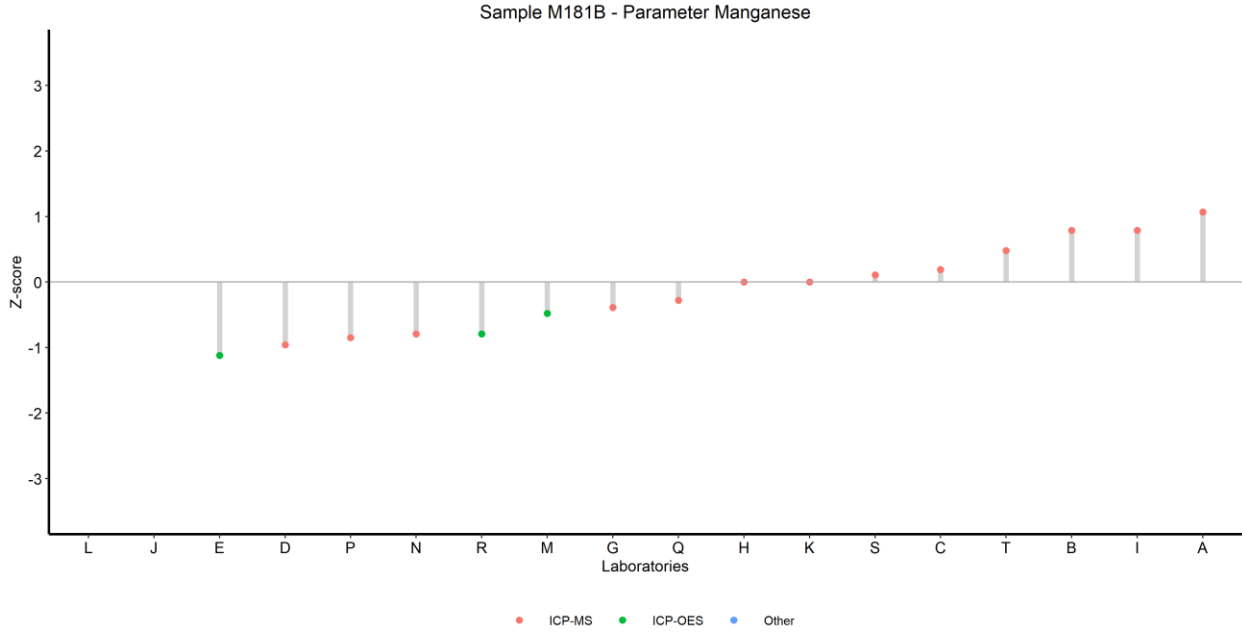
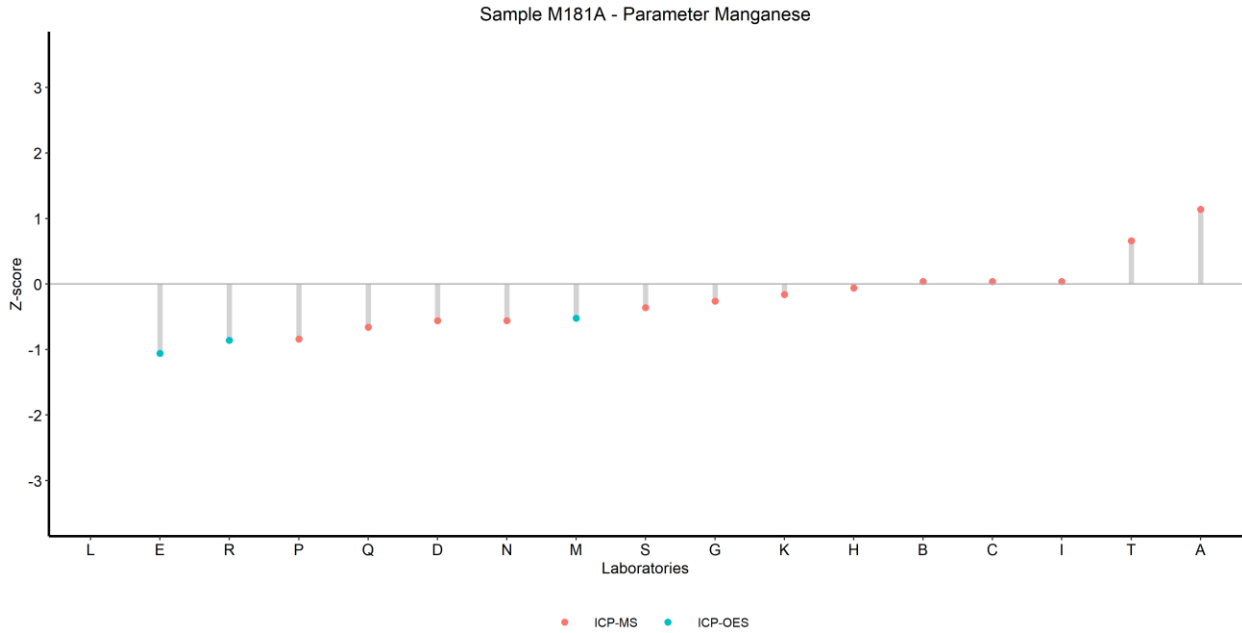
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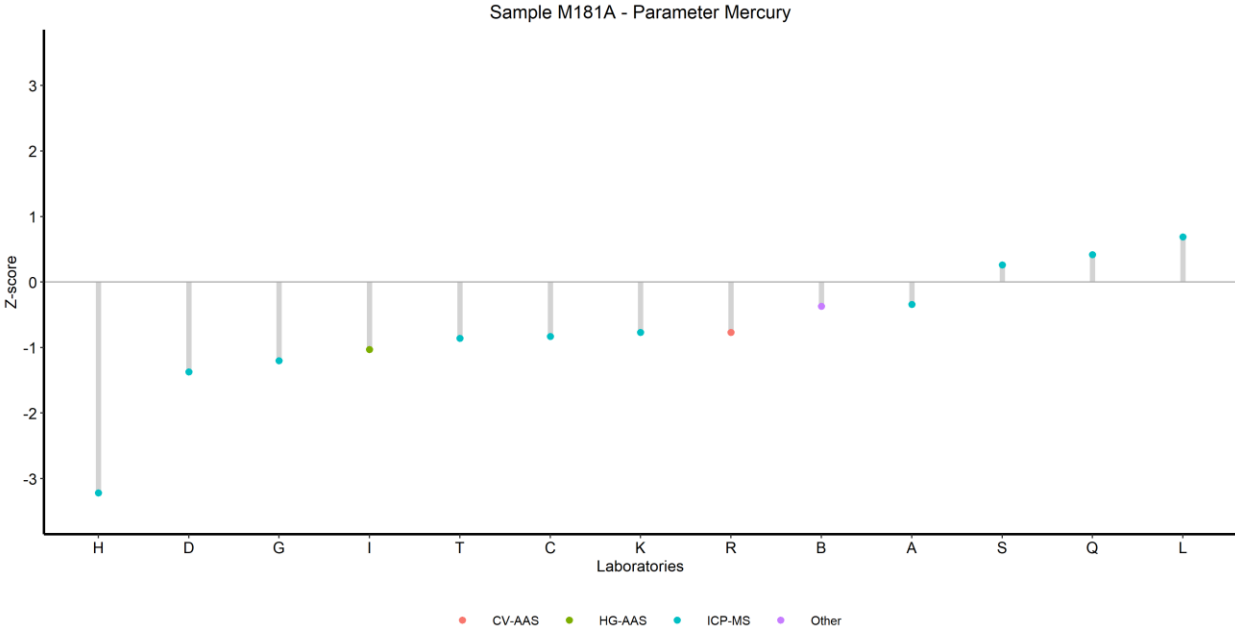
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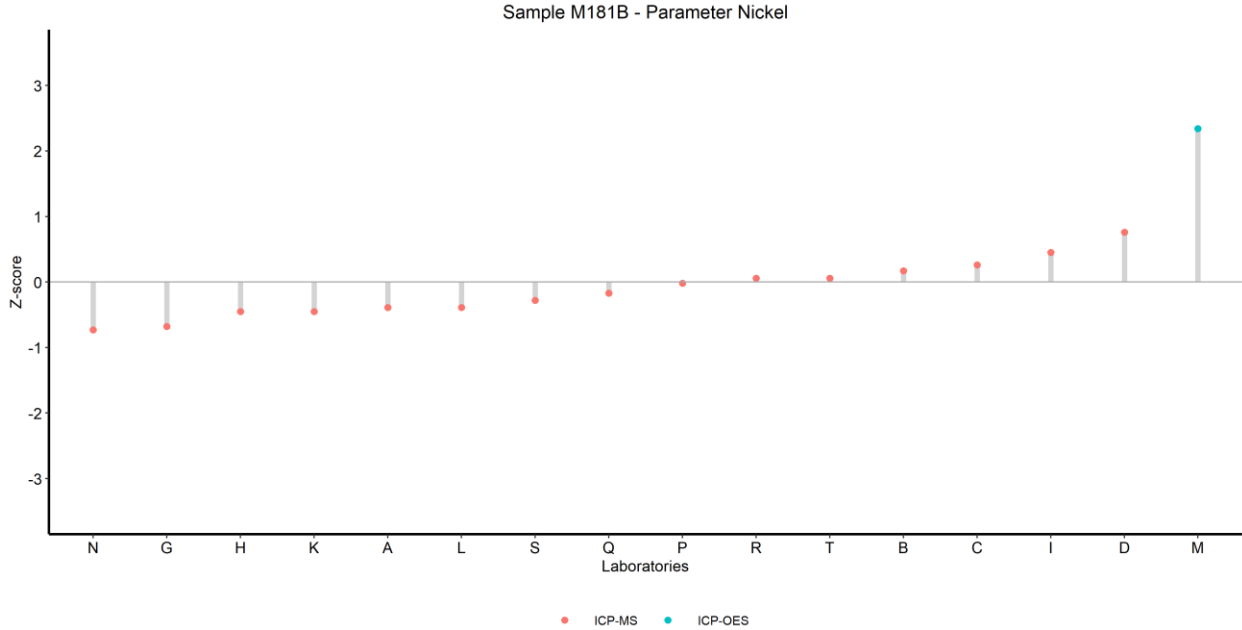
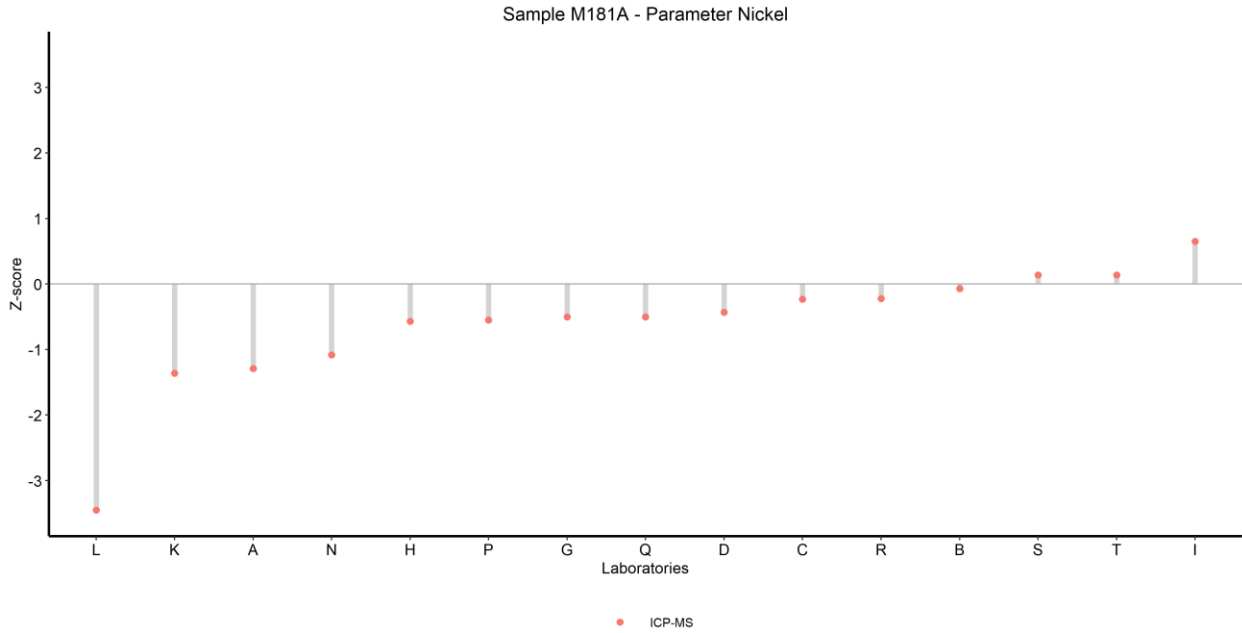
Manganese



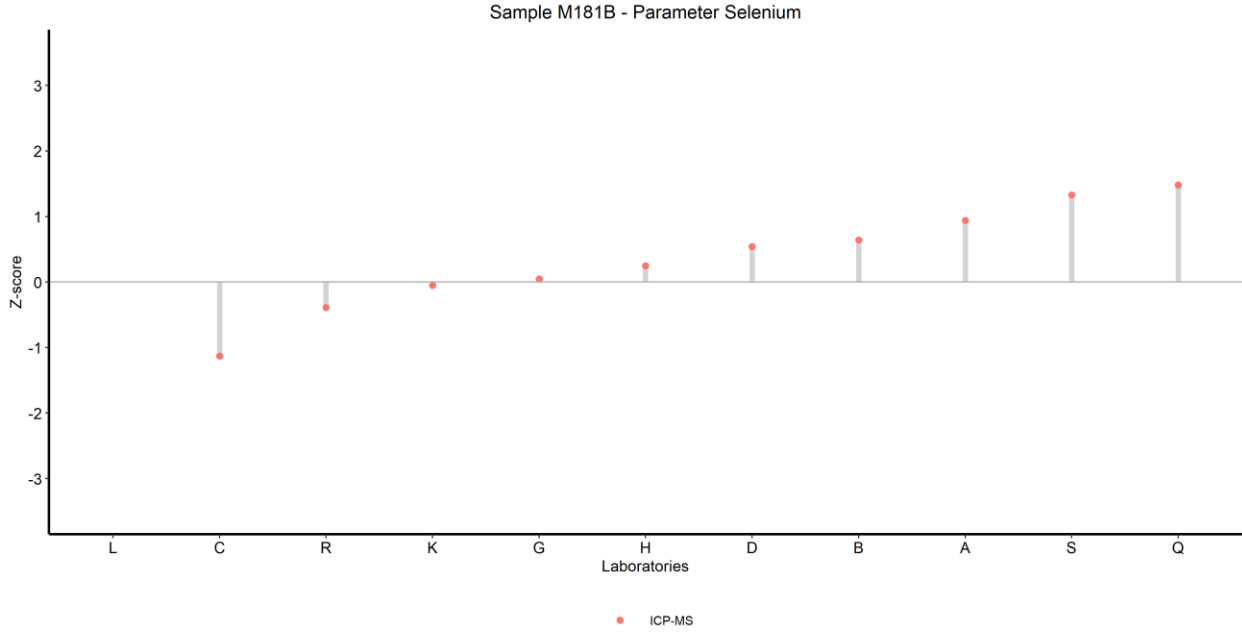
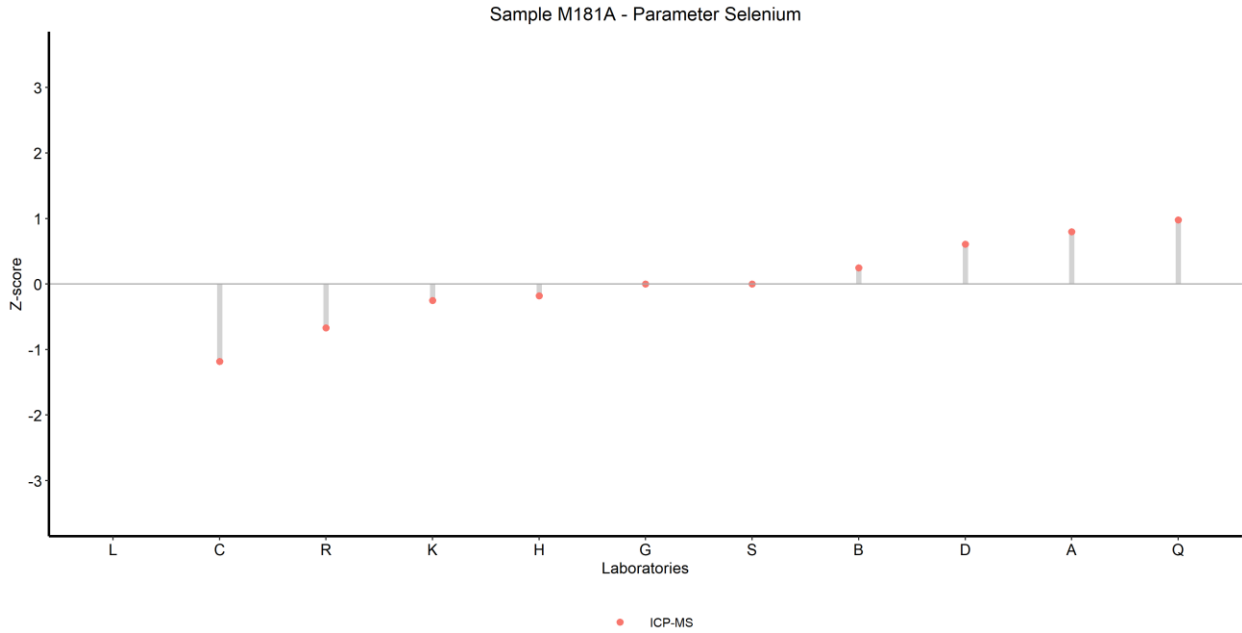
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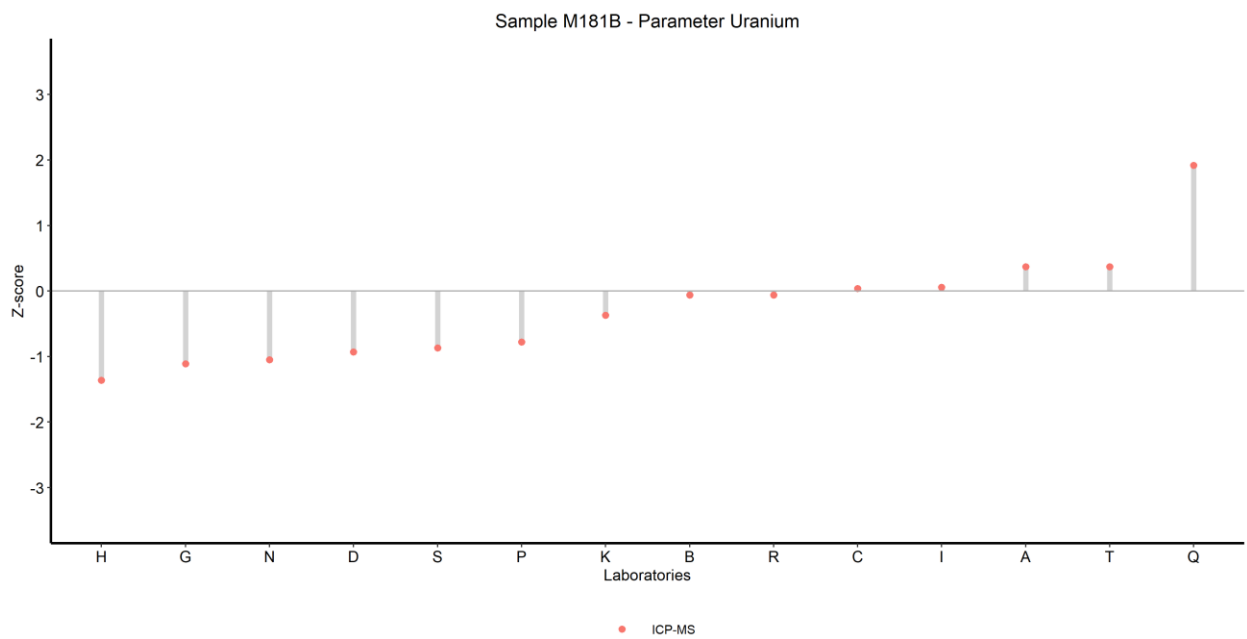
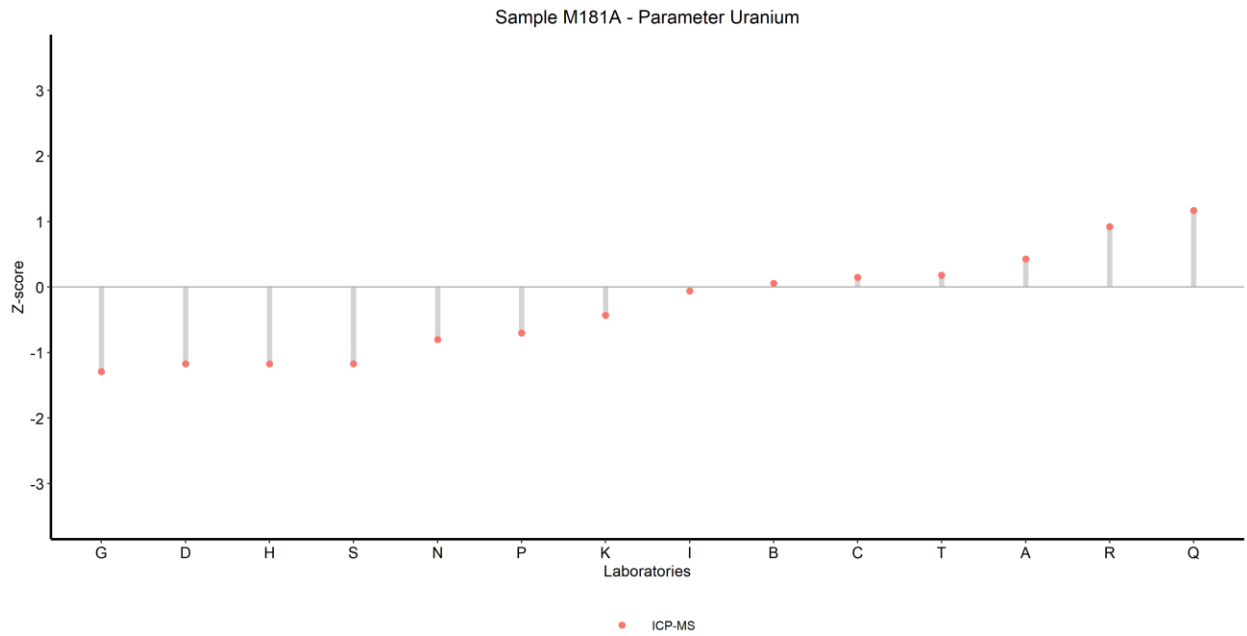
Nickel



Selenium



Uranium



Zinc

