



IFA-Proficiency Testing Scheme zur Wasseranalytik / for Water Analysis

Endbericht / Final Report
Eignungsprüfungsrunde / Proficiency testing round
M178

Metalle / Metals

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Anschrift / Address: **Universität für Bodenkultur Wien**
Department für Agrarwissenschaften
Institut für Bioanalytik und Agro-Metabolomics

BOKU UNIVERSITY
Department of Agricultural Sciences
Institute of Bioanalytics and Agro-Metabolomics
Leiter / Head: Prof. DI Dr. Rudolf Krska
Konrad-Lorenz-Str. 20
3430 Tulln
Österreich / Austria

Website: www.imatest.at / www.imatest.eu
www.ifa-tulln.boku.ac.at

Tel: +43(0) 1 47654 – Dw / Ext

IFA-Proficiency Testing Scheme:

Koordination und technische Leitung / Coordinator and technical management:

Ing. Dr. Stephan Freitag Dw / Ext 97312 stephan.freitag@boku.ac.at

Verantwortlich für die Durchführung / Responsible for the implementation:

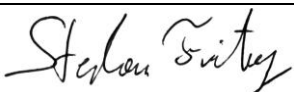
Ing. Uta Kachelmeier Dw / Ext 97306 uta.kachelmeier@boku.ac.at

Unter Mitarbeit von / With the collaboration of:

Ing. Caroline Stadlmann, Dipl.-HTL-Ing. Manuela Führer, Ing. Dr. Stephan Freitag, Dr. Wolfgang Kandler, Ing. Marco Reiter

Verantwortlich für die Freigabe des Berichts / Responsible for authorizing the report

Gesamtverantwortliche Leitung / Overall responsible management:

Approved by: Ing. Dr. Stephan Freitag	
Round M178:	Date / Signature: 13.10.2025 / 

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Allgemeine Informationen

Diese Zusammenfassung beschreibt die 178. Runde der regelmäßigen Eignungsprüfungen zur Parametergruppe „Metalle“. Die Prüfgegenstände M178A und M178B wurden am 08. September 2025 an 26 Teilnehmer versendet. Jedes Labor erhielt zwei Prüfgegenstände zu je 250 ml, abgefüllt in LDPE-Flaschen.

Einsendeschluss für die Ergebnisse war am 3. Oktober 2025. Von 25 Teilnehmern wurden Ergebnisse übermittelt.

Zur Anonymisierung wurde jedem Labor per Zufallsgenerator ein Buchstabencode zugeteilt.

Zusammensetzung des Prüfgegenstands

Die Prüfgegenstände M178A und M178B 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: 46 mg/l Ca, 19,4 mg/l Mg, 9,0 mg/l Na, 1,15 mg/l K, 19,1 mg/l SO_4^{2-} , 16,3 (16,8) mg/l Cl^- und 378 (693) $\mu\text{g/l}$ Sr M178A (M178B). 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 (M179) 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 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.

Auswertung

Mit den bei uns eingegangenen Messwerten wurde ein Ausreißertest nach Hampel durchgeführt. Die von diesem Test als auffällig eingestufteten 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 95,2 % (Cu in M178B) und 102,8 % (Se in M178A). Die aus den ausreißerbereinigten Daten berechneten Standardabweichungen bewegten sich im Bereich von 2,7 % (Mn in M178A) bis 12,2 % (Cr in M178B).

Zu den Mittelwerten und mittleren Wiederfindungen wurden auch die Vertrauensbereiche ($P = 99\%$) angegeben. Diese Vertrauensbereiche der Labormittelwerte enthielten in allen Fällen mit Ausnahme von Kupfer in M178B ($95,2\% \pm 3,6\%$) 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 der Vorgabe.

Für Kupfer in M78B wurde 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. Dieser Parameter entsprach sehr knapp nicht der Vorgabe:

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

Die von den Labors erzielten z-Scores waren jedoch unauffällig. Daher wurde auch für Cu in der Probe M178B der berechnete zugewiesene Wert mit seiner Standardunsicherheit übernommen.

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 Messwerts eines Labors vom zugewiesenen Wert zu einer vorgegebenen Standardabweichung.

Die Standardabweichungen für die Eignungsbewertung wurden aus den Ergebnissen der im Zeitraum 2014 - 2024 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 $\mu\text{g/l}$	entsprechen 101,94 % (Messwert des Labors)
X	72,3 $\mu\text{g/l}$	entsprechen 100 % (zugewiesener Wert)
σ_{pt}	5,4 $\mu\text{g/l}$	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 $\mu\text{g/l}$
Arsen	6,6 %	0,5 $\mu\text{g/l}$
Blei	6,5 %	0,3 $\mu\text{g/l}$
Cadmium	5,0 %	0,1 $\mu\text{g/l}$
Chrom	5,9 %	0,5 $\mu\text{g/l}$
Eisen	6,4 %	10 $\mu\text{g/l}$
Kupfer	7,3 %	1,0 $\mu\text{g/l}$
Mangan	5,1 %	2,0 $\mu\text{g/l}$
Nickel	6,4 %	0,75 $\mu\text{g/l}$
Quecksilber	11 %	0,2 $\mu\text{g/l}$
Selen	8,5 %	0,45 $\mu\text{g/l}$
Uran	5,4 %	0,35 $\mu\text{g/l}$
Zink	6,5 %	3 $\mu\text{g/l}$

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, 13. Oktober 2025

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

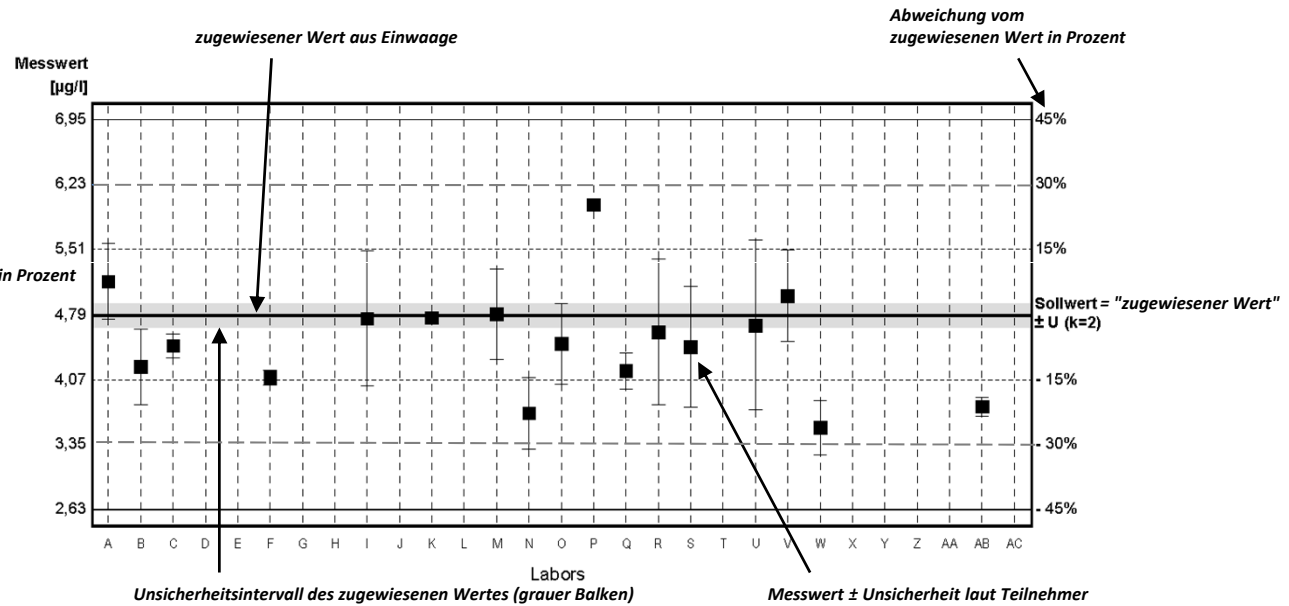
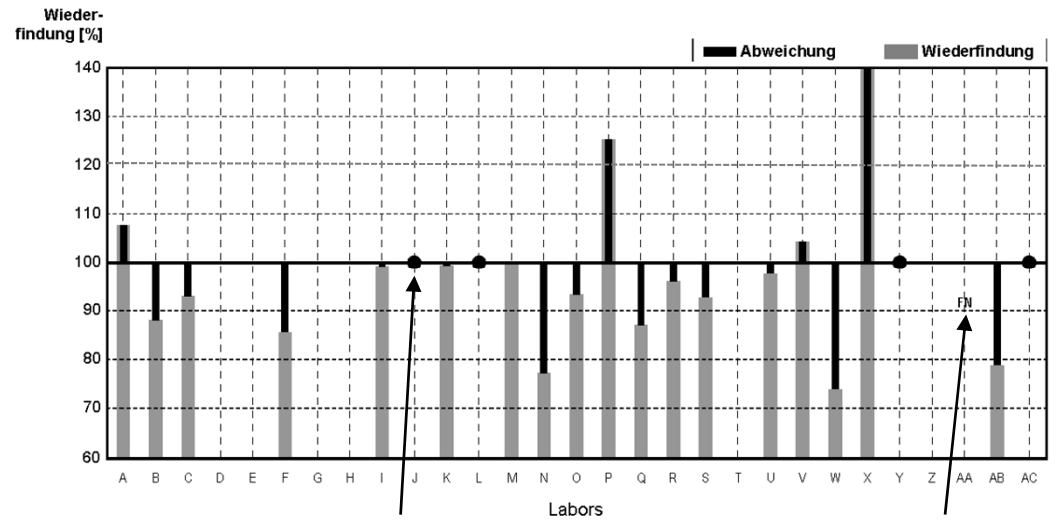


Diagramm 1: Messwerte mit zugehörigen Unsicherheitsintervallen



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 M178 (trace metals) within the IFA-Proficiency Testing Scheme for Water Analysis. The proficiency testing items M178A and M178B were distributed to 26 participants on Monday, 8 September 2025. 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, 03 October 2025. 25 participants submitted results. To ensure participant anonymity, each laboratory was randomly assigned a letter code.

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 46 mg/L Ca, 19.4 mg/L Mg, 9.0 mg/L Na, 1.15 mg/L K, 19.1 mg/L SO_4^{2-} , 16.3 (16.8) mg/L Cl⁻ and 378 (693) $\mu\text{g/L}$ Sr M178A (M178B). 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 M178A and M178B 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 (M179). 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 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 %).

The recoveries of the assigned concentrations, calculated from outlier-corrected data mean values ranged between 95.2 % (Cu in M178B) and 102.8 % (Se in M178A).

The between laboratory CVs covered the ranged between 2.7 % (Mn in M178A) and 12.2 % (Cr in M178B).

All confidence intervals of the outlier-corrected laboratory mean values except that for Cu in M178B ($95.2 \% \pm 3.6 \%$) 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 $u(x_{pp}) < 0,3\sigma_{pp}$ or $u(x_{pp}) < 0,1\delta E$, (DIN ISO 13528, Section 9.2) and met the requirement in all cases.

For Copper in M178B 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. It narrowly failed to meet the criterion:

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

However, the z-scores obtained by the laboratories showed no notable deviations. Therefore, the calculated assigned value with its standard uncertainty were also adopted for Cu in sample M178B.

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 2014 to 2024. 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 anticipate 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 $\mu\text{g/L}$	equivalent to 101.94 % (result of the laboratory)
X	72.3 $\mu\text{g/L}$	equivalent to 100 % (assigned value)
σ_{pt}	5.4 $\mu\text{g/L}$	equivalent to 7.5 % (standard deviation for proficiency assessment see table below)

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

The following table lists the standard deviations for proficiency assessment and their limits of applicability. Z-scores were only calculated, if the 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 $\mu\text{g/L}$
Arsenic	6.6 %	0.5 $\mu\text{g/L}$
Cadmium	5.0 %	0.1 $\mu\text{g/L}$
Chromium	5.9 %	0.5 $\mu\text{g/L}$
Copper	7.3 %	1.0 $\mu\text{g/L}$
Iron	6.4 %	10 $\mu\text{g/L}$
Lead	6.5 %	0.3 $\mu\text{g/L}$
Manganese	5.1 %	2.0 $\mu\text{g/L}$
Mercury	11 %	0.2 $\mu\text{g/L}$
Nickel	6.4 %	0.75 $\mu\text{g/L}$
Selenium	8.5 %	0.45 $\mu\text{g/L}$
Uranium	5.4 %	0.35 $\mu\text{g/L}$
Zinc	6.5 %	3 $\mu\text{g/L}$

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 on the basis of 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, 13 October 2025

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

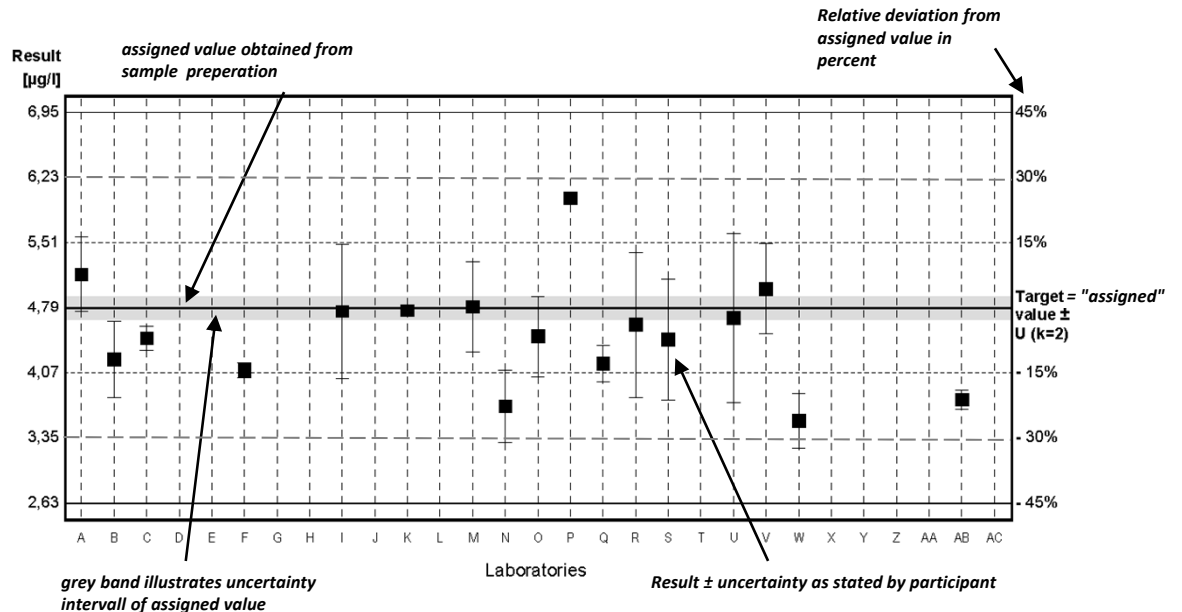


Diagram 1: Measurement results and their uncertainties

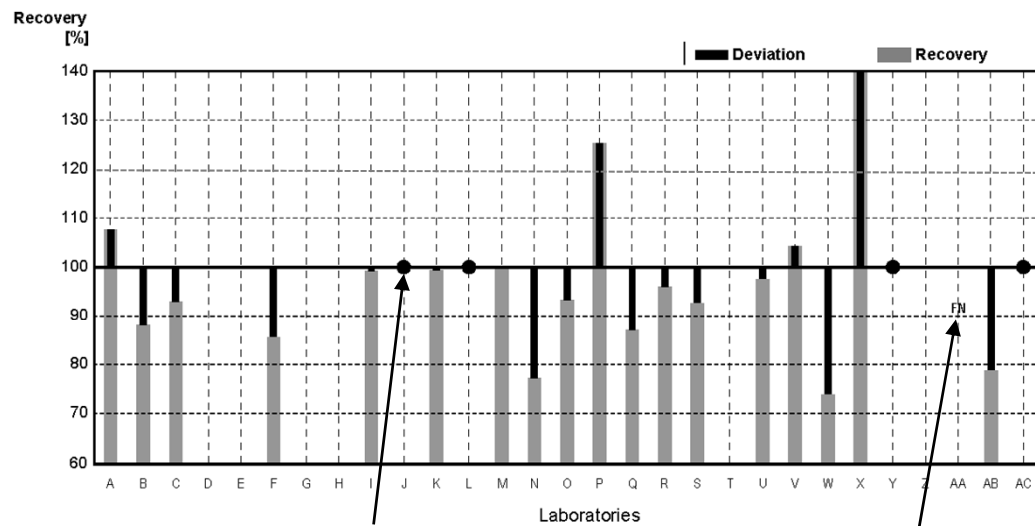


Diagram 2: Recoveries and deviations from assigned values

EXPLANATION



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

Eignungsprüfungsrunde / Proficiency testing round
M178

Metalle / Metals

Versand / Dispatch: 08.09.2025

Results M178A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
assigned value	12.36	1.075	4.23	0.993	4.58	45.5	3.44
IFA result	12.9	1.05	3.93	1.00	4.74	46.1	3.55
A							
B	12.5	1.20	3.96	0.993	4.46	43.3	3.06
C	11.7	1.10	3.67	0.95	4.65	46.3	3.25
D	18.26	1.133	3.816	1.006	4.453	42.34	4.830
E	31.6	2.44	2.62	0.57	6.2	46.2	1.88
F	11.8	1.08	4.03	0.973	4.46	43.3	3.15
G	13.0	<1	4.28	0.900	4.48	43.0	3.28
H	12.585	1.011	4.238	0.997	4.511	46.513	3.384
I	12.0	1.22	4.16	0.990	4.73	44.5	3.70
J	13.8	1.15	4.32	1.05	4.82	45.2	3.42
K	14.00	1.10	3.90	0.96	4.50	44.0	3.30
L	12.2	1.04	4.06	1.01	4.53	45.8	3.38
M	<40	1.38	4.43	0.946	4.76	44.5	<5
N	12.7	1.21	4.54	1.01	4.84	46.9	3.30
O	11.3	0.884	3.35	0.778	4.01	39.3	2.69
P	14.9	1.13	4.31	1.01	4.87	46.5	3.36
Q	49.15	1.37	4.345	0.845	4.775	79.25	3.725
R	12.6	1.09	3.88	0.981	4.46	45.85	3.16
S	11.5	1.13	4.24	0.993	4.35	43.9	3.42
T	12.9	1.08	4.04	0.97	4.44	44.5	3.39
U					3.786		
V	11.93	0.655	2.91	0.945	3.85	92.7	9.96
W	12.7	1.07	4.14	1.00	4.69	42.4	3.07
X							
Y	11.6	1.10	4.50	1.00	4.30	42.7	3.20
Z	8.99	1.03	4.04	0.96	3.99	39.9	2.94

All data in µg/L

Measurement Uncertainties M178A

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
assigned value	0.18	0.015	0.03	0.011	0.03	0.2	0.03
IFA result	0.5	0.10	0.20	0.06	0.15	3.5	0.25
A							
B							
C	0.96	0.10	0.19	0.21	0.73	7.4	0.51
D							
E	2.0	0.24	0.20	0.04	0.4	3.2	0.12
F	2.4	0.16	0.48	0.12	0.67	6.5	0.38
G	2.6		0.86	0.18	0.90	8.6	0.66
H	2.04	0.2	0.52	0.08	0.33	4.74	0.38
I	0.91	0.15	0.36	0.11	0.35	2.2	0.30
J	4.1	0.35	0.65	0.16	1.45	6.8	1.02
K	1.40	0.132	0.312	0.0768	0.540	11.44	0.264
L	3.1	0.32	1.02	0.26	1.4	13.8	0.85
M		0.21	0.85	0.19	0.57	5.16	
N	1.90	0.18	0.68	0.15	0.73	7.04	0.50
O	2.3	0.177	0.67	0.156	0.80	7.9	0.54
P	0.153	0.015	0.023	0.033	0.046	0.265	0.056
Q							
R							
S	0.229	0.0632	0.0319	0.00792	0.147	0.222	0.0480
T	2.2	0.30	0.37	0.12	0.41	4.0	0.44
U							
V	2.39	0.131	0.582	0.189	0.770	18.5	1.99
W	1.27	0.107	0.414	0.100	0.469	4.24	0.307
X							
Y	1.32	0.06	0.29	0.05	0.51	5.08	0.30
Z	0.899	0.050	0.182	0.015	0.138	1.39	0.131

All data in µg/L

Results M178A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
assigned value	21.94	3.46	1.800	1.20	4.98	56
IFA result	22.8	3.49	1.82	1.17	4.24	64
A						
B	21.1	3.24	1.64	1.30	4.84	54.4
C	22.0	3.37	1.77	1.30	4.61	53
D	19.46	3.282	172.2	1.102	4.439	53.51
E	22.1	3.22	0.962	<0.20		66.4
F	21.4	3.36	1.71	1.17	4.68	53.3
G	21.3	3.25	1.48	1.18	4.20	54.5
H	22.094	3.411	1.758	1.123	4.860	55.292
I	21.7	3.46		1.34	4.90	57.8
J	22.5	3.68		1.21	5.21	57.4
K	22.0	3.30	1.92	1.20	4.61	54.0
L	22.1	3.13	2.36	1.15	4.60	56.8
M	22.3	3.67				56.0
N	22.3	3.53	1.84	1.28	5.34	55.1
O	18.1	2.80	1.36	<1.0	4.84	51.6
P	22.3	3.83	1.77	1.28	4.77	56.0
Q	22.05	3.685	1.895	1.375		41.7
R	21.6	3.32	1.78	1.38	4.77	51.6
S	21.2	3.48	1.71	1.23	4.85	54.5
T	21.0	3.59	1.72	1.19	4.70	55.0
U						
V	33.8	3.32	1.93	3.29		59.13
W	23.2	3.58	1.72	1.22	5.09	53.5
X			1.77			
Y	20.9	3.20	1.80	1.30	5.60	52.1
Z	18.9	2.97	1.70	1.11	4.46	51.7

All data in µg/L

Measurement Uncertainties M178A

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
assigned value	0.13	0.03	0.018	0.02	0.03	1
IFA result	1.5	0.16	0.30	0.15	0.42	8
A						
B						
C	1.05	0.31	0.33	0.07	0.16	6.9
D						
E	1.6	0.23	0.275			9.8
F	2.6	0.37	0.38	0.18	0.70	8.0
G	4.3	0.65	0.30	0.24	0.84	11
H	1.83	0.33	0.08	0.22	0.7	9.79
I	1.68	0.26		0.16	0.47	5.8
J	3.4	1.10		0.36	0.78	8.6
K	2.20	0.330	0.288	0.180	0.231	5.40
L	6.7	0.79	0.71	0.46	1.4	12
M	1.31	0.57				11.70
N	3.34	0.53	0.28	0.19	0.80	8.26
O	3.6	0.56	0.27	0.50	0.97	10.3
P	0.05	0.060	0.015	0.025	0.071	0.458
Q			0.661			
R						
S	0.654	0.0687	0.0288	0.0698	0.0247	1.63
T	1.3	0.43	0.29	0.33	0.25	6.4
U						
V	6.76	0.664	0.386	0.658		11.83
W	2.32	0.358	0.172	0.122	0.509	5.35
X			0.35			
Y	1.38	0.27	0.37	0.01	0.56	7.35
Z	0.88	0.083	0.104	0.019	0.351	0.66

All data in µg/L

Results M178B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
assigned value	20.4	1.592	2.55	1.916	1.233	15.16	5.28
IFA result	21.9	1.55	2.26	1.97	1.29	15.2	5.4
A							
B	22.9	1.68	2.36	1.92	1.49	14.2	5.04
C	19.4	1.59	2.15	1.86	1.25	15.8	5.0
D	26.1	1.685	2.194	1.878	1.435	13.35	6.596
E	33.9	2.60	1.42	1.17	0.54	15.9	3.13
F	19.7	1.57	2.39	1.89	1.18	15.9	4.84
G	21.3	1.38	2.50	1.73	1.20	14.0	4.93
H	21.11	1.507	2.553	1.916	1.207	15.497	5.239
I	20.2	1.75	2.49	1.89	1.30	14.1	5.45
J	21.9	1.71	2.59	2.02	1.44	15.4	5.30
K	22.0	1.60	2.30	1.86	1.20	15.0	5.00
L	20.2	1.55	2.44	1.98	1.20	15.5	5.24
M	<40	2.26	2.56	1.90	<2	14.0	5.17
N	20.9	1.76	3.04	1.97	1.30	16.2	4.95
O	18.9	1.36	2.03	1.52	1.13	13.9	4.46
P	23.7	1.66	2.61	1.92	1.42	17.0	5.12
Q	69.0	1.620	2.805	1.590	1.345	25.85	5.720
R	21.1	1.58	2.32	1.928	1.19	16.07	4.83
S	19.5	1.68	2.52	1.90	1.08	14.3	5.14
T	20.7	1.67	2.53	1.88	1.18	14.7	5.1
U					0.9659		
V	20.73	2.78	1.07	2.16	1.59	162.5	
W	20.4	1.58	2.51	1.92	1.26	14.4	4.76
X							
Y	19.0	3.00	2.70	2.00	1.10	13.0	4.60
Z	16.7	1.55	2.43	1.86	1.06	13.5	4.63

All data in µg/L

Measurement Uncertainties M178B

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
assigned value	0.2	0.016	0.02	0.014	0.013	0.15	0.04
IFA result	0.8	0.14	0.11	0.12	0.07	1.1	0.4
A							
B							
C	1.59	0.15	0.11	0.40	0.20	2.5	0.79
D							
E	2.1	0.26	0.11	0.08	0.04	1.1	0.20
F	3.9	0.24	0.29	0.23	0.18	2.4	0.58
G	4.3	0.28	0.50	0.35	0.24	2.8	0.99
H	3.42	0.3	0.31	0.16	0.09	1.58	0.59
I	1.52	0.21	0.21	0.22	0.10	0.7	0.44
J	6.6	0.51	0.39	0.30	0.43	4.6	1.59
K	2.20	0.192	0.184	0.1488	0.144	3.90	0.400
L	5.1	0.47	0.61	0.50	0.36	4.7	1.3
M		0.29	0.49	0.38		1.62	0.61
N	3.14	0.26	0.46	0.30	0.20	2.43	0.74
O	3.8	0.27	0.50	0.30	0.23	2.8	0.89
P	0.503	0.023	0.057	0.057	0.035	0.458	0.044
Q							
R							
S	0.200	0.0608	0.0341	0.0197	0.196	0.239	0.0461
T	3.0	0.34	0.25	0.19	0.31	1.6	0.5
U							
V	4.15	0.556	0.214	0.432	0.318	32.5	
W	2.04	0.158	0.251	0.192	0.126	1.44	0.476
X							
Y	2.17	0.16	0.18	0.10	0.13	1.55	0.43
Z	0.89	0.042	0.170	0.037	0.047	0.43	0.108

All data in µg/L

Results M178B

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
assigned value	15.10	9.06	1.004	1.95	2.391	17.2
IFA result	15.6	9.2	0.86	2.24	1.80	18.2
A						
B	14.5	9.06	0.87	2.06	2.29	15.9
C	15.6	8.8	0.96	2.20	2.16	16.3
D	13.27	8.788	95.56	1.896	1.875	15.69
E	14.5	9.08	0.356	<0.20		43.8
F	14.7	8.77	0.991	1.91	2.28	16.4
G	14.5	8.50	0.760	1.98	2.05	16.3
H	15.231	9.235	0.957	1.804	2.34	16.967
I	15.0	9.18		2.10	2.29	17.3
J	15.5	9.40		1.98	2.51	17.9
K	15.0	8.80	1.047	1.90	2.20	17.0
L	15.2	8.74	1.31	1.97	2.20	17.5
M	15.3	9.16				17.1
N	15.1	9.16	1.03	2.25	2.75	17.2
O	14.2	7.69	0.648	1.63	2.28	15.1
P	15.3	8.88	0.979	1.99	2.26	17.3
Q	15.60	8.905	1.050	1.645		15.5
R	14.97	8.65	1.02	2.19	2.31	15.6
S	14.3	8.93	0.938	2.04	2.28	15.9
T	14.5	8.7	0.98	2.13	2.35	17.8
U						
V	38.1	9.03	0.976	5.42		15.97
W	15.5	9.22	1.01	2.06	2.47	14.9
X			0.92			
Y	14.3	8.30	0.90	1.50	2.50	15.7
Z	13.2	7.98	0.94	1.77	2.09	15.7

All data in µg/L

Measurement Uncertainties M178B

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
assigned value	0.11	0.06	0.016	0.02	0.018	0.6
IFA result	1.0	0.4	0.14	0.29	0.18	2.9
A						
B						
C	0.75	0.81	0.18	0.12	0.08	2.11
D						
E	1.0	0.66	0.102			6.5
F	1.8	0.96	0.22	0.29	0.34	2.5
G	2.9	1.7	0.15	0.40	0.41	3.3
H	1.26	0.89	0.04	0.36	0.33	3
I	1.16	0.68		0.24	0.22	1.7
J	2.3	2.82		0.59	0.38	2.7
K	1.50	0.880	0.1571	0.285	0.110	1.70
L	4.6	2.2	0.40	0.8	0.66	3.5
M	0.90	1.41				3.57
N	2.26	1.37	0.15	0.34	0.41	2.58
O	2.8	1.54	0.130	0.50	0.50	3.0
P	0.100	0.076	0.019	0.021	0.026	0.354
Q			0.366			
R						
S	0.681	0.0735	0.0275	0.0665	0.0237	0.262
T	1.0	0.7	0.17	0.44	0.22	2.3
U						
V	7.62	1.81	0.195	1.08		3.19
W	1.55	0.922	0.101	0.206	0.247	1.49
X			0.18			
Y	0.94	0.69	0.19	0.01	0.25	2.21
Z	0.49	0.186	0.080	0.018	0.359	1.73

All data in µg/L

z-Scores M178A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A							
B	0.15	1.76	-0.98	0.00	-0.44	-0.76	-1.51
C	-0.71	0.35	-2.04	-0.87	0.26	0.27	-0.76
D	6.36	0.82	-1.51	0.26	-0.47	-1.09	5.54
E	20.76	19.24	-5.86	-8.52	6.00	0.24	-6.21
F	-0.60	0.07	-0.73	-0.40	-0.44	-0.76	-1.15
G	0.69		0.18	-1.87	-0.37	-0.86	-0.64
H	0.24	-0.90	0.03	0.08	-0.26	0.35	-0.22
I	-0.39	2.04	-0.25	-0.06	0.56	-0.34	1.04
J	1.55	1.06	0.33	1.15	0.89	-0.10	-0.08
K	1.77	0.35	-1.20	-0.66	-0.30	-0.52	-0.56
L	-0.17	-0.49	-0.62	0.34	-0.19	0.10	-0.24
M		4.30	0.73	-0.95	0.67	-0.34	
N	0.37	1.90	1.13	0.34	0.96	0.48	-0.56
O	-1.14	-2.69	-3.20	-4.33	-2.11	-2.13	-2.99
P	2.74	0.78	0.29	0.34	1.07	0.34	-0.32
Q	39.69	4.16	0.42	-2.98	0.72	11.59	1.13
R	0.26	0.21	-1.27	-0.24	-0.44	0.12	-1.12
S	-0.93	0.78	0.04	0.00	-0.85	-0.55	-0.08
T	0.58	0.07	-0.69	-0.46	-0.52	-0.34	-0.20
U					-2.94		
V	-0.46	-5.92	-4.80	-0.97	-2.70	16.21	25.96
W	0.37	-0.07	-0.33	0.14	0.41	-1.06	-1.47
X							
Y	-0.82	0.35	0.98	0.14	-1.04	-0.96	-0.96
Z	-3.64	-0.63	-0.69	-0.66	-2.18	-1.92	-1.99

z-Scores M178A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A						
B	-0.75	-0.99	-0.81	0.98	-0.52	-0.44
C	0.05	-0.41	-0.15	0.98	-1.38	-0.82
D	-2.22	-0.80	860.61	-0.96	-2.01	-0.68
E	0.14	-1.08	-4.23			2.86
F	-0.48	-0.45	-0.45	-0.29	-1.12	-0.74
G	-0.57	-0.95	-1.62	-0.20	-2.90	-0.41
H	0.14	-0.22	-0.21	-0.75	-0.45	-0.19
I	-0.21	0.00		1.37	-0.30	0.49
J	0.50	0.99		0.10	0.86	0.38
K	0.05	-0.72	0.61	0.00	-1.38	-0.55
L	0.14	-1.49	2.83	-0.49	-1.41	0.22
M	0.32	0.95				0.00
N	0.32	0.32	0.20	0.78	1.34	-0.25
O	-3.43	-2.98	-2.22		-0.52	-1.21
P	0.32	1.67	-0.15	0.78	-0.78	0.00
Q	0.10	1.02	0.48	1.72		-3.93
R	-0.30	-0.63	-0.10	1.76	-0.78	-1.21
S	-0.66	0.09	-0.45	0.29	-0.48	-0.41
T	-0.84	0.59	-0.40	-0.10	-1.04	-0.27
U						
V	10.60	-0.63	0.66	20.49		0.86
W	1.13	0.54	-0.40	0.20	0.41	-0.69
X			-0.15			
Y	-0.93	-1.17	0.00	0.98	2.31	-1.07
Z	-2.72	-2.21	-0.51	-0.88	-1.93	-1.18

z-Scores M178B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
A							
B	1.63	0.84	-1.15	0.04	3.53	-0.99	-0.62
C	-0.65	-0.02	-2.41	-0.58	0.23	0.66	-0.73
D	3.73	0.89	-2.15	-0.40	2.78	-1.87	3.41
E	8.82	9.59	-6.82	-7.79	-9.53	0.76	-5.58
F	-0.46	-0.21	-0.97	-0.27	-0.73	0.76	-1.14
G	0.59	-2.02	-0.30	-1.94	-0.45	-1.20	-0.91
H	0.46	-0.81	0.02	0.00	-0.36	0.35	-0.11
I	-0.13	1.50	-0.36	-0.27	0.92	-1.09	0.44
J	0.98	1.12	0.24	1.09	2.85	0.25	0.05
K	1.05	0.08	-1.51	-0.58	-0.45	-0.16	-0.73
L	-0.13	-0.40	-0.66	0.67	-0.45	0.35	-0.10
M		6.36	0.06	-0.17		-1.20	-0.29
N	0.33	1.60	2.96	0.56	0.92	1.07	-0.86
O	-0.98	-2.21	-3.14	-4.13	-1.42	-1.30	-2.13
P	2.16	0.65	0.36	0.04	2.57	1.90	-0.42
Q	31.76	0.27	1.54	-3.40	1.54	11.02	1.14
R	0.46	-0.11	-1.39	0.13	-0.59	0.94	-1.17
S	-0.59	0.84	-0.18	-0.17	-2.10	-0.89	-0.36
T	0.20	0.74	-0.12	-0.38	-0.73	-0.47	-0.47
U					-3.67		
V	0.22	11.31	-8.93	2.55	4.91	151.86	
W	0.00	-0.11	-0.24	0.04	0.37	-0.78	-1.35
X							
Y	-0.92	13.40	0.90	0.88	-1.83	-2.23	-1.76
Z	-2.42	-0.40	-0.72	-0.58	-2.38	-1.71	-1.69

z-Scores M178B

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
A						
B	-0.78	0.00	-1.21	0.66	-0.78	-1.16
C	0.65	-0.45	-0.40	1.51	-1.79	-0.81
D	-2.38	-0.47	856.18	-0.33	-4.00	-1.35
E	-0.78	0.03	-5.87			23.79
F	-0.52	-0.50	-0.12	-0.24	-0.86	-0.72
G	-0.78	-0.97	-2.21	0.18	-2.64	-0.81
H	0.17	0.30	-0.43	-0.88	-0.39	-0.21
I	-0.13	0.21		0.90	-0.78	0.09
J	0.52	0.59		0.18	0.92	0.63
K	-0.13	-0.45	0.39	-0.30	-1.48	-0.18
L	0.13	-0.55	2.77	0.12	-1.48	0.27
M	0.26	0.17				-0.09
N	0.00	0.17	0.24	1.81	2.78	0.00
O	-1.17	-2.36	-3.22	-1.93	-0.86	-1.88
P	0.26	-0.31	-0.23	0.24	-1.01	0.09
Q	0.65	-0.27	0.42	-1.84		-1.52
R	-0.17	-0.71	0.14	1.45	-0.63	-1.43
S	-1.04	-0.22	-0.60	0.54	-0.86	-1.16
T	-0.78	-0.62	-0.22	1.09	-0.32	0.54
U						
V	29.87	-0.05	-0.25	20.94		-1.10
W	0.52	0.28	0.05	0.66	0.61	-2.06
X			-0.76			
Y	-1.04	-1.31	-0.94	-2.71	0.84	-1.34
Z	-2.47	-1.86	-0.58	-1.09	-2.33	-1.34

Sample M178A

Parameter Aluminium

Assigned value ± U (k=2) 12,36 µg/l ± 0,18 µg/l

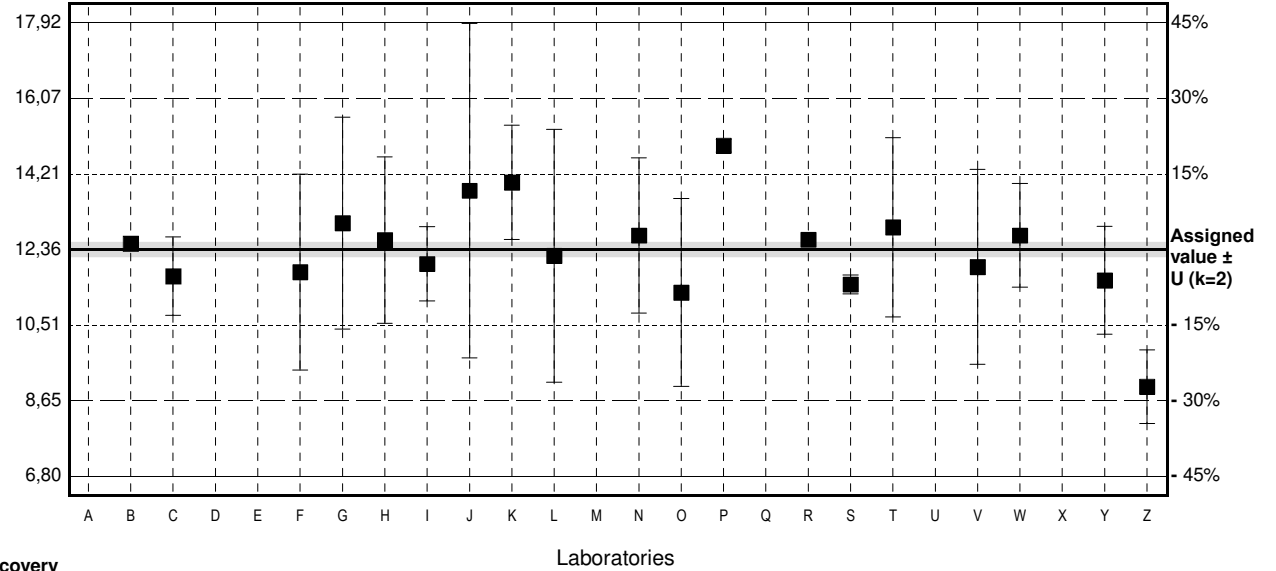
IFA result ± U (k=2) 12,9 µg/l ± 0,5 µg/l

Stability test µg/l

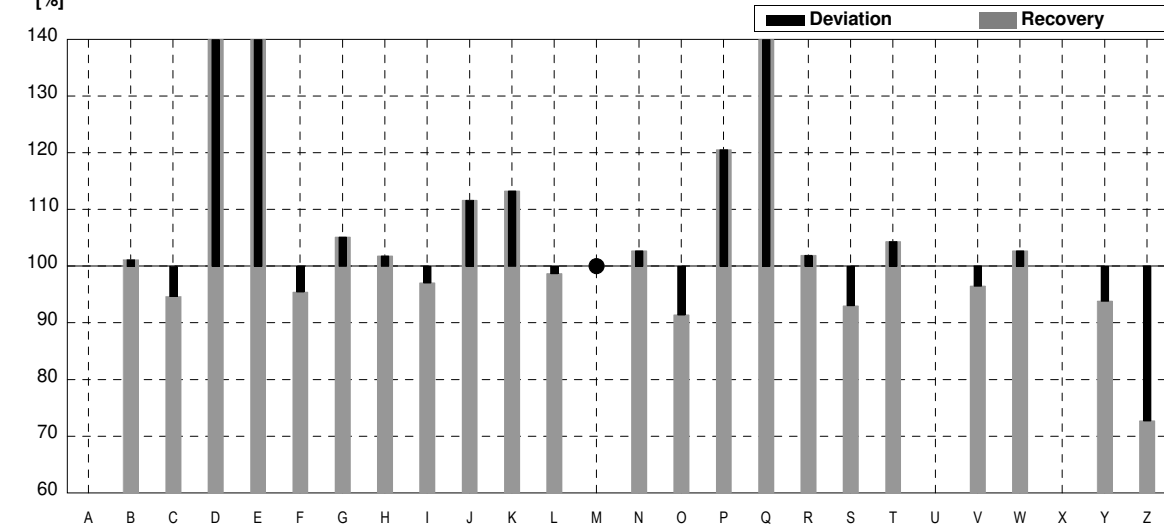
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	12,5		µg/l	101%	0,15
C	11,7	0,96	µg/l	95%	-0,71
D	18,26 *		µg/l	148%	6,36
E	31,6 *	2,0	µg/l	256%	20,76
F	11,8	2,4	µg/l	95%	-0,60
G	13,0	2,6	µg/l	105%	0,69
H	12,585	2,04	µg/l	102%	0,24
I	12,0	0,91	µg/l	97%	-0,39
J	13,8	4,1	µg/l	112%	1,55
K	14,00	1,40	µg/l	113%	1,77
L	12,2	3,1	µg/l	99%	-0,17
M	<40		µg/l	*	
N	12,7	1,90	µg/l	103%	0,37
O	11,3	2,3	µg/l	91%	-1,14
P	14,9	0,153	µg/l	121%	2,74
Q	49,15 *		µg/l	398%	39,69
R	12,6		µg/l	102%	0,26
S	11,5	0,229	µg/l	93%	-0,93
T	12,9	2,2	µg/l	104%	0,58
U			µg/l		
V	11,93	2,39	µg/l	97%	-0,46
W	12,7	1,27	µg/l	103%	0,37
X			µg/l		
Y	11,6	1,32	µg/l	94%	-0,82
Z	8,99	0,899	µg/l	73%	-3,64

	All results	Outliers excl.	Unit
Mean ± CI(99%)	15,17 ± 5,29	12,35 ± 0,81	µg/l
Recov. ± CI(99%)	122,7 ± 42,8	99,9 ± 6,6	%
SD between labs	8,76	1,23	µg/l
RSD between labs	57,8	9,9	%
n for calculation	22	19	

Result
[µg/l]



Recovery
[%]



Sample M178B

Parameter Aluminium

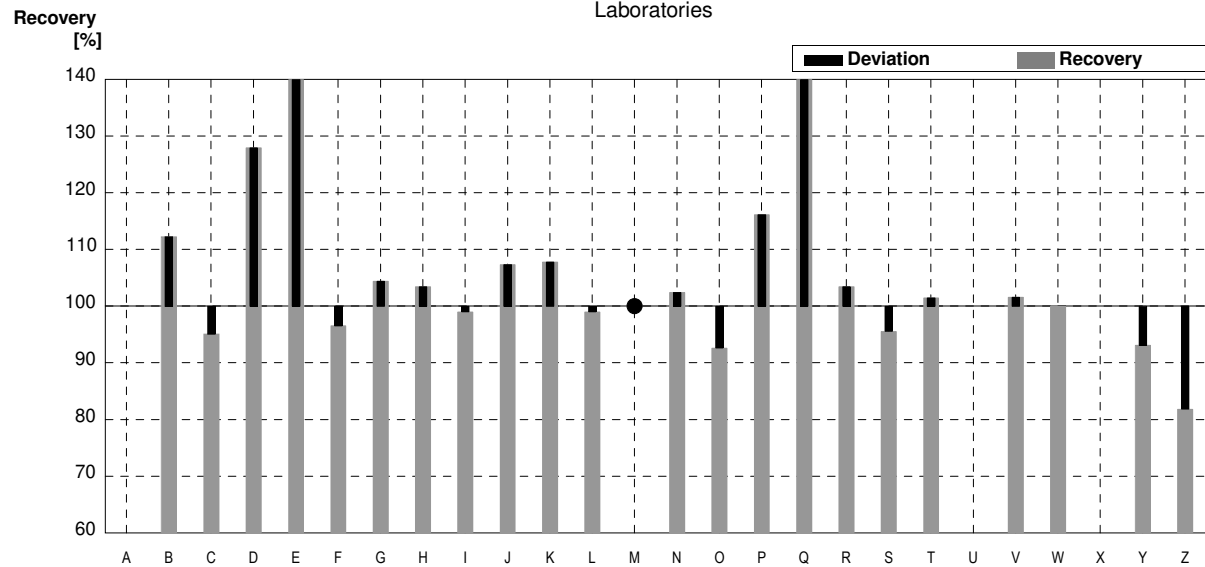
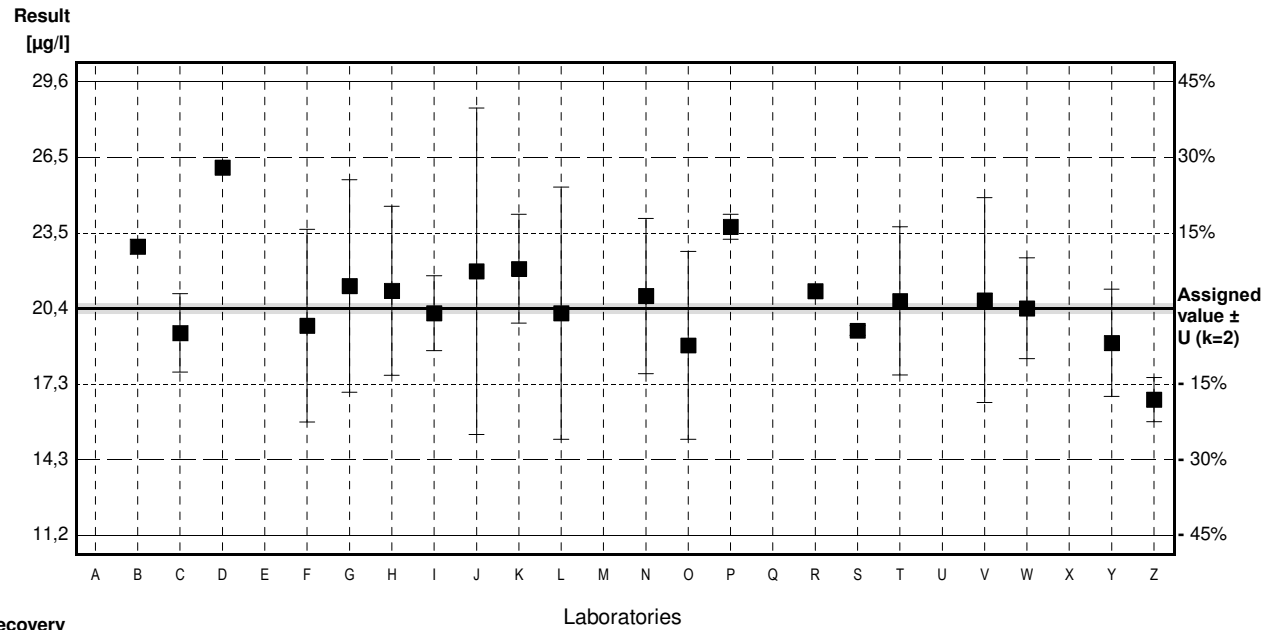
Assigned value ± U (k=2) 20,4 µg/l ± 0,2 µg/l

IFA result ± U (k=2) 21,9 µg/l ± 0,8 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	22,9		µg/l	112%	1,63
C	19,4	1,59	µg/l	95%	-0,65
D	26,1		µg/l	128%	3,73
E	33,9 *	2,1	µg/l	166%	8,82
F	19,7	3,9	µg/l	97%	-0,46
G	21,3	4,3	µg/l	104%	0,59
H	21,11	3,42	µg/l	103%	0,46
I	20,2	1,52	µg/l	99%	-0,13
J	21,9	6,6	µg/l	107%	0,98
K	22,0	2,20	µg/l	108%	1,05
L	20,2	5,1	µg/l	99%	-0,13
M	<40		µg/l	*	
N	20,9	3,14	µg/l	102%	0,33
O	18,9	3,8	µg/l	93%	-0,98
P	23,7	0,503	µg/l	116%	2,16
Q	69,0 *		µg/l	338%	31,76
R	21,1		µg/l	103%	0,46
S	19,5	0,200	µg/l	96%	-0,59
T	20,7	3,0	µg/l	101%	0,20
U			µg/l		
V	20,73	4,15	µg/l	102%	0,22
W	20,4	2,04	µg/l	100%	0,00
X			µg/l		
Y	19,0	2,17	µg/l	93%	-0,92
Z	16,7	0,89	µg/l	82%	-2,42

	All results	Outliers excl.	Unit
Mean ± CI(99%)	23,6 ± 6,4	20,8 ± 1,3	µg/l
Recov. ± CI(99%)	115,7 ± 31,6	102,1 ± 6,2	%
SD between labs	10,7	2,0	µg/l
RSD between labs	45,2	9,4	%
n for calculation	22	20	



Sample M178A Parameter Arsenic

Assigned value ± U (k=2) 1,075 µg/l ± 0,015 µg/l

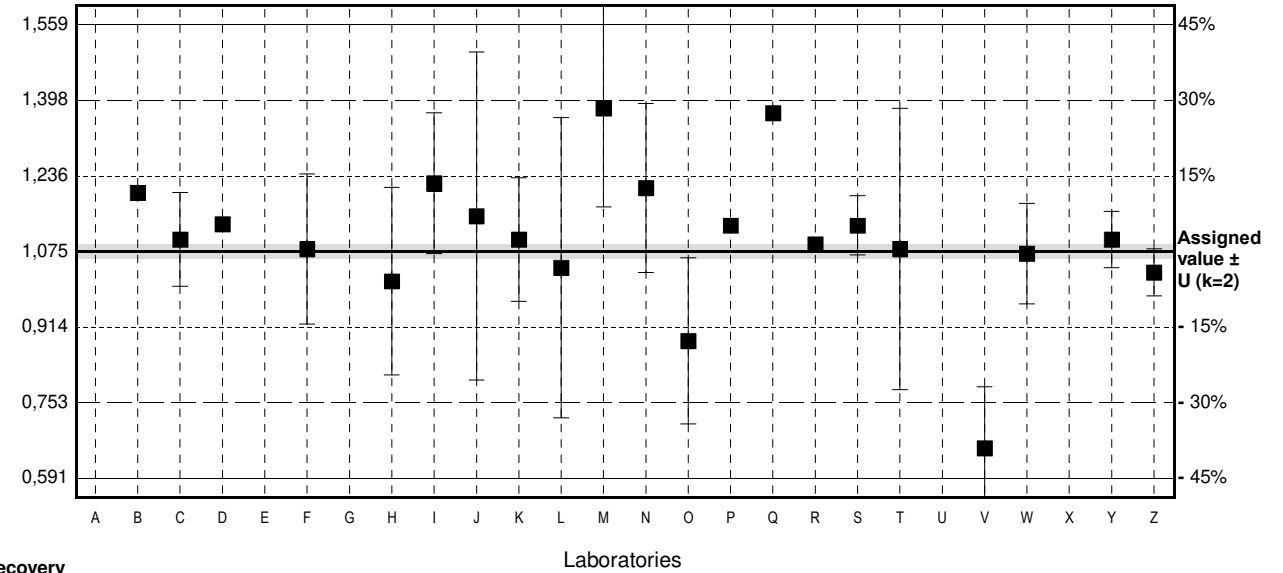
IFA result ± U (k=2) 1,05 µg/l ± 0,10 µg/l

Stability test µg/l

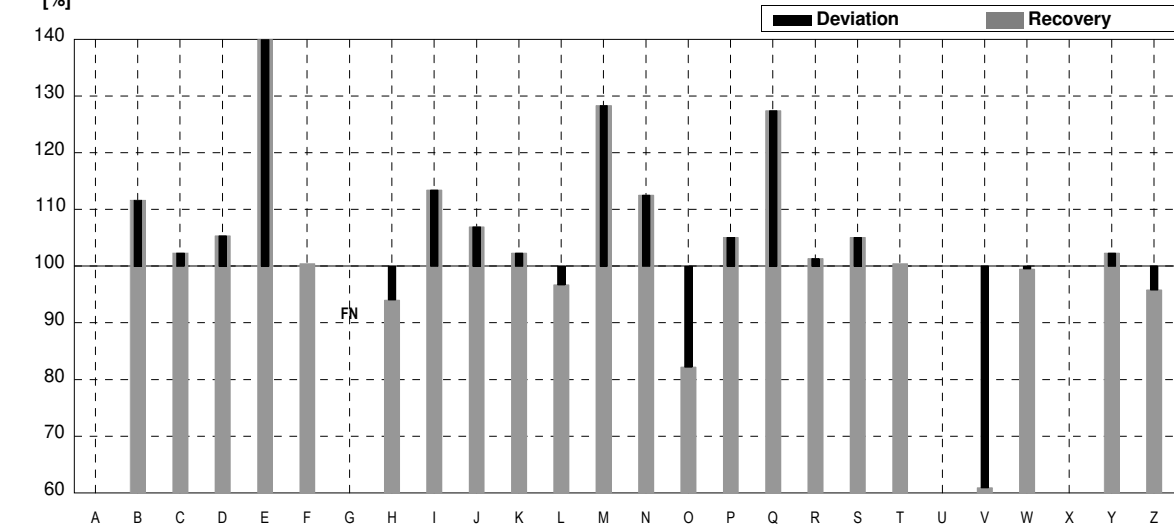
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	1,20		µg/l	112%	1,76
C	1,10	0,10	µg/l	102%	0,35
D	1,133		µg/l	105%	0,82
E	2,44 *	0,24	µg/l	227%	19,24
F	1,08	0,16	µg/l	100%	0,07
G	<1		µg/l	FN	
H	1,011	0,2	µg/l	94%	-0,90
I	1,22	0,15	µg/l	113%	2,04
J	1,15	0,35	µg/l	107%	1,06
K	1,10	0,132	µg/l	102%	0,35
L	1,04	0,32	µg/l	97%	-0,49
M	1,38 *	0,21	µg/l	128%	4,30
N	1,21	0,18	µg/l	113%	1,90
O	0,884	0,177	µg/l	82%	-2,69
P	1,13	0,015	µg/l	105%	0,78
Q	1,37 *		µg/l	127%	4,16
R	1,09		µg/l	101%	0,21
S	1,13	0,0632	µg/l	105%	0,78
T	1,08	0,30	µg/l	100%	0,07
U			µg/l		
V	0,655 *	0,131	µg/l	61%	-5,92
W	1,07	0,107	µg/l	100%	-0,07
X			µg/l		
Y	1,10	0,06	µg/l	102%	0,35
Z	1,03	0,050	µg/l	96%	-0,63

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,164 ± 0,194	1,098 ± 0,054	µg/l
Recov. ± CI(99%)	108,3 ± 18,0	102,1 ± 5,0	%
SD between labs	0,321	0,079	µg/l
RSD between labs	27,6	7,2	%
n for calculation	22	18	

Result
[µg/l]



Recovery
[%]



Sample M178B

Parameter Arsenic

Assigned value ± U (k=2) 1,592 µg/l ± 0,016 µg/l

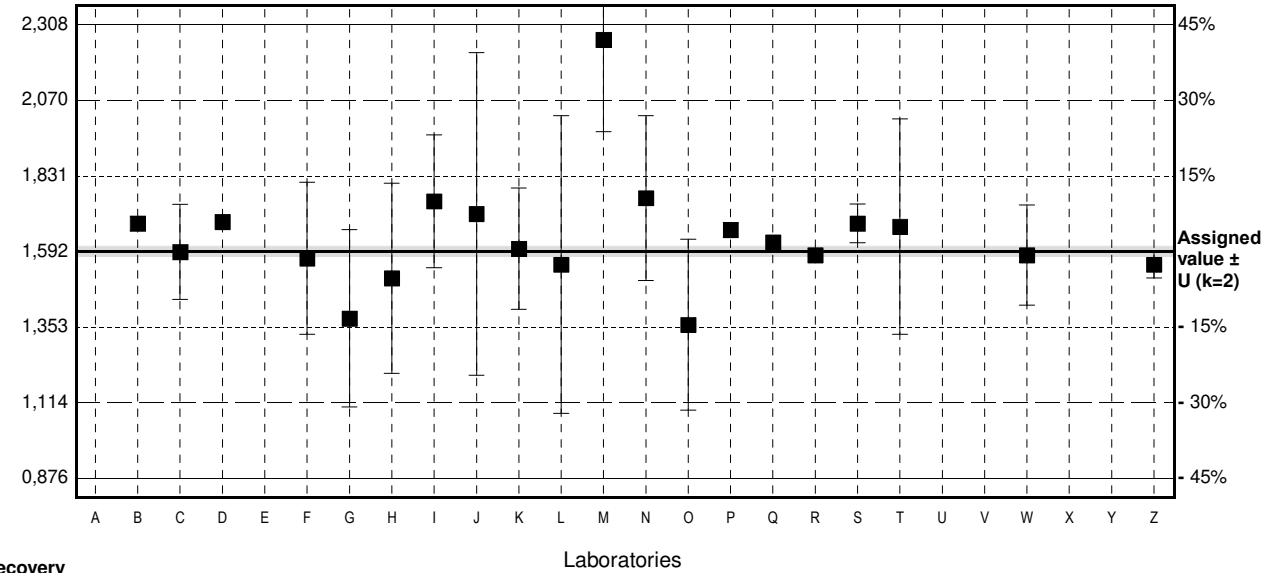
IFA result ± U (k=2) 1,55 µg/l ± 0,14 µg/l

Stability test µg/l

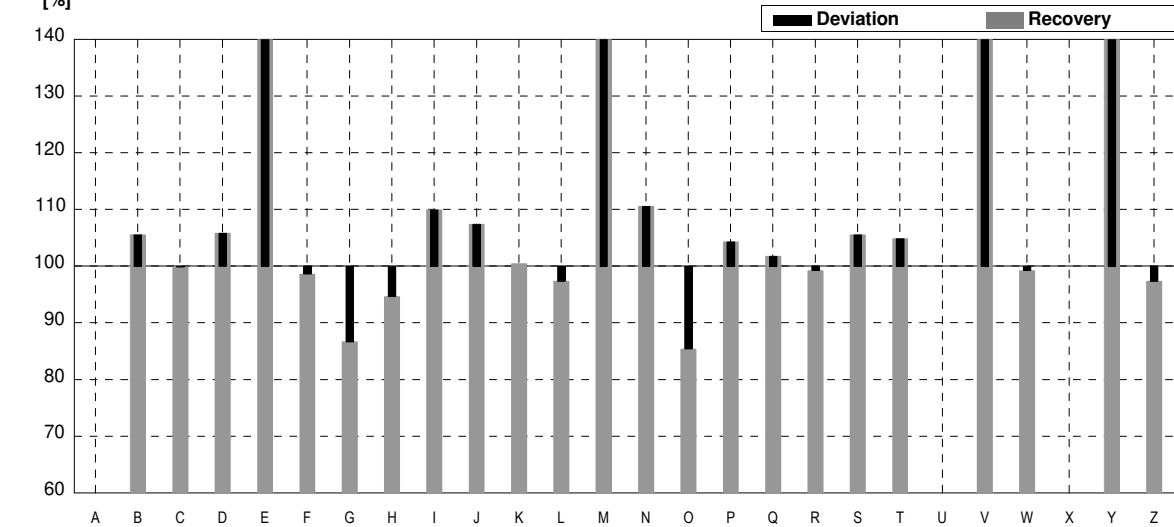
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	1,68		µg/l	106%	0,84
C	1,59	0,15	µg/l	100%	-0,02
D	1,685		µg/l	106%	0,89
E	2,60 *	0,26	µg/l	163%	9,59
F	1,57	0,24	µg/l	99%	-0,21
G	1,38	0,28	µg/l	87%	-2,02
H	1,507	0,3	µg/l	95%	-0,81
I	1,75	0,21	µg/l	110%	1,50
J	1,71	0,51	µg/l	107%	1,12
K	1,60	0,192	µg/l	101%	0,08
L	1,55	0,47	µg/l	97%	-0,40
M	2,26 *	0,29	µg/l	142%	6,36
N	1,76	0,26	µg/l	111%	1,60
O	1,36	0,27	µg/l	85%	-2,21
P	1,66	0,023	µg/l	104%	0,65
Q	1,620		µg/l	102%	0,27
R	1,58		µg/l	99%	-0,11
S	1,68	0,0608	µg/l	106%	0,84
T	1,67	0,34	µg/l	105%	0,74
U			µg/l		
V	2,78 *	0,556	µg/l	175%	11,31
W	1,58	0,158	µg/l	99%	-0,11
X			µg/l		
Y	3,00 *	0,16	µg/l	188%	13,40
Z	1,55	0,042	µg/l	97%	-0,40

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,788 ± 0,257	1,604 ± 0,071	µg/l
Recov. ± CI(99%)	112,3 ± 16,1	100,8 ± 4,5	%
SD between labs	0,436	0,108	µg/l
RSD between labs	24,4	6,7	%
n for calculation	23	19	

Result [µg/l]



Recovery [%]



Sample M178A

Parameter Lead

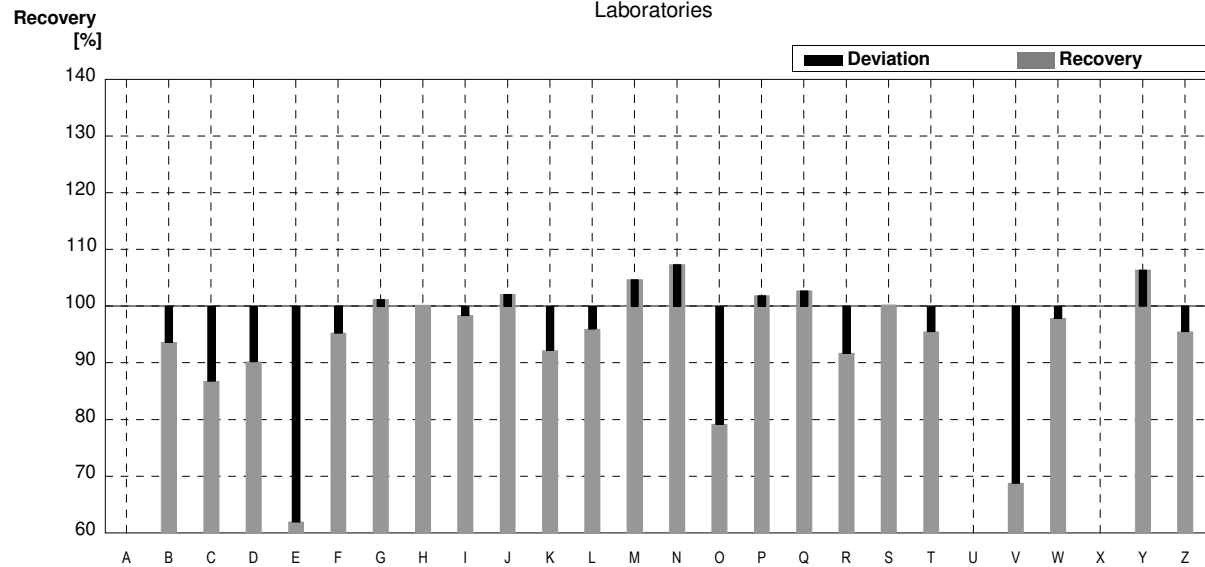
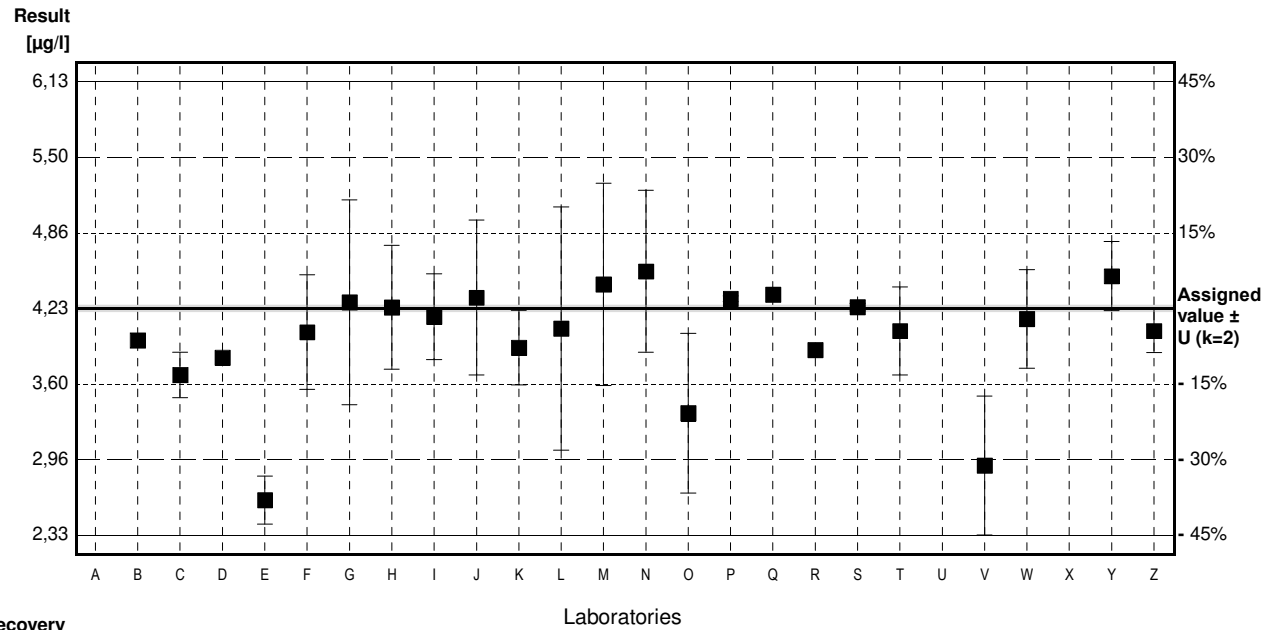
Assigned value ± U (k=2) 4,23 µg/l ± 0,03 µg/l

IFA result ± U (k=2) 3,93 µg/l ± 0,20 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	3,96		µg/l	94%	-0,98
C	3,67	0,19	µg/l	87%	-2,04
D	3,816		µg/l	90%	-1,51
E	2,62 *	0,20	µg/l	62%	-5,86
F	4,03	0,48	µg/l	95%	-0,73
G	4,28	0,86	µg/l	101%	0,18
H	4,238	0,52	µg/l	100%	0,03
I	4,16	0,36	µg/l	98%	-0,25
J	4,32	0,65	µg/l	102%	0,33
K	3,90	0,312	µg/l	92%	-1,20
L	4,06	1,02	µg/l	96%	-0,62
M	4,43	0,85	µg/l	105%	0,73
N	4,54	0,68	µg/l	107%	1,13
O	3,35	0,67	µg/l	79%	-3,20
P	4,31	0,023	µg/l	102%	0,29
Q	4,345		µg/l	103%	0,42
R	3,88		µg/l	92%	-1,27
S	4,24	0,0319	µg/l	100%	0,04
T	4,04	0,37	µg/l	96%	-0,69
U			µg/l		
V	2,91 *	0,582	µg/l	69%	-4,80
W	4,14	0,414	µg/l	98%	-0,33
X			µg/l		
Y	4,50	0,29	µg/l	106%	0,98
Z	4,04	0,182	µg/l	96%	-0,69

	All results	Outliers excl.	Unit
Mean ± CI(99%)	3,99 ± 0,28	4,11 ± 0,18	µg/l
Recov. ± CI(99%)	94,3 ± 6,6	97,1 ± 4,2	%
SD between labs	0,48	0,29	µg/l
RSD between labs	11,9	7,0	%
n for calculation	23	21	



Sample M178B

Parameter Lead

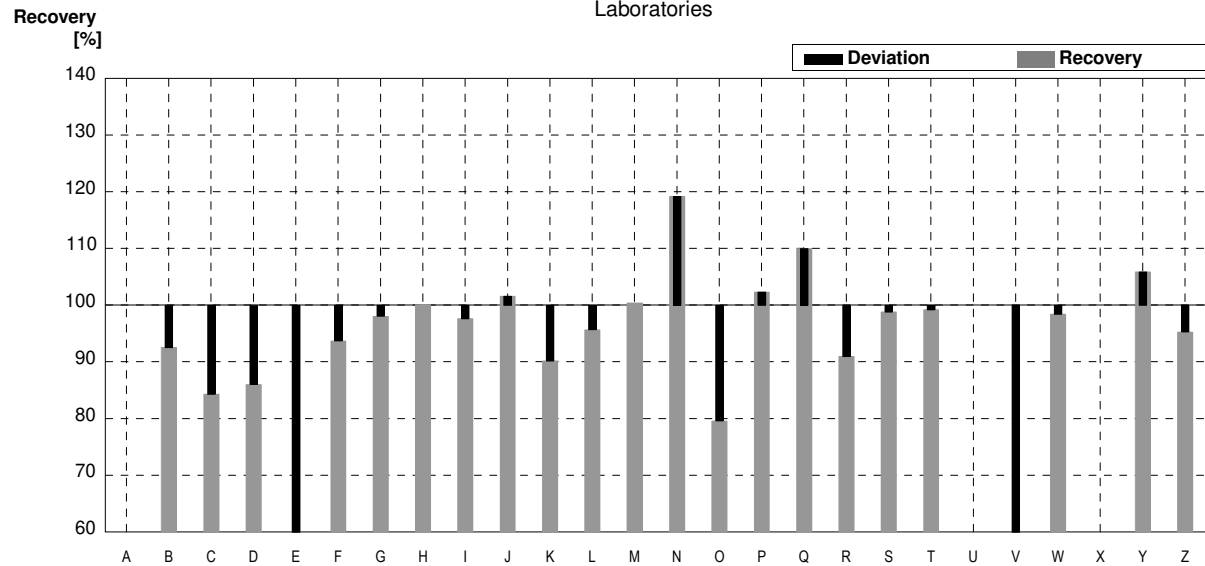
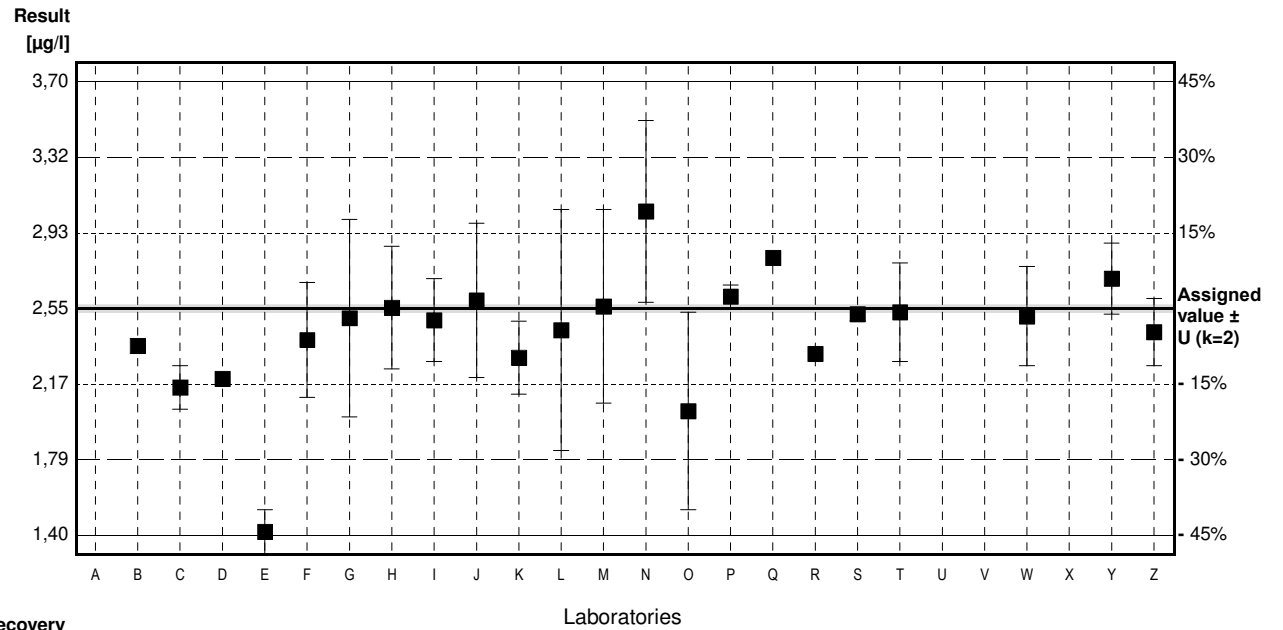
Assigned value ± U (k=2) 2,55 µg/l ± 0,02 µg/l

IFA result ± U (k=2) 2,26 µg/l ± 0,11 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	2,36		µg/l	93%	-1,15
C	2,15	0,11	µg/l	84%	-2,41
D	2,194		µg/l	86%	-2,15
E	1,42 *	0,11	µg/l	56%	-6,82
F	2,39	0,29	µg/l	94%	-0,97
G	2,50	0,50	µg/l	98%	-0,30
H	2,553	0,31	µg/l	100%	0,02
I	2,49	0,21	µg/l	98%	-0,36
J	2,59	0,39	µg/l	102%	0,24
K	2,30	0,184	µg/l	90%	-1,51
L	2,44	0,61	µg/l	96%	-0,66
M	2,56	0,49	µg/l	100%	0,06
N	3,04	0,46	µg/l	119%	2,96
O	2,03	0,50	µg/l	80%	-3,14
P	2,61	0,057	µg/l	102%	0,36
Q	2,805		µg/l	110%	1,54
R	2,32		µg/l	91%	-1,39
S	2,52	0,0341	µg/l	99%	-0,18
T	2,53	0,25	µg/l	99%	-0,12
U			µg/l		
V	1,07 *	0,214	µg/l	42%	-8,93
W	2,51	0,251	µg/l	98%	-0,24
X			µg/l		
Y	2,70	0,18	µg/l	106%	0,90
Z	2,43	0,170	µg/l	95%	-0,72

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,37 ± 0,25	2,48 ± 0,14	µg/l
Recov. ± CI(99%)	92,9 ± 9,6	97,1 ± 5,4	%
SD between labs	0,42	0,22	µg/l
RSD between labs	17,6	9,0	%
n for calculation	23	21	



Sample M178A

Parameter Cadmium

Assigned value ± U (k=2) 0,993 µg/l ± 0,011 µg/l

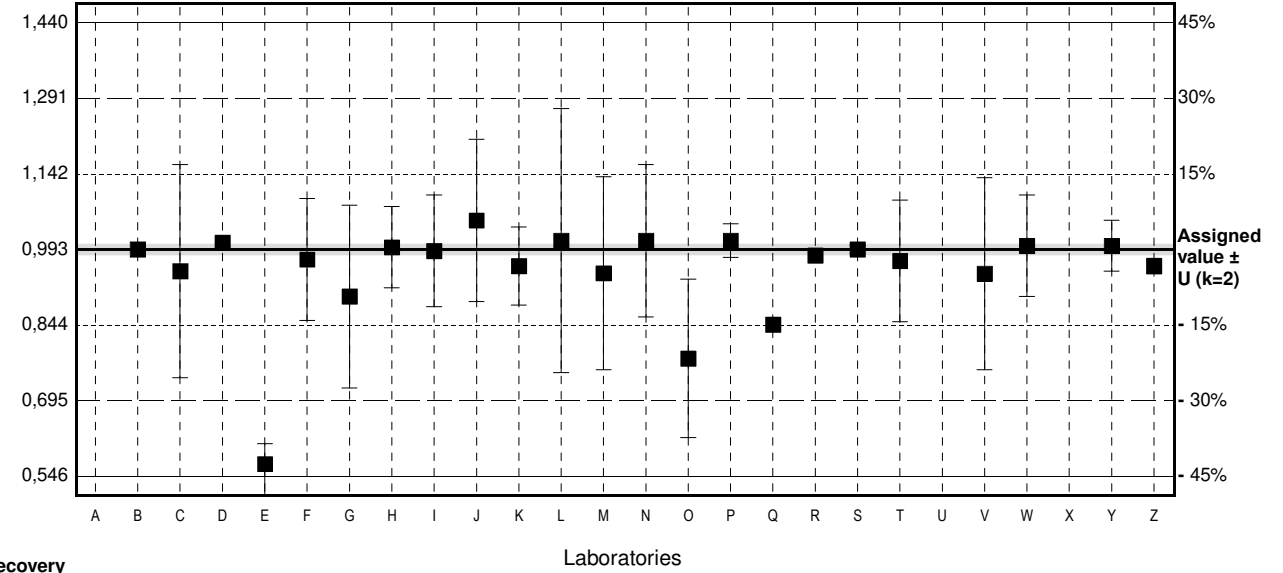
IFA result ± U (k=2) 1,00 µg/l ± 0,06 µg/l

Stability test µg/l

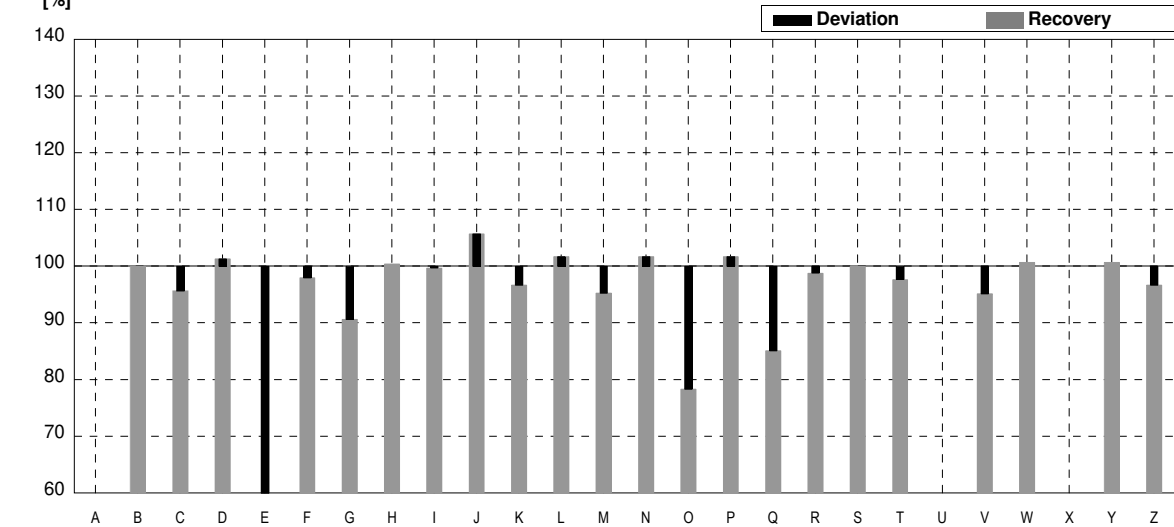
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	0,993		µg/l	100%	0,00
C	0,95	0,21	µg/l	96%	-0,87
D	1,006		µg/l	101%	0,26
E	0,57 *	0,04	µg/l	57%	-8,52
F	0,973	0,12	µg/l	98%	-0,40
G	0,900	0,18	µg/l	91%	-1,87
H	0,997	0,08	µg/l	100%	0,08
I	0,990	0,11	µg/l	100%	-0,06
J	1,05	0,16	µg/l	106%	1,15
K	0,96	0,0768	µg/l	97%	-0,66
L	1,01	0,26	µg/l	102%	0,34
M	0,946	0,19	µg/l	95%	-0,95
N	1,01	0,15	µg/l	102%	0,34
O	0,778 *	0,156	µg/l	78%	-4,33
P	1,01	0,033	µg/l	102%	0,34
Q	0,845 *		µg/l	85%	-2,98
R	0,981		µg/l	99%	-0,24
S	0,993	0,00792	µg/l	100%	0,00
T	0,97	0,12	µg/l	98%	-0,46
U			µg/l		
V	0,945	0,189	µg/l	95%	-0,97
W	1,00	0,100	µg/l	101%	0,14
X			µg/l		
Y	1,00	0,05	µg/l	101%	0,14
Z	0,96	0,015	µg/l	97%	-0,66

	All results	Outliers excl.	Unit
Mean ± CI(99%)	0,949 ± 0,060	0,982 ± 0,021	µg/l
Recov. ± CI(99%)	95,6 ± 6,0	98,9 ± 2,1	%
SD between labs	0,101	0,033	µg/l
RSD between labs	10,7	3,3	%
n for calculation	23	20	

Result
[µg/l]



Recovery
[%]



Sample M178B

Parameter Cadmium

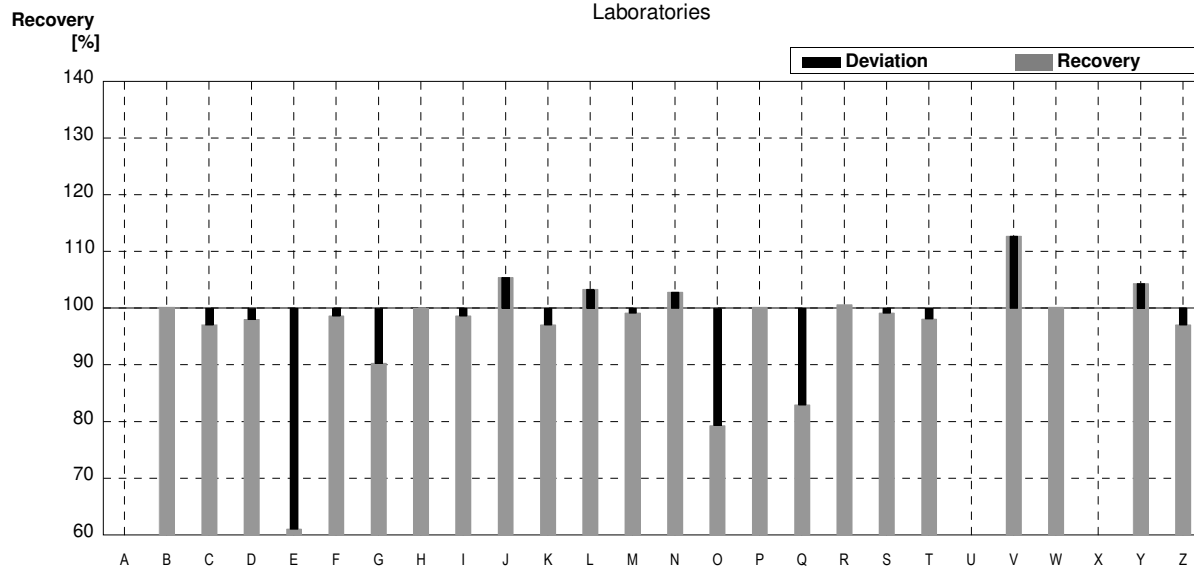
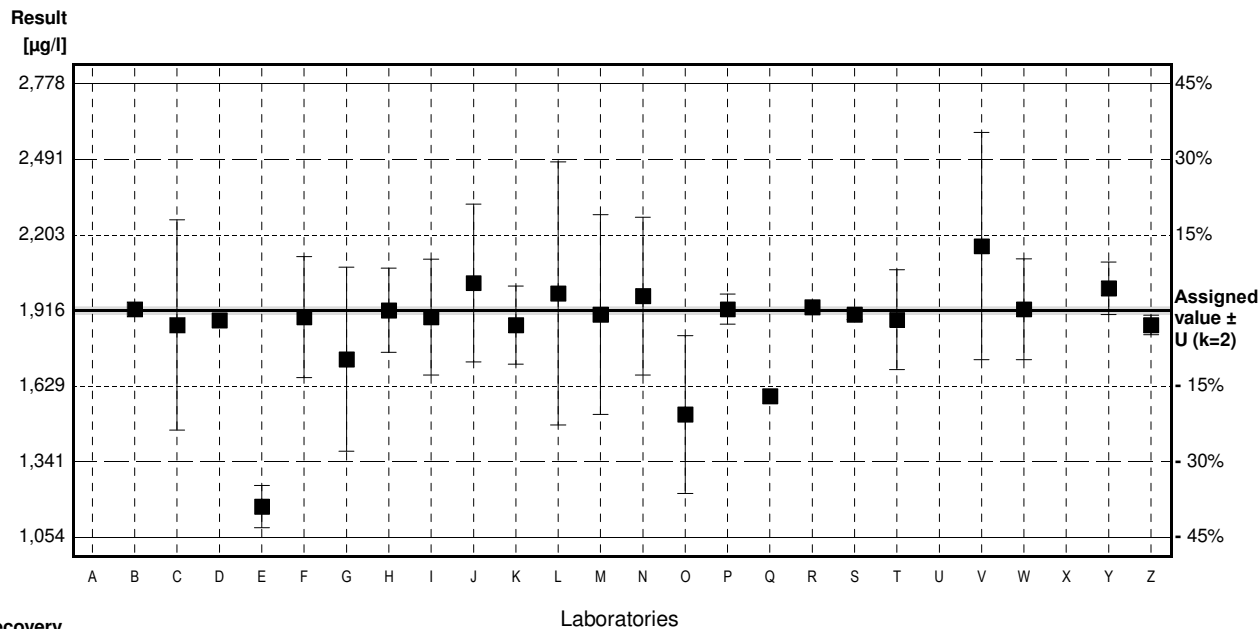
Assigned value ± U (k=2) 1,916 µg/l ± 0,014 µg/l

IFA result ± U (k=2) 1,97 µg/l ± 0,12 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	1,92		µg/l	100%	0,04
C	1,86	0,40	µg/l	97%	-0,58
D	1,878		µg/l	98%	-0,40
E	1,17 *	0,08	µg/l	61%	-7,79
F	1,89	0,23	µg/l	99%	-0,27
G	1,73	0,35	µg/l	90%	-1,94
H	1,916	0,16	µg/l	100%	0,00
I	1,89	0,22	µg/l	99%	-0,27
J	2,02	0,30	µg/l	105%	1,09
K	1,86	0,1488	µg/l	97%	-0,58
L	1,98	0,50	µg/l	103%	0,67
M	1,90	0,38	µg/l	99%	-0,17
N	1,97	0,30	µg/l	103%	0,56
O	1,52 *	0,30	µg/l	79%	-4,13
P	1,92	0,057	µg/l	100%	0,04
Q	1,590 *		µg/l	83%	-3,40
R	1,928		µg/l	101%	0,13
S	1,90	0,0197	µg/l	99%	-0,17
T	1,88	0,19	µg/l	98%	-0,38
U			µg/l		
V	2,16 *	0,432	µg/l	113%	2,55
W	1,92	0,192	µg/l	100%	0,04
X			µg/l		
Y	2,00	0,10	µg/l	104%	0,88
Z	1,86	0,037	µg/l	97%	-0,58

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,855 ± 0,117	1,906 ± 0,042	µg/l
Recov. ± CI(99%)	96,8 ± 6,1	99,5 ± 2,2	%
SD between labs	0,199	0,063	µg/l
RSD between labs	10,7	3,3	%
n for calculation	23	19	



Sample M178A

Parameter Chromium

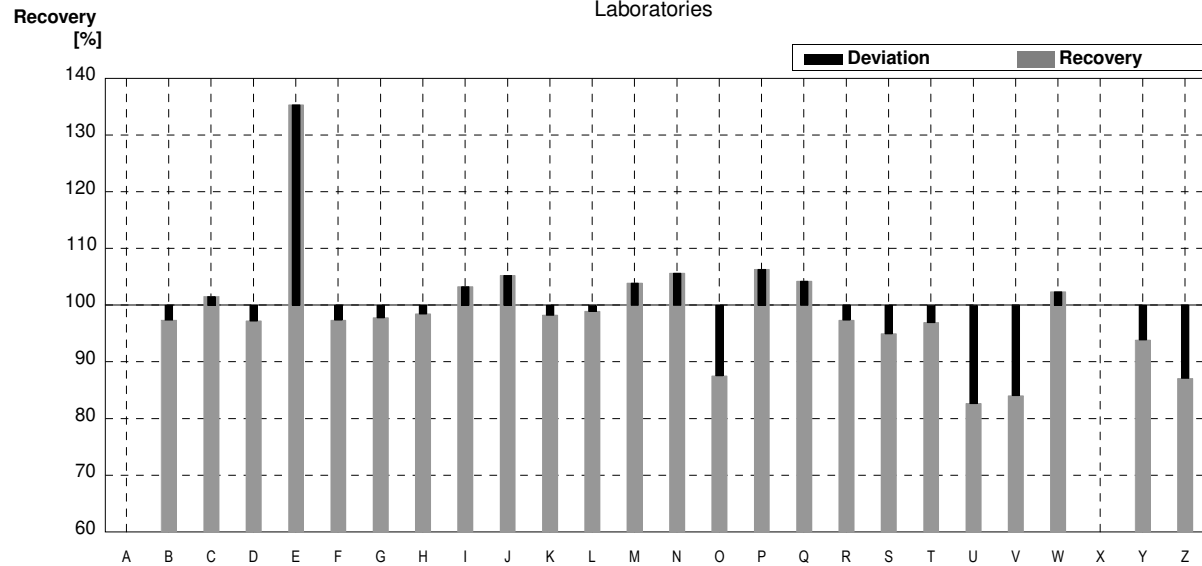
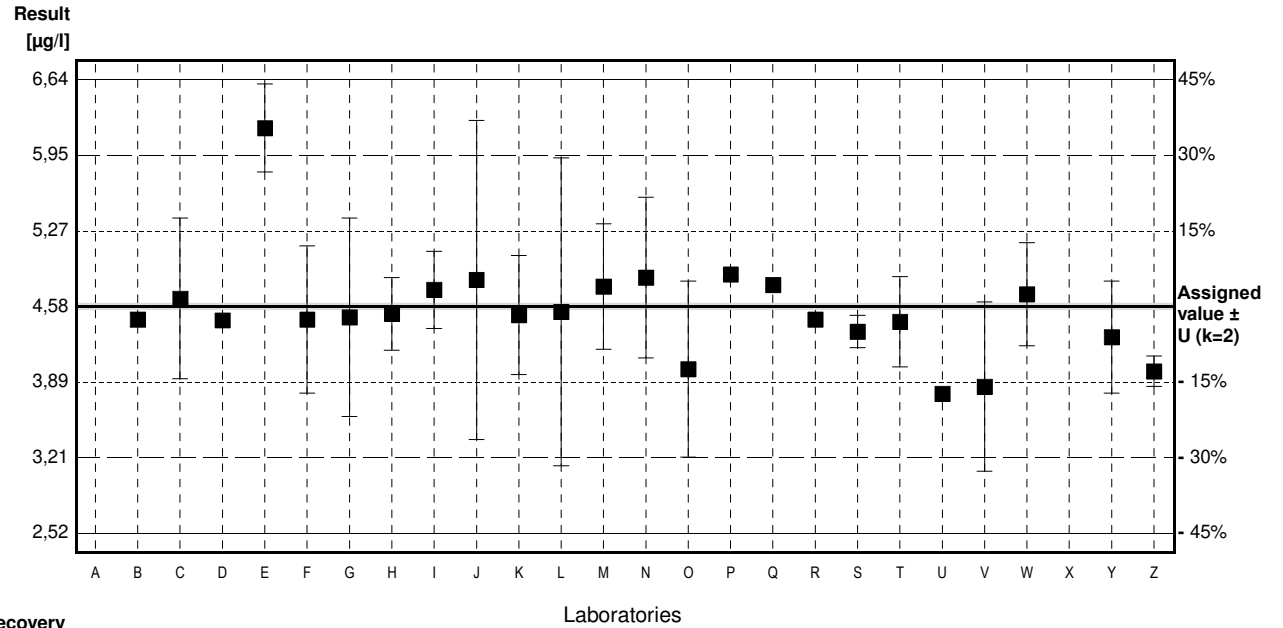
Assigned value ± U (k=2) 4,58 µg/l ± 0,03 µg/l

IFA result ± U (k=2) 4,74 µg/l ± 0,15 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	4,46		µg/l	97%	-0,44
C	4,65	0,73	µg/l	102%	0,26
D	4,453		µg/l	97%	-0,47
E	6,2 *	0,4	µg/l	135%	6,00
F	4,46	0,67	µg/l	97%	-0,44
G	4,48	0,90	µg/l	98%	-0,37
H	4,511	0,33	µg/l	98%	-0,26
I	4,73	0,35	µg/l	103%	0,56
J	4,82	1,45	µg/l	105%	0,89
K	4,50	0,540	µg/l	98%	-0,30
L	4,53	1,4	µg/l	99%	-0,19
M	4,76	0,57	µg/l	104%	0,67
N	4,84	0,73	µg/l	106%	0,96
O	4,01	0,80	µg/l	88%	-2,11
P	4,87	0,046	µg/l	106%	1,07
Q	4,775		µg/l	104%	0,72
R	4,46		µg/l	97%	-0,44
S	4,35	0,147	µg/l	95%	-0,85
T	4,44	0,41	µg/l	97%	-0,52
U	3,786		µg/l	83%	-2,94
V	3,85	0,770	µg/l	84%	-2,70
W	4,69	0,469	µg/l	102%	0,41
X			µg/l		
Y	4,30	0,51	µg/l	94%	-1,04
Z	3,99	0,138	µg/l	87%	-2,18

	All results	Outliers excl.	Unit
Mean ± CI(99%)	4,54 ± 0,27	4,47 ± 0,18	µg/l
Recov. ± CI(99%)	99,1 ± 5,8	97,5 ± 4,0	%
SD between labs	0,46	0,31	µg/l
RSD between labs	10,2	6,9	%
n for calculation	24	23	



Sample M178B

Parameter Chromium

Assigned value ± U (k=2) 1,233 µg/l ± 0,013 µg/l

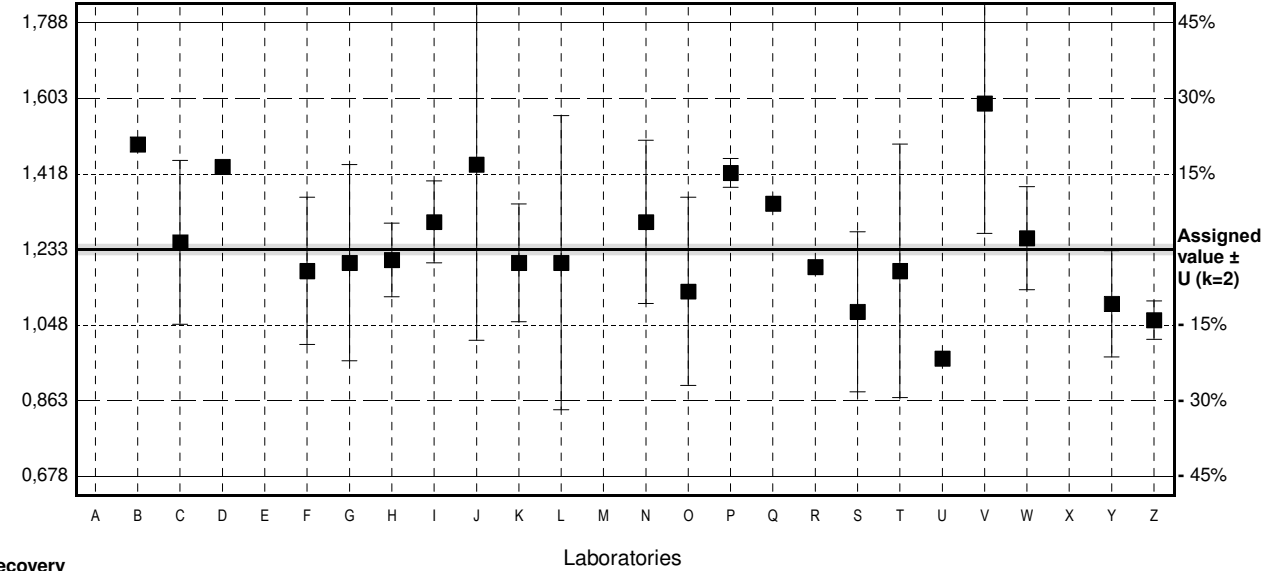
IFA result ± U (k=2) 1,29 µg/l ± 0,07 µg/l

Stability test µg/l

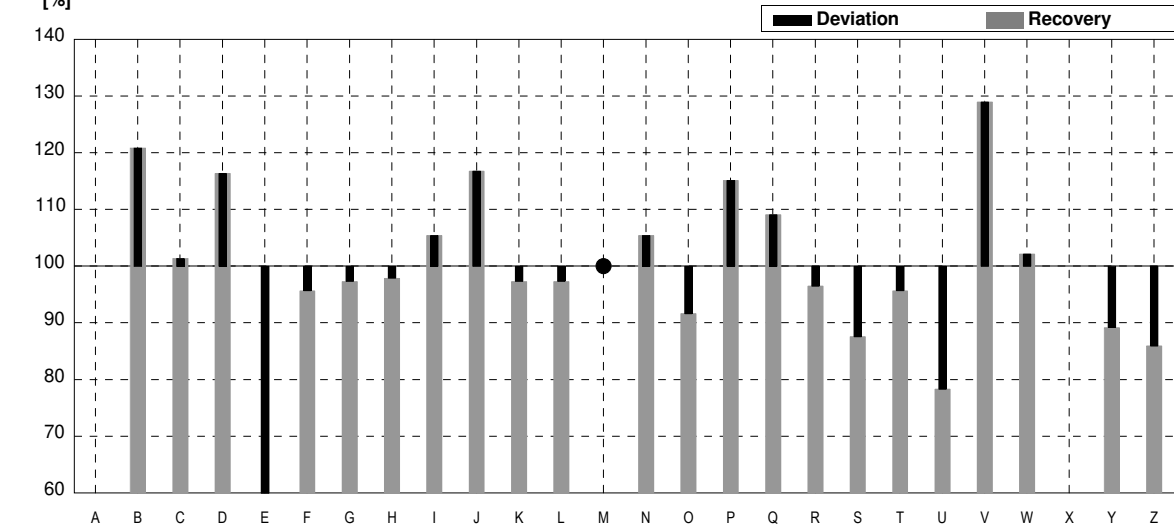
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	1,49		µg/l	121%	3,53
C	1,25	0,20	µg/l	101%	0,23
D	1,435		µg/l	116%	2,78
E	0,54 *	0,04	µg/l	44%	-9,53
F	1,18	0,18	µg/l	96%	-0,73
G	1,20	0,24	µg/l	97%	-0,45
H	1,207	0,09	µg/l	98%	-0,36
I	1,30	0,10	µg/l	105%	0,92
J	1,44	0,43	µg/l	117%	2,85
K	1,20	0,144	µg/l	97%	-0,45
L	1,20	0,36	µg/l	97%	-0,45
M	<2		µg/l	•	
N	1,30	0,20	µg/l	105%	0,92
O	1,13	0,23	µg/l	92%	-1,42
P	1,42	0,035	µg/l	115%	2,57
Q	1,345		µg/l	109%	1,54
R	1,19		µg/l	97%	-0,59
S	1,08	0,196	µg/l	88%	-2,10
T	1,18	0,31	µg/l	96%	-0,73
U	0,9659		µg/l	78%	-3,67
V	1,59	0,318	µg/l	129%	4,91
W	1,26	0,126	µg/l	102%	0,37
X			µg/l		
Y	1,10	0,13	µg/l	89%	-1,83
Z	1,06	0,047	µg/l	86%	-2,38

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,220 ± 0,124	1,251 ± 0,092	µg/l
Recov. ± CI(99%)	99,0 ± 10,0	101,5 ± 7,5	%
SD between labs	0,211	0,153	µg/l
RSD between labs	17,3	12,2	%
n for calculation	23	22	

Result [µg/l]



Recovery [%]



Sample M178A

Parameter Iron

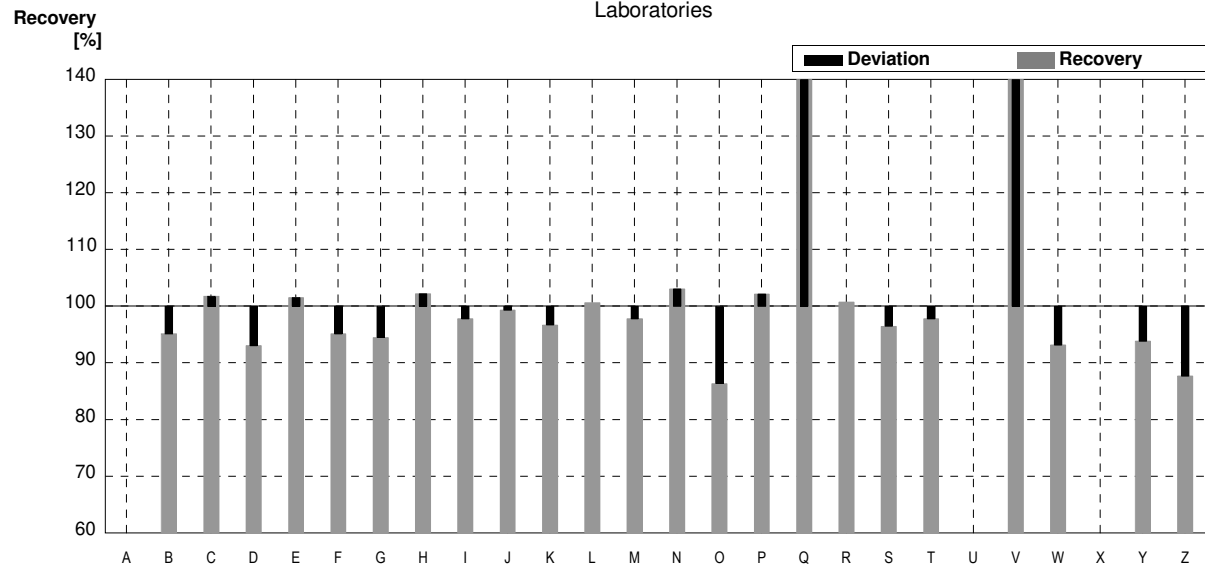
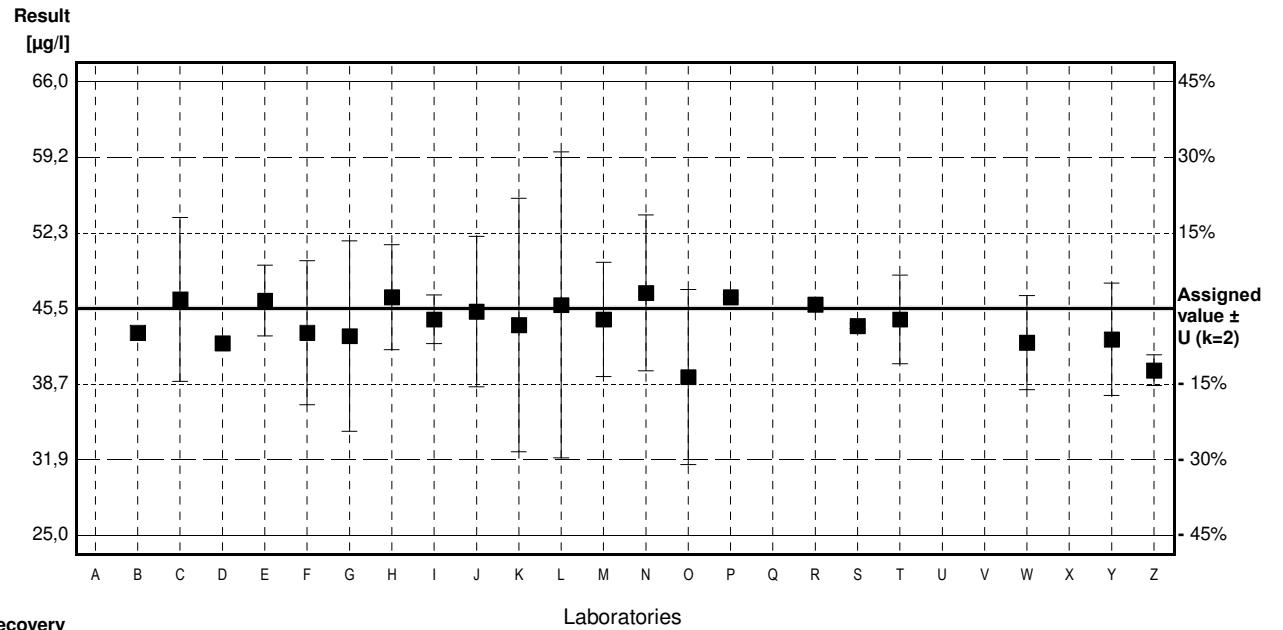
Assigned value ± U (k=2) 45,5 µg/l ± 0,2 µg/l

IFA result ± U (k=2) 46,1 µg/l ± 3,5 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	43,3		µg/l	95%	-0,76
C	46,3	7,4	µg/l	102%	0,27
D	42,34		µg/l	93%	-1,09
E	46,2	3,2	µg/l	102%	0,24
F	43,3	6,5	µg/l	95%	-0,76
G	43,0	8,6	µg/l	95%	-0,86
H	46,513	4,74	µg/l	102%	0,35
I	44,5	2,2	µg/l	98%	-0,34
J	45,2	6,8	µg/l	99%	-0,10
K	44,0	11,44	µg/l	97%	-0,52
L	45,8	13,8	µg/l	101%	0,10
M	44,5	5,16	µg/l	98%	-0,34
N	46,9	7,04	µg/l	103%	0,48
O	39,3	7,9	µg/l	86%	-2,13
P	46,5	0,265	µg/l	102%	0,34
Q	79,25 *		µg/l	174%	11,59
R	45,85		µg/l	101%	0,12
S	43,9	0,222	µg/l	96%	-0,55
T	44,5	4,0	µg/l	98%	-0,34
U			µg/l		
V	92,7 *	18,5	µg/l	204%	16,21
W	42,4	4,24	µg/l	93%	-1,06
X			µg/l		
Y	42,7	5,08	µg/l	94%	-0,96
Z	39,9	1,39	µg/l	88%	-1,92

	All results	Outliers excl.	Unit
Mean ± CI(99%)	47,8 ± 7,3	44,1 ± 1,3	µg/l
Recov. ± CI(99%)	105,0 ± 16,0	97,0 ± 2,9	%
SD between labs	12,4	2,1	µg/l
RSD between labs	25,9	4,7	%
n for calculation	23	21	



Sample M178B

Parameter Iron

Assigned value ± U (k=2) 15,16 µg/l ± 0,15 µg/l

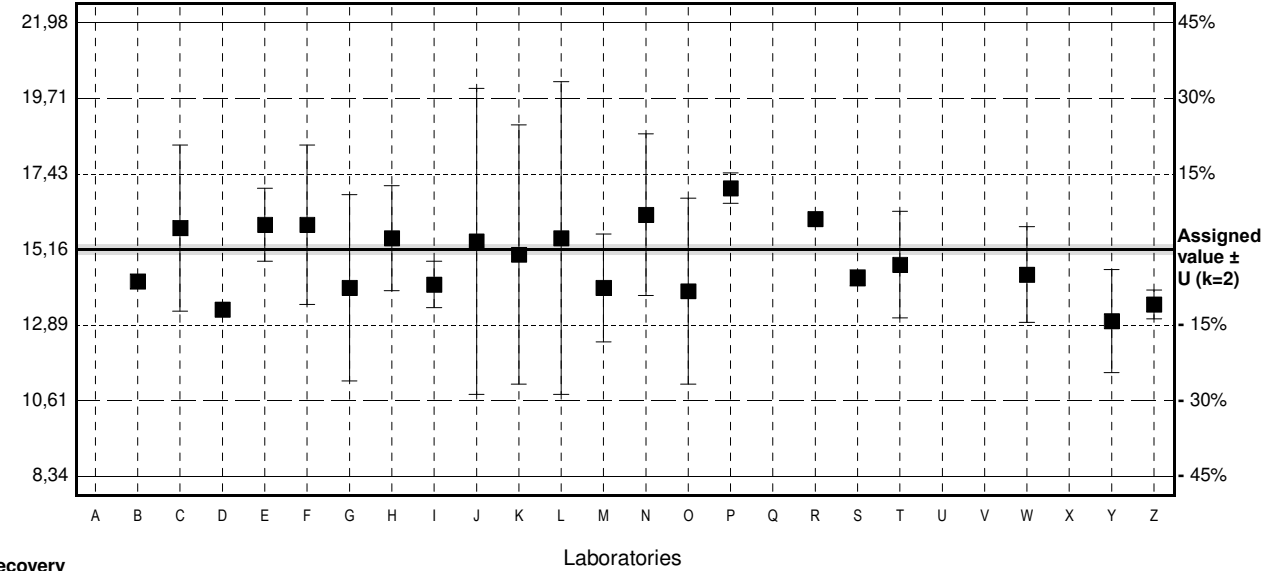
IFA result ± U (k=2) 15,2 µg/l ± 1,1 µg/l

Stability test µg/l

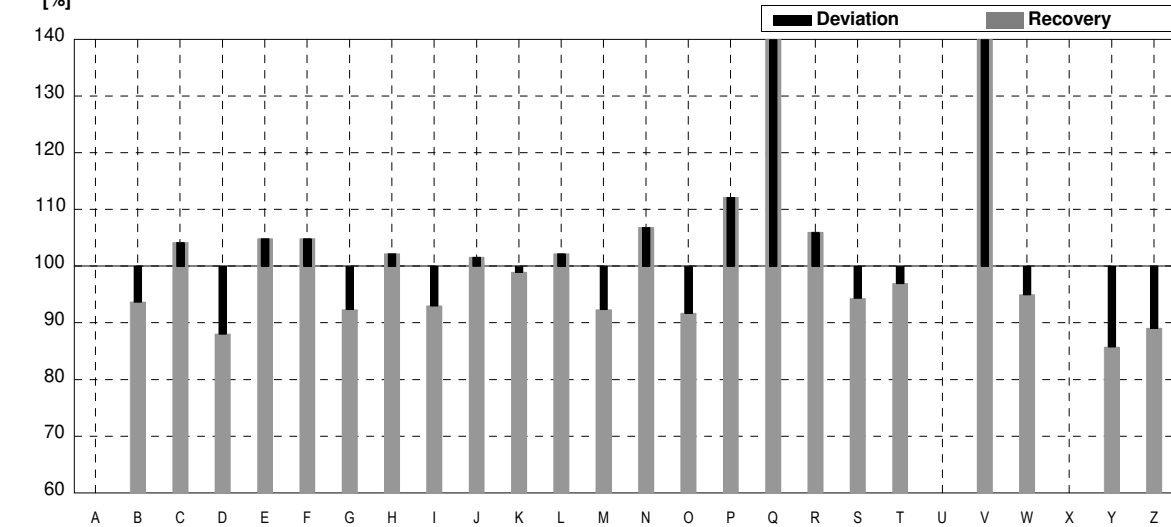
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	14,2		µg/l	94%	-0,99
C	15,8	2,5	µg/l	104%	0,66
D	13,35		µg/l	88%	-1,87
E	15,9	1,1	µg/l	105%	0,76
F	15,9	2,4	µg/l	105%	0,76
G	14,0	2,8	µg/l	92%	-1,20
H	15,497	1,58	µg/l	102%	0,35
I	14,1	0,7	µg/l	93%	-1,09
J	15,4	4,6	µg/l	102%	0,25
K	15,0	3,90	µg/l	99%	-0,16
L	15,5	4,7	µg/l	102%	0,35
M	14,0	1,62	µg/l	92%	-1,20
N	16,2	2,43	µg/l	107%	1,07
O	13,9	2,8	µg/l	92%	-1,30
P	17,0	0,458	µg/l	112%	1,90
Q	25,85 *		µg/l	171%	11,02
R	16,07		µg/l	106%	0,94
S	14,3	0,239	µg/l	94%	-0,89
T	14,7	1,6	µg/l	97%	-0,47
U			µg/l		
V	162,5 *	32,5	µg/l	1072%	151,86
W	14,4	1,44	µg/l	95%	-0,78
X			µg/l		
Y	13,0	1,55	µg/l	86%	-2,23
Z	13,5	0,43	µg/l	89%	-1,71

	All results	Outliers excl.	Unit
Mean ± CI(99%)	21,74 ± 18,10	14,84 ± 0,68	µg/l
Recov. ± CI(99%)	143,4 ± 119,4	97,9 ± 4,5	%
SD between labs	30,79	1,09	µg/l
RSD between labs	141,6	7,3	%
n for calculation	23	21	

Result [µg/l]



Recovery [%]



Sample M178A
Parameter Copper

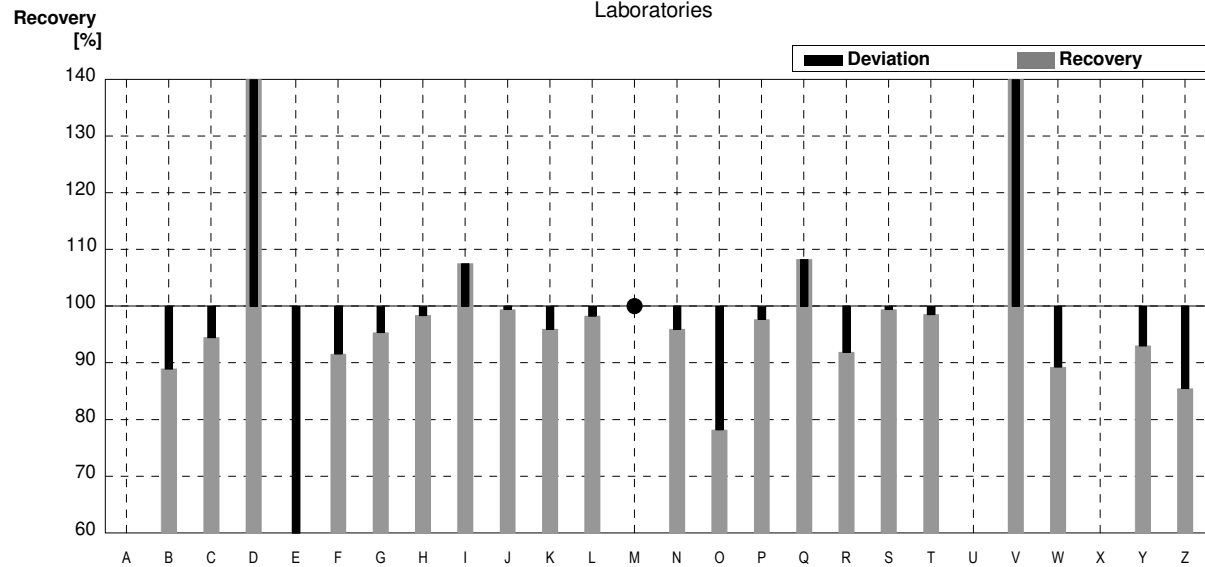
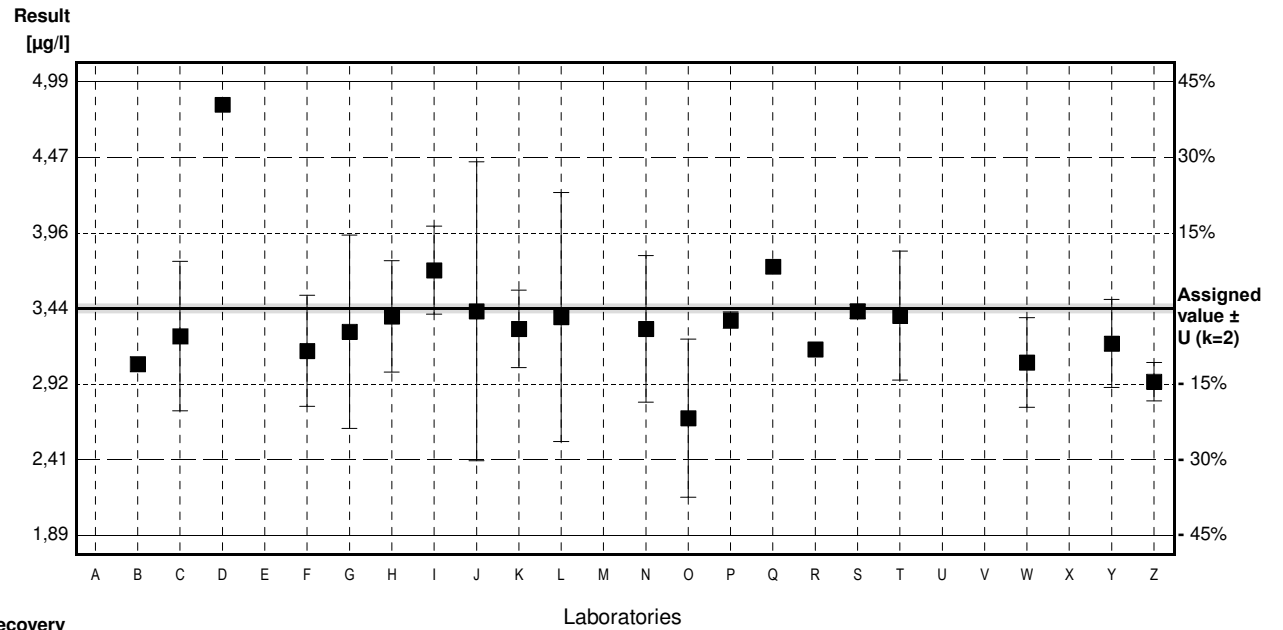
Assigned value ± U (k=2) 3,44 µg/l ± 0,03 µg/l

IFA result ± U (k=2) 3,55 µg/l ± 0,25 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	3,06		µg/l	89%	-1,51
C	3,25	0,51	µg/l	94%	-0,76
D	4,830 *		µg/l	140%	5,54
E	1,88 *	0,12	µg/l	55%	-6,21
F	3,15	0,38	µg/l	92%	-1,15
G	3,28	0,66	µg/l	95%	-0,64
H	3,384	0,38	µg/l	98%	-0,22
I	3,70	0,30	µg/l	108%	1,04
J	3,42	1,02	µg/l	99%	-0,08
K	3,30	0,264	µg/l	96%	-0,56
L	3,38	0,85	µg/l	98%	-0,24
M	<5		µg/l	*	
N	3,30	0,50	µg/l	96%	-0,56
O	2,69 *	0,54	µg/l	78%	-2,99
P	3,36	0,056	µg/l	98%	-0,32
Q	3,725		µg/l	108%	1,13
R	3,16		µg/l	92%	-1,12
S	3,42	0,0480	µg/l	99%	-0,08
T	3,39	0,44	µg/l	99%	-0,20
U			µg/l		
V	9,96 *	1,99	µg/l	290%	25,96
W	3,07	0,307	µg/l	89%	-1,47
X			µg/l		
Y	3,20	0,30	µg/l	93%	-0,96
Z	2,94	0,131	µg/l	85%	-1,99

	All results	Outliers excl.	Unit
Mean ± CI(99%)	3,58 ± 0,91	3,30 ± 0,14	µg/l
Recov. ± CI(99%)	104,2 ± 26,5	96,1 ± 4,0	%
SD between labs	1,51	0,20	µg/l
RSD between labs	42,2	6,1	%
n for calculation	22	18	



Sample M178B
Parameter Copper

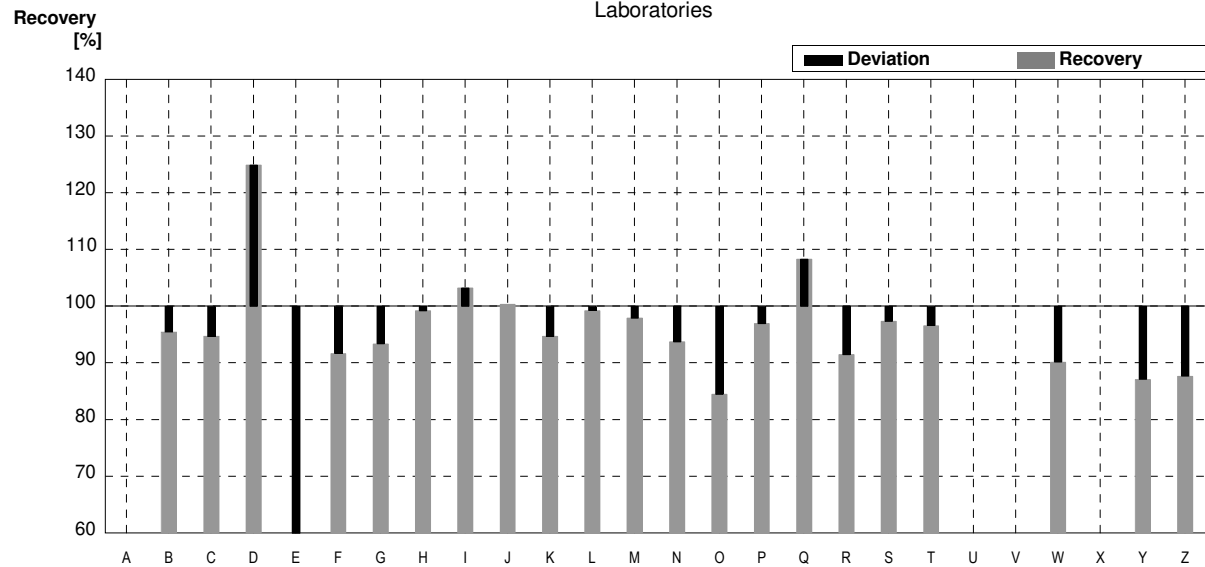
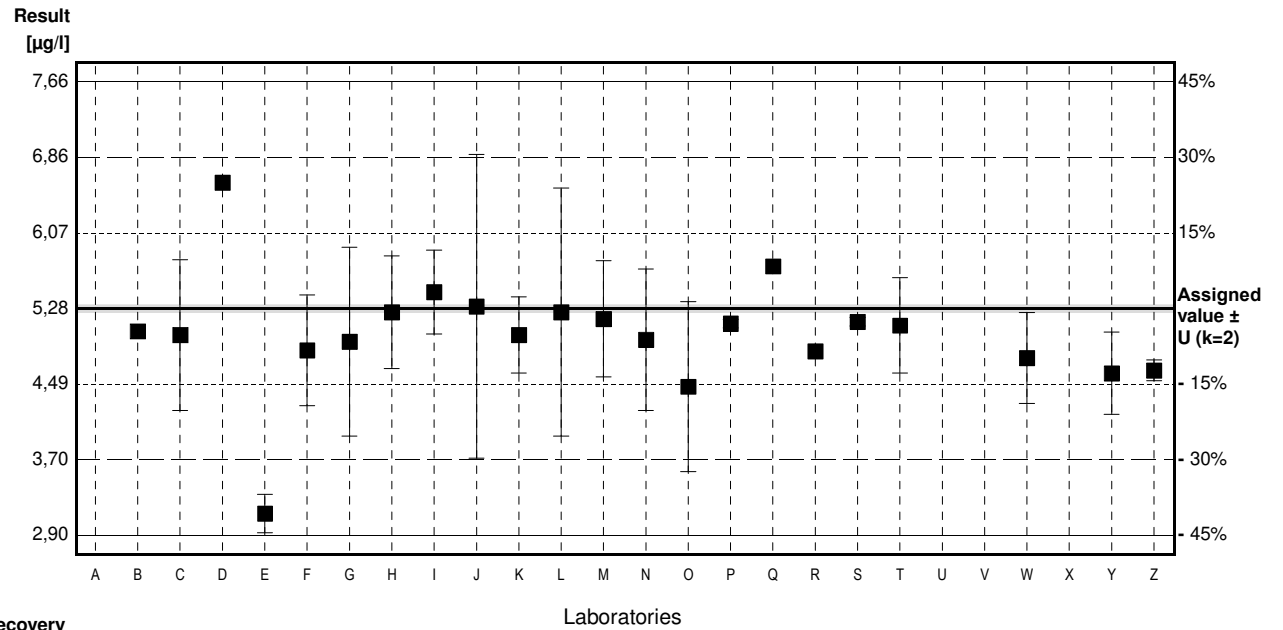
Assigned value ± U (k=2) 5,28 µg/l ± 0,04 µg/l

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

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	5,04		µg/l	95%	-0,62
C	5,0	0,79	µg/l	95%	-0,73
D	6,596 *		µg/l	125%	3,41
E	3,13 *	0,20	µg/l	59%	-5,58
F	4,84	0,58	µg/l	92%	-1,14
G	4,93	0,99	µg/l	93%	-0,91
H	5,239	0,59	µg/l	99%	-0,11
I	5,45	0,44	µg/l	103%	0,44
J	5,30	1,59	µg/l	100%	0,05
K	5,00	0,400	µg/l	95%	-0,73
L	5,24	1,3	µg/l	99%	-0,10
M	5,17	0,61	µg/l	98%	-0,29
N	4,95	0,74	µg/l	94%	-0,86
O	4,46	0,89	µg/l	84%	-2,13
P	5,12	0,044	µg/l	97%	-0,42
Q	5,720		µg/l	108%	1,14
R	4,83		µg/l	91%	-1,17
S	5,14	0,0461	µg/l	97%	-0,36
T	5,1	0,5	µg/l	97%	-0,47
U			µg/l		
V			µg/l		
W	4,76	0,476	µg/l	90%	-1,35
X			µg/l		
Y	4,60	0,43	µg/l	87%	-1,76
Z	4,63	0,108	µg/l	88%	-1,69

	All results	Outliers excl.	Unit
Mean ± CI(99%)	5,01 ± 0,37	5,03 ± 0,19	µg/l
Recov. ± CI(99%)	94,9 ± 6,9	95,2 ± 3,6	%
SD between labs	0,61	0,30	µg/l
RSD between labs	12,1	5,9	%
n for calculation	22	20	



Sample M178A

Parameter Manganese

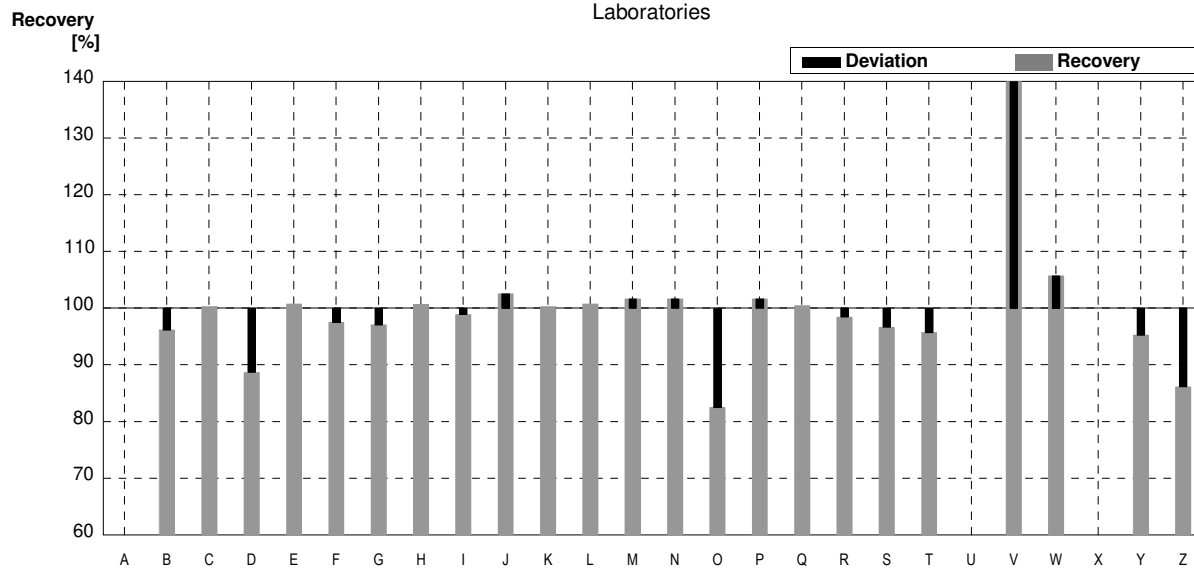
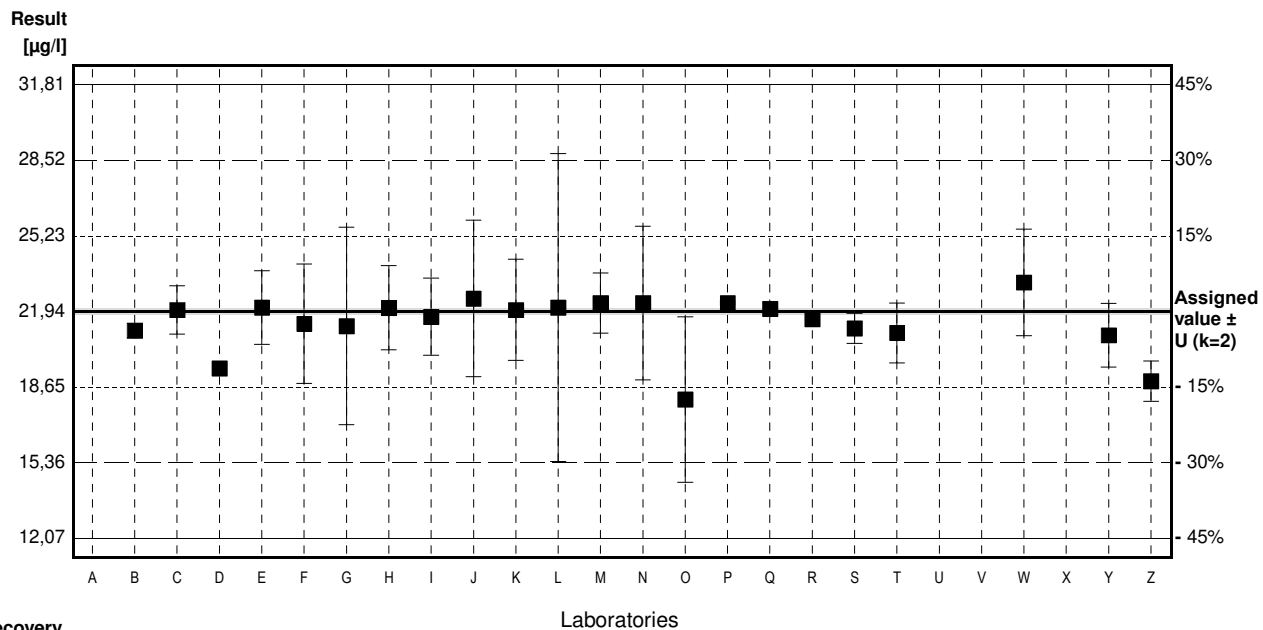
Assigned value ± U (k=2) 21,94 µg/l ± 0,13 µg/l

IFA result ± U (k=2) 22,8 µg/l ± 1,5 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	21,1		µg/l	96%	-0,75
C	22,0	1,05	µg/l	100%	0,05
D	19,46 *		µg/l	89%	-2,22
E	22,1	1,6	µg/l	101%	0,14
F	21,4	2,6	µg/l	98%	-0,48
G	21,3	4,3	µg/l	97%	-0,57
H	22,094	1,83	µg/l	101%	0,14
I	21,7	1,68	µg/l	99%	-0,21
J	22,5	3,4	µg/l	103%	0,50
K	22,0	2,20	µg/l	100%	0,05
L	22,1	6,7	µg/l	101%	0,14
M	22,3	1,31	µg/l	102%	0,32
N	22,3	3,34	µg/l	102%	0,32
O	18,1 *	3,6	µg/l	82%	-3,43
P	22,3	0,05	µg/l	102%	0,32
Q	22,05		µg/l	101%	0,10
R	21,6		µg/l	98%	-0,30
S	21,2	0,654	µg/l	97%	-0,66
T	21,0	1,3	µg/l	96%	-0,84
U			µg/l		
V	33,8 *	6,76	µg/l	154%	10,60
W	23,2	2,32	µg/l	106%	1,13
X			µg/l		
Y	20,9	1,38	µg/l	95%	-0,93
Z	18,9 *	0,88	µg/l	86%	-2,72

	All results	Outliers excl.	Unit
Mean ± CI(99%)	21,97 ± 1,67	21,85 ± 0,39	µg/l
Recov. ± CI(99%)	100,2 ± 7,6	99,6 ± 1,8	%
SD between labs	2,84	0,59	µg/l
RSD between labs	12,9	2,7	%
n for calculation	23	19	



Sample M178B

Parameter Manganese

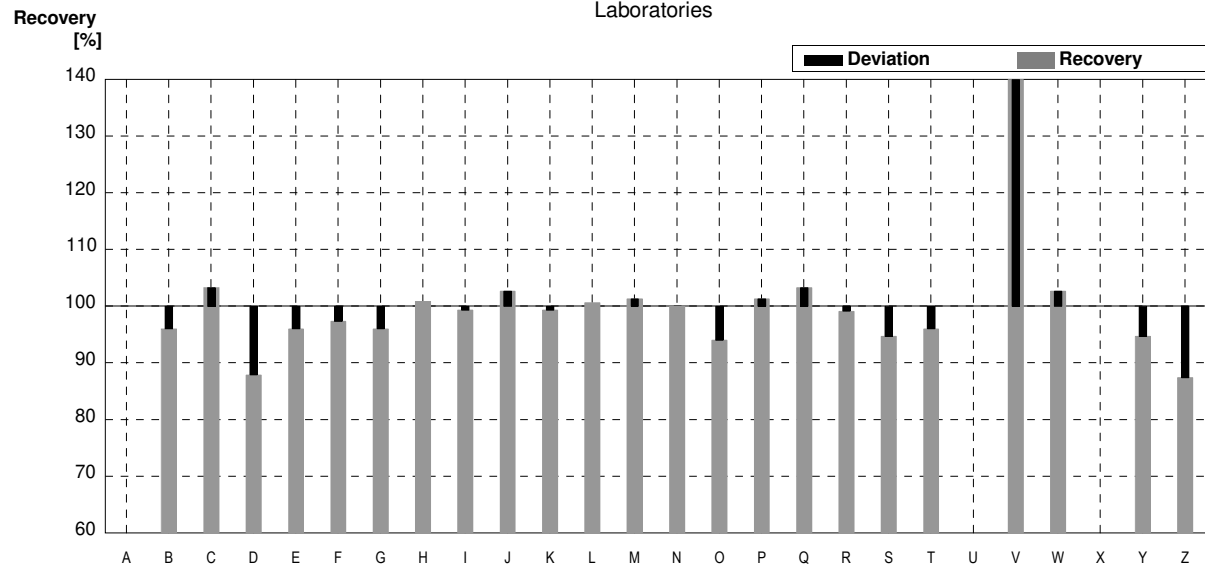
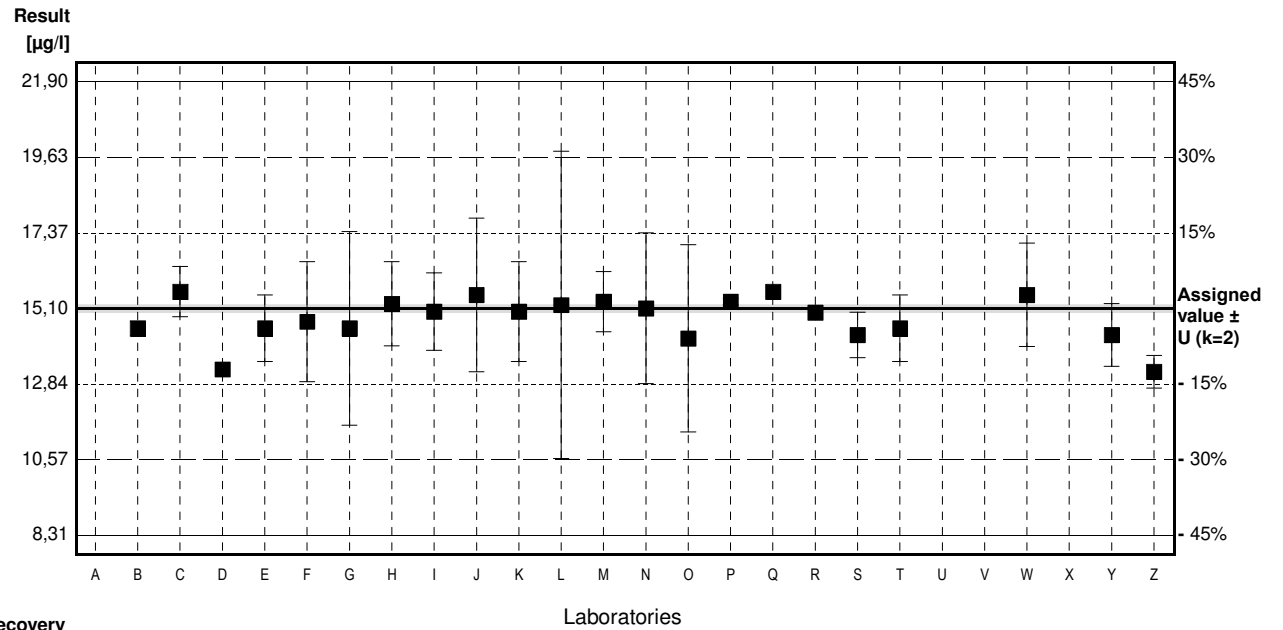
Assigned value ± U (k=2) 15,10 µg/l ± 0,11 µg/l

IFA result ± U (k=2) 15,6 µg/l ± 1,0 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	14,5		µg/l	96%	-0,78
C	15,6	0,75	µg/l	103%	0,65
D	13,27		µg/l	88%	-2,38
E	14,5	1,0	µg/l	96%	-0,78
F	14,7	1,8	µg/l	97%	-0,52
G	14,5	2,9	µg/l	96%	-0,78
H	15,231	1,26	µg/l	101%	0,17
I	15,0	1,16	µg/l	99%	-0,13
J	15,5	2,3	µg/l	103%	0,52
K	15,0	1,50	µg/l	99%	-0,13
L	15,2	4,6	µg/l	101%	0,13
M	15,3	0,90	µg/l	101%	0,26
N	15,1	2,26	µg/l	100%	0,00
O	14,2	2,8	µg/l	94%	-1,17
P	15,3	0,100	µg/l	101%	0,26
Q	15,60		µg/l	103%	0,65
R	14,97		µg/l	99%	-0,17
S	14,3	0,681	µg/l	95%	-1,04
T	14,5	1,0	µg/l	96%	-0,78
U			µg/l		
V	38,1 *	7,62	µg/l	252%	29,87
W	15,5	1,55	µg/l	103%	0,52
X			µg/l		
Y	14,3	0,94	µg/l	95%	-1,04
Z	13,2	0,49	µg/l	87%	-2,47

	All results	Outliers excl.	Unit
Mean ± CI(99%)	15,80 ± 2,88	14,79 ± 0,40	µg/l
Recov. ± CI(99%)	104,6 ± 19,1	97,9 ± 2,7	%
SD between labs	4,91	0,67	µg/l
RSD between labs	31,0	4,5	%
n for calculation	23	22	



Sample M178A

Parameter Nickel

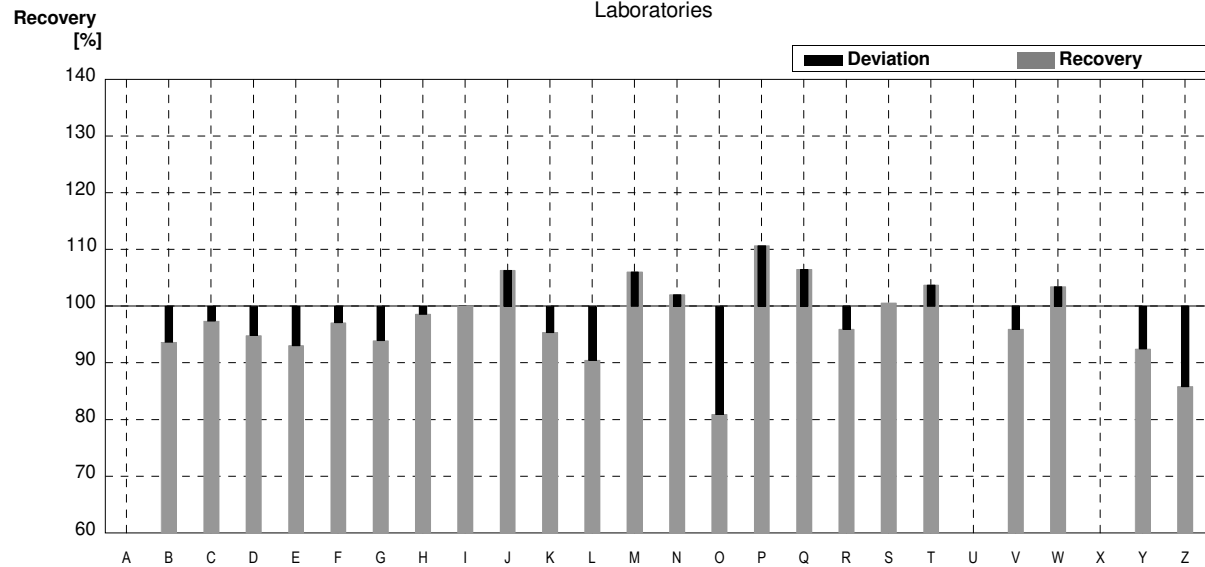
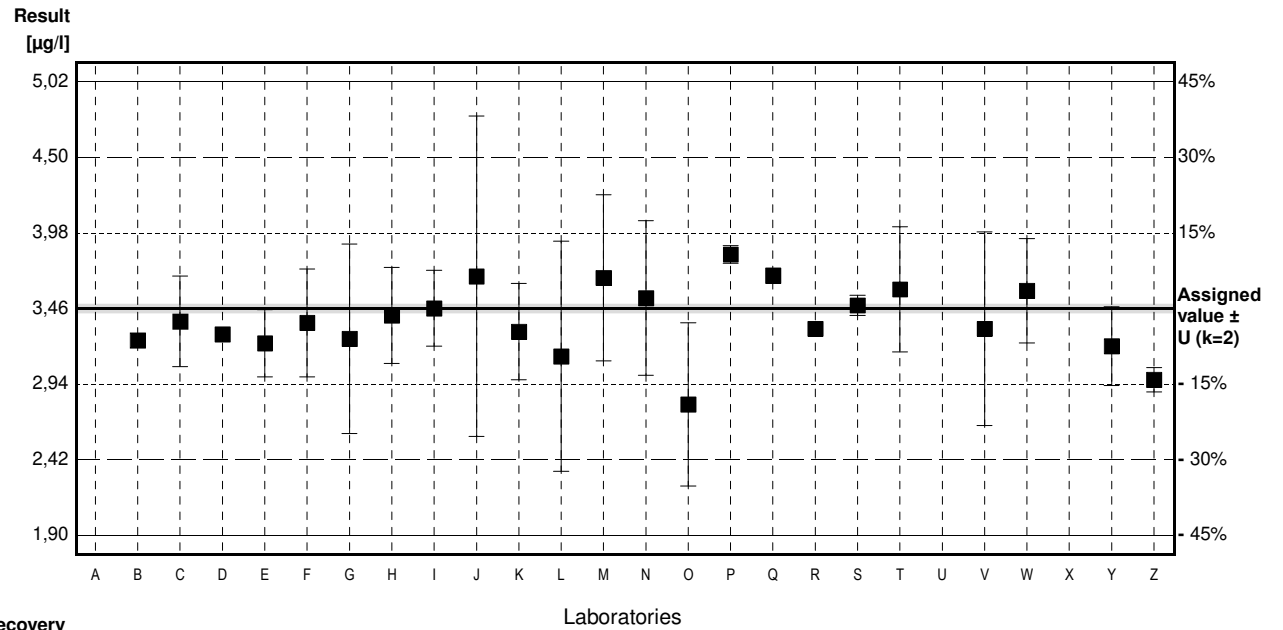
Assigned value ± U (k=2) 3,46 µg/l ± 0,03 µg/l

IFA result ± U (k=2) 3,49 µg/l ± 0,16 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	3,24		µg/l	94%	-0,99
C	3,37	0,31	µg/l	97%	-0,41
D	3,282		µg/l	95%	-0,80
E	3,22	0,23	µg/l	93%	-1,08
F	3,36	0,37	µg/l	97%	-0,45
G	3,25	0,65	µg/l	94%	-0,95
H	3,411	0,33	µg/l	99%	-0,22
I	3,46	0,26	µg/l	100%	0,00
J	3,68	1,10	µg/l	106%	0,99
K	3,30	0,330	µg/l	95%	-0,72
L	3,13	0,79	µg/l	90%	-1,49
M	3,67	0,57	µg/l	106%	0,95
N	3,53	0,53	µg/l	102%	0,32
O	2,80	0,56	µg/l	81%	-2,98
P	3,83	0,060	µg/l	111%	1,67
Q	3,685		µg/l	107%	1,02
R	3,32		µg/l	96%	-0,63
S	3,48	0,0687	µg/l	101%	0,09
T	3,59	0,43	µg/l	104%	0,59
U			µg/l		
V	3,32	0,664	µg/l	96%	-0,63
W	3,58	0,358	µg/l	103%	0,54
X			µg/l		
Y	3,20	0,27	µg/l	92%	-1,17
Z	2,97	0,083	µg/l	86%	-2,21

	All results	Outliers excl.	Unit
Mean ± CI(99%)	3,38 ± 0,14	3,38 ± 0,14	µg/l
Recov. ± CI(99%)	97,6 ± 4,1	97,6 ± 4,1	%
SD between labs	0,24	0,24	µg/l
RSD between labs	7,1	7,1	%
n for calculation	23	23	



Sample M178B

Parameter Nickel

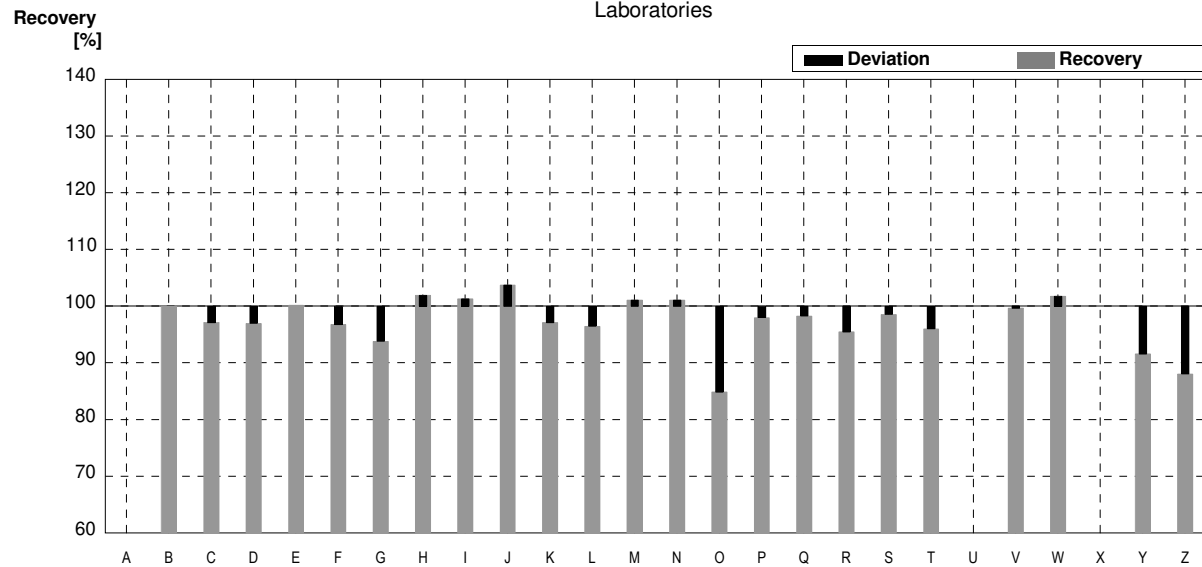
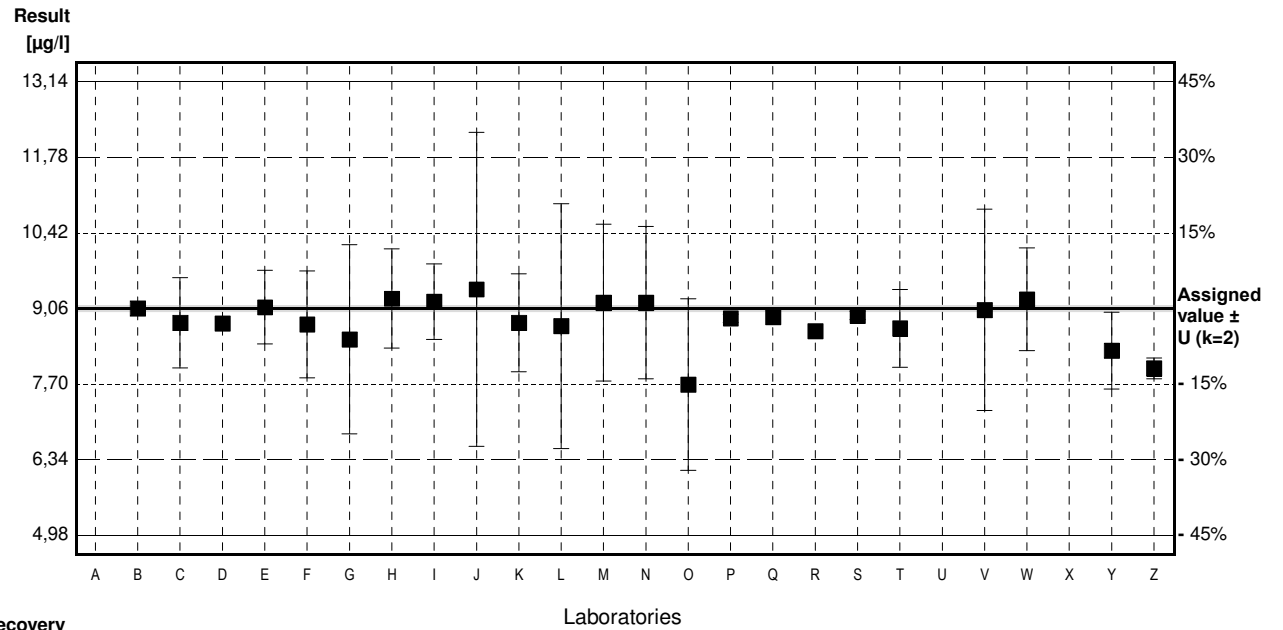
Assigned value ± U (k=2) 9,06 µg/l ± 0,06 µg/l

IFA result ± U (k=2) 9,2 µg/l ± 0,4 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	9,06		µg/l	100%	0,00
C	8,8	0,81	µg/l	97%	-0,45
D	8,788		µg/l	97%	-0,47
E	9,08	0,66	µg/l	100%	0,03
F	8,77	0,96	µg/l	97%	-0,50
G	8,50	1,7	µg/l	94%	-0,97
H	9,235	0,89	µg/l	102%	0,30
I	9,18	0,68	µg/l	101%	0,21
J	9,40	2,82	µg/l	104%	0,59
K	8,80	0,880	µg/l	97%	-0,45
L	8,74	2,2	µg/l	96%	-0,55
M	9,16	1,41	µg/l	101%	0,17
N	9,16	1,37	µg/l	101%	0,17
O	7,69 *	1,54	µg/l	85%	-2,36
P	8,88	0,076	µg/l	98%	-0,31
Q	8,905		µg/l	98%	-0,27
R	8,65		µg/l	95%	-0,71
S	8,93	0,0735	µg/l	99%	-0,22
T	8,7	0,7	µg/l	96%	-0,62
U			µg/l		
V	9,03	1,81	µg/l	100%	-0,05
W	9,22	0,922	µg/l	102%	0,28
X			µg/l		
Y	8,30	0,69	µg/l	92%	-1,31
Z	7,98	0,186	µg/l	88%	-1,86

	All results	Outliers excl.	Unit
Mean ± CI(99%)	8,82 ± 0,24	8,88 ± 0,20	µg/l
Recov. ± CI(99%)	97,4 ± 2,6	98,0 ± 2,2	%
SD between labs	0,41	0,33	µg/l
RSD between labs	4,6	3,7	%
n for calculation	23	22	



Sample M178A
Parameter Mercury

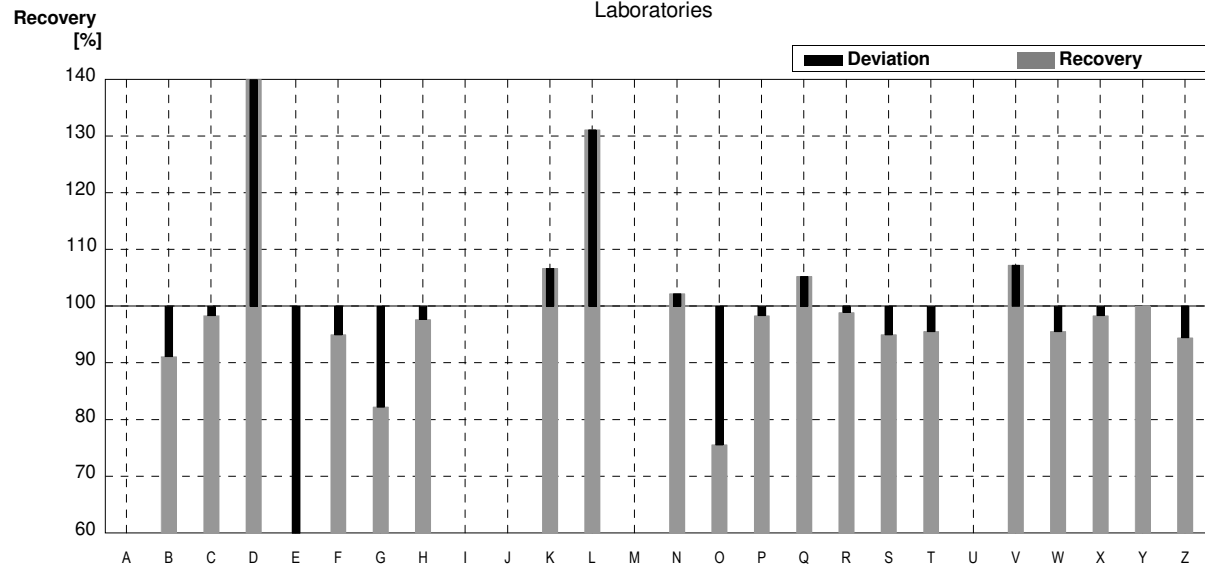
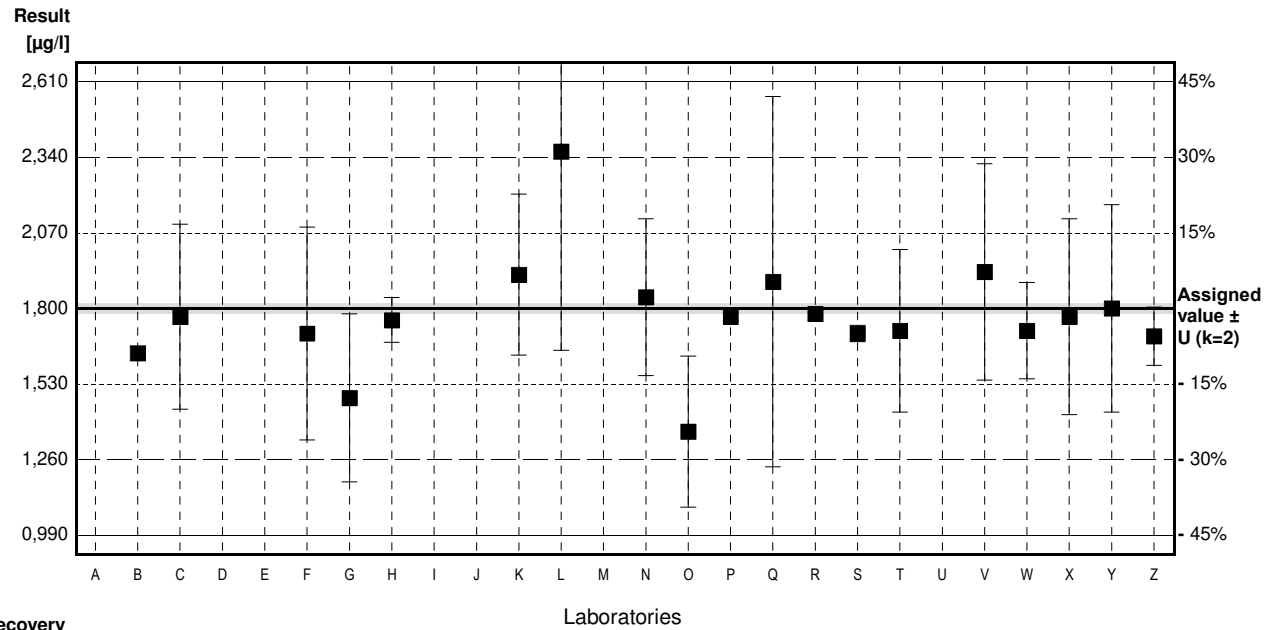
Assigned value ± U (k=2) 1,800 µg/l ± 0,018 µg/l

IFA result ± U (k=2) 1,82 µg/l ± 0,30 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	1,64		µg/l	91%	-0,81
C	1,77	0,33	µg/l	98%	-0,15
D	172,2 *		µg/l	9567%	860,61
E	0,962 *	0,275	µg/l	53%	-4,23
F	1,71	0,38	µg/l	95%	-0,45
G	1,48	0,30	µg/l	82%	-1,62
H	1,758	0,08	µg/l	98%	-0,21
I			µg/l		
J			µg/l		
K	1,92	0,288	µg/l	107%	0,61
L	2,36 *	0,71	µg/l	131%	2,83
M			µg/l		
N	1,84	0,28	µg/l	102%	0,20
O	1,36 *	0,27	µg/l	76%	-2,22
P	1,77	0,015	µg/l	98%	-0,15
Q	1,895	0,661	µg/l	105%	0,48
R	1,78		µg/l	99%	-0,10
S	1,71	0,0288	µg/l	95%	-0,45
T	1,72	0,29	µg/l	96%	-0,40
U			µg/l		
V	1,93	0,386	µg/l	107%	0,66
W	1,72	0,172	µg/l	96%	-0,40
X	1,77	0,35	µg/l	98%	-0,15
Y	1,80	0,37	µg/l	100%	0,00
Z	1,70	0,104	µg/l	94%	-0,51

	All results	Outliers excl.	Unit
Mean ± CI(99%)	9,847 ± 23,136	1,760 ± 0,076	µg/l
Recov. ± CI(99%)	547,1 ± 1285,3	97,8 ± 4,2	%
SD between labs	37,201	0,108	µg/l
RSD between labs	377,8	6,1	%
n for calculation	21	17	



Sample M178B

Parameter Mercury

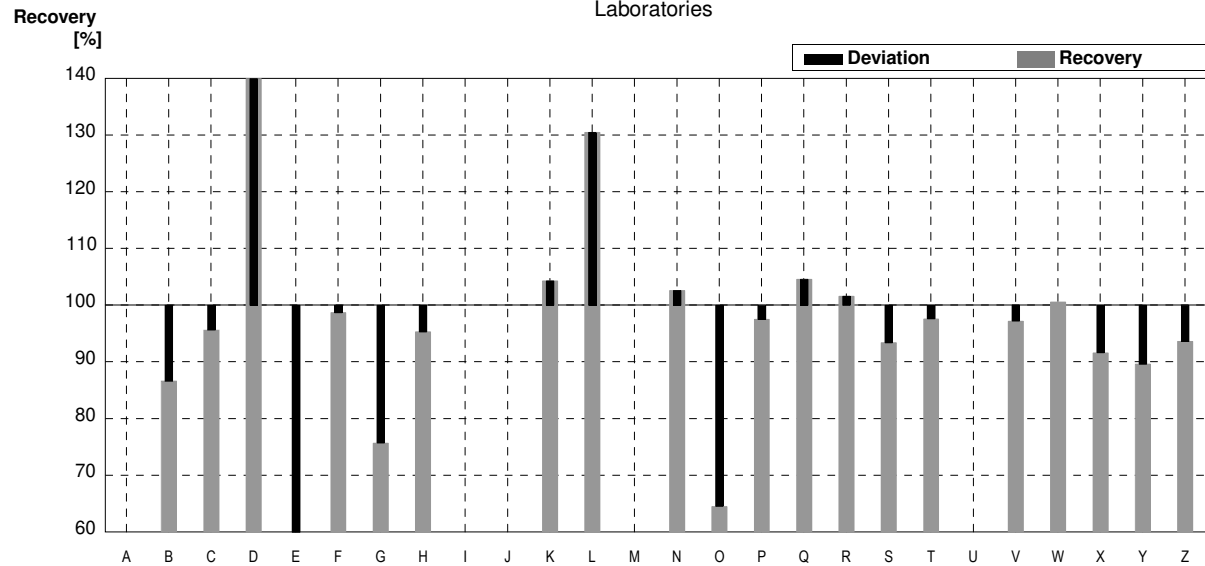
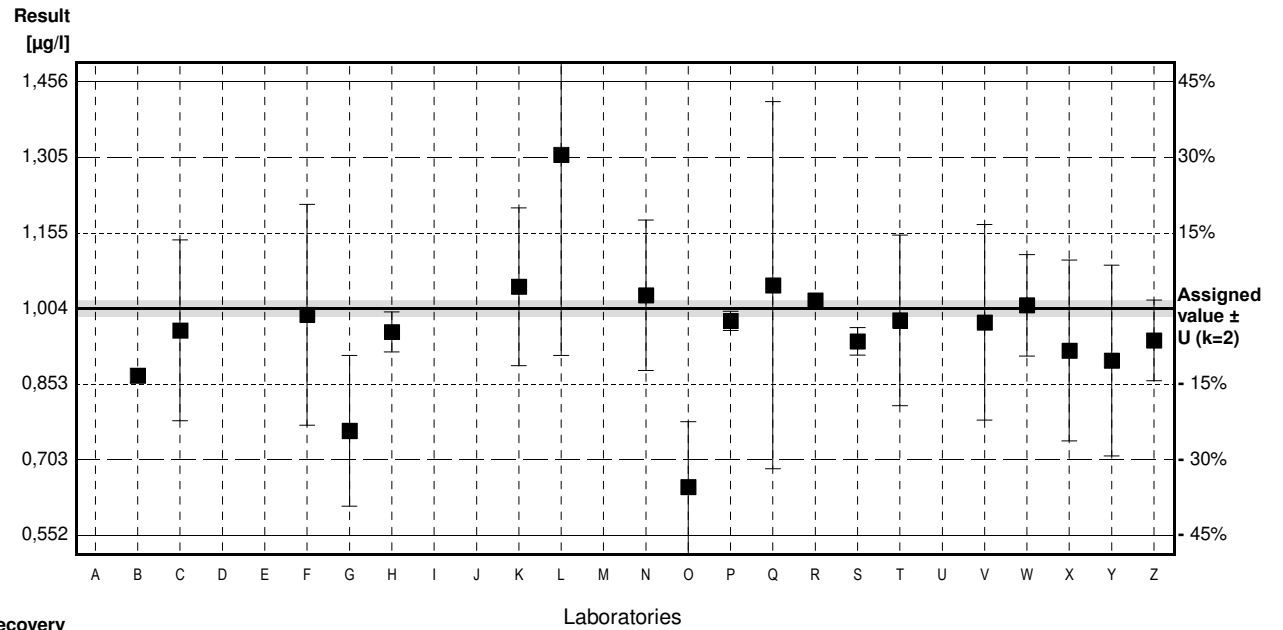
Assigned value ± U (k=2) 1,004 µg/l ± 0,016 µg/l

IFA result ± U (k=2) 0,86 µg/l ± 0,14 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	0,87		µg/l	87%	-1,21
C	0,96	0,18	µg/l	96%	-0,40
D	95,56 *		µg/l	9518%	856,18
E	0,356 *	0,102	µg/l	35%	-5,87
F	0,991	0,22	µg/l	99%	-0,12
G	0,760	0,15	µg/l	76%	-2,21
H	0,957	0,04	µg/l	95%	-0,43
I			µg/l		
J			µg/l		
K	1,047	0,1571	µg/l	104%	0,39
L	1,31 *	0,40	µg/l	130%	2,77
M			µg/l		
N	1,03	0,15	µg/l	103%	0,24
O	0,648 *	0,130	µg/l	65%	-3,22
P	0,979	0,019	µg/l	98%	-0,23
Q	1,050	0,366	µg/l	105%	0,42
R	1,02		µg/l	102%	0,14
S	0,938	0,0275	µg/l	93%	-0,60
T	0,98	0,17	µg/l	98%	-0,22
U			µg/l		
V	0,976	0,195	µg/l	97%	-0,25
W	1,01	0,101	µg/l	101%	0,05
X	0,92	0,18	µg/l	92%	-0,76
Y	0,90	0,19	µg/l	90%	-0,94
Z	0,94	0,080	µg/l	94%	-0,58

	All results	Outliers excl.	Unit
Mean ± CI(99%)	5,438 ± 12,843	0,960 ± 0,051	µg/l
Recov. ± CI(99%)	541,7 ± 1279,2	95,7 ± 5,1	%
SD between labs	20,650	0,072	µg/l
RSD between labs	379,7	7,5	%
n for calculation	21	17	



Sample M178A

Parameter Selenium

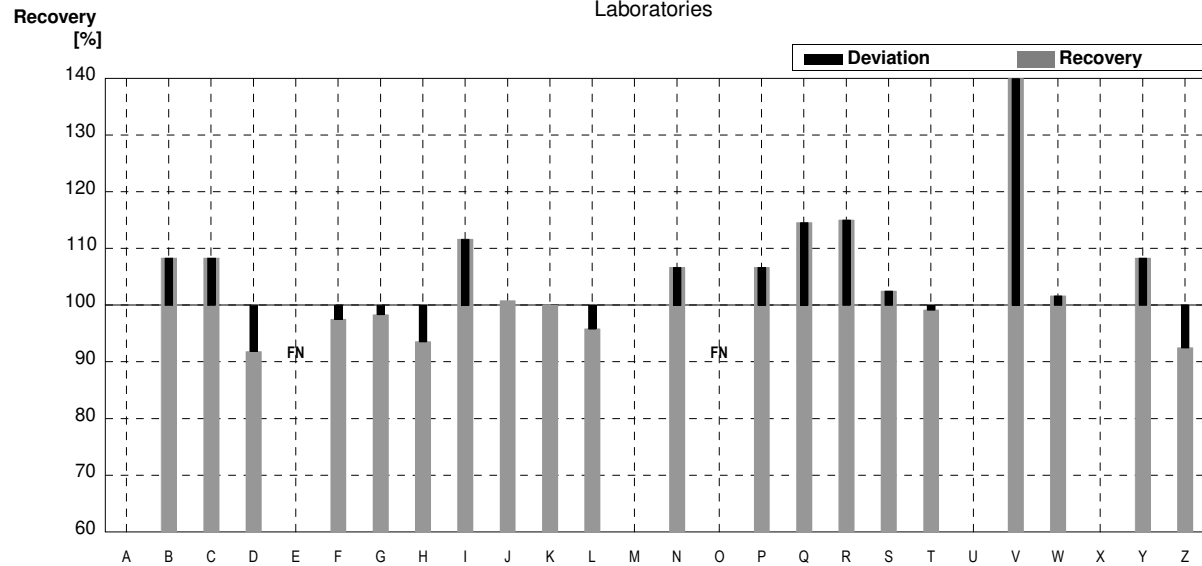
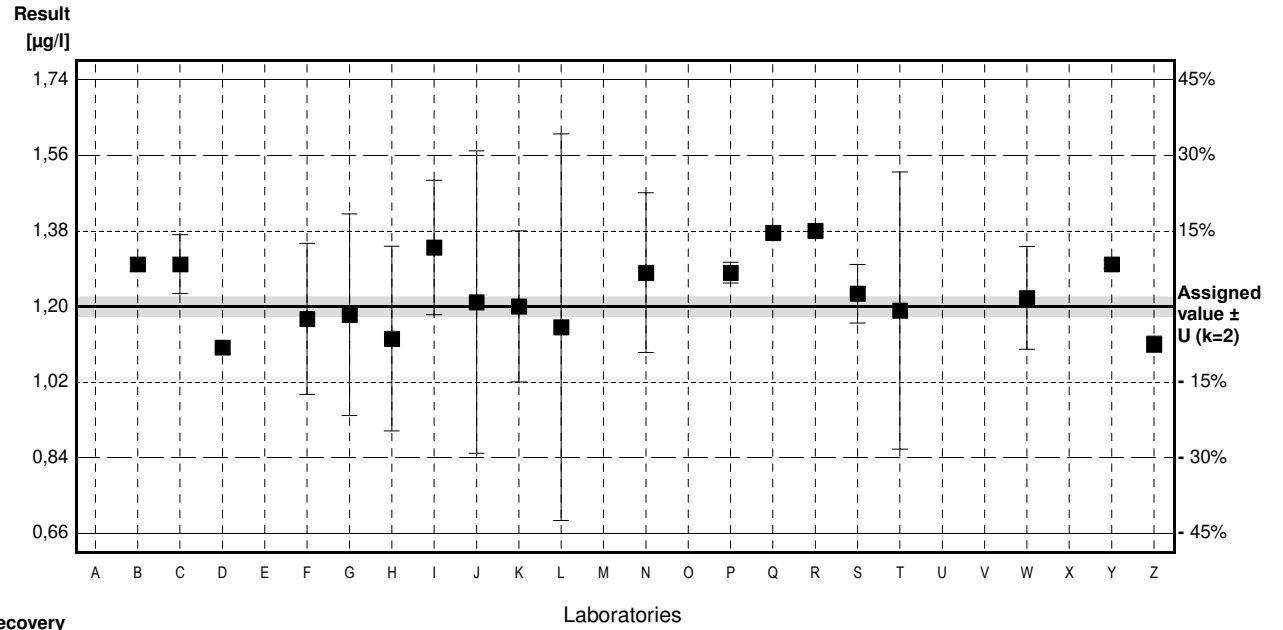
Assigned value ± U (k=2) 1,20 µg/l ± 0,02 µg/l

IFA result ± U (k=2) 1,17 µg/l ± 0,15 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	1,30		µg/l	108%	0,98
C	1,30	0,07	µg/l	108%	0,98
D	1,102		µg/l	92%	-0,96
E	<0,20		µg/l	FN	
F	1,17	0,18	µg/l	98%	-0,29
G	1,18	0,24	µg/l	98%	-0,20
H	1,123	0,22	µg/l	94%	-0,75
I	1,34	0,16	µg/l	112%	1,37
J	1,21	0,36	µg/l	101%	0,10
K	1,20	0,180	µg/l	100%	0,00
L	1,15	0,46	µg/l	96%	-0,49
M			µg/l		
N	1,28	0,19	µg/l	107%	0,78
O	<1,0	0,50	µg/l	FN	
P	1,28	0,025	µg/l	107%	0,78
Q	1,375		µg/l	115%	1,72
R	1,38		µg/l	115%	1,76
S	1,23	0,0698	µg/l	103%	0,29
T	1,19	0,33	µg/l	99%	-0,10
U			µg/l		
V	3,29 *	0,658	µg/l	274%	20,49
W	1,22	0,122	µg/l	102%	0,20
X			µg/l		
Y	1,30	0,01	µg/l	108%	0,98
Z	1,11	0,019	µg/l	93%	-0,88

	All results	Outliers excl.	Unit
Mean ± CI(99%)	1,34 ± 0,30	1,23 ± 0,06	µg/l
Recov. ± CI(99%)	111,4 ± 24,9	102,8 ± 4,7	%
SD between labs	0,47	0,09	µg/l
RSD between labs	35,0	7,0	%
n for calculation	20	19	



Sample M178B
Parameter Selenium

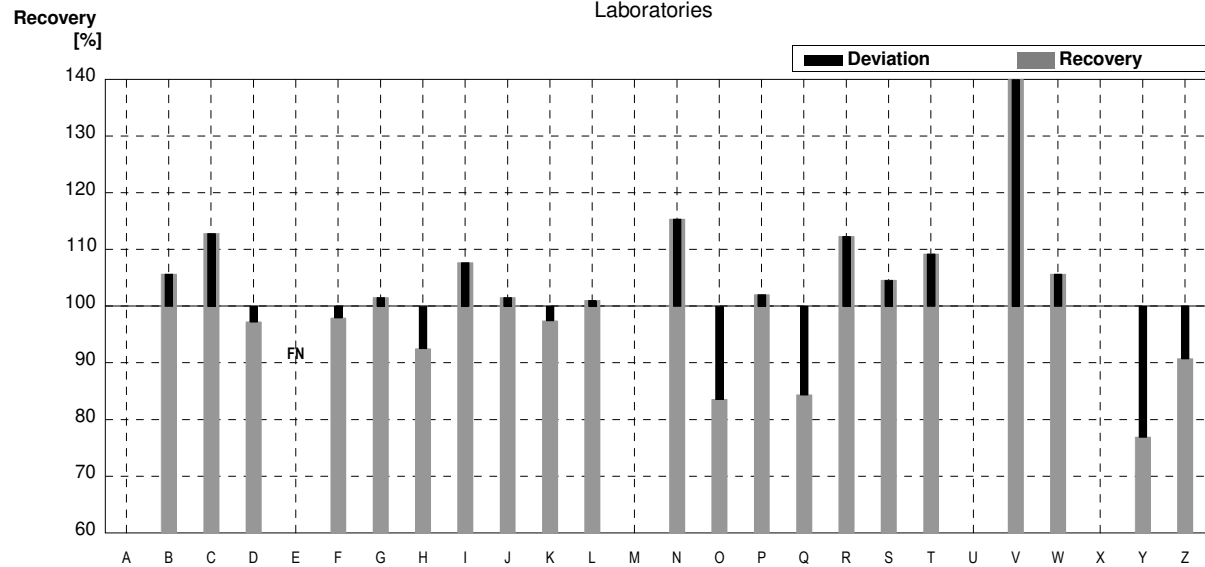
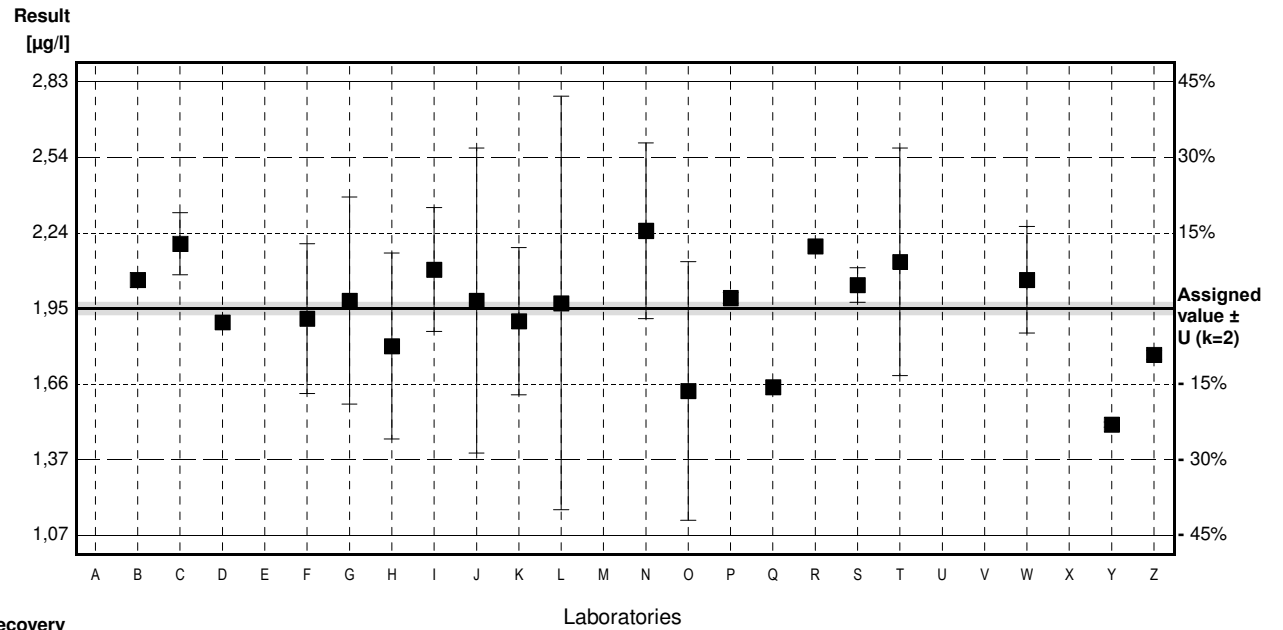
Assigned value ± U (k=2) 1,95 µg/l ± 0,02 µg/l

IFA result ± U (k=2) 2,24 µg/l ± 0,29 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	2,06		µg/l	106%	0,66
C	2,20	0,12	µg/l	113%	1,51
D	1,896		µg/l	97%	-0,33
E	<0,20		µg/l	FN	
F	1,91	0,29	µg/l	98%	-0,24
G	1,98	0,40	µg/l	102%	0,18
H	1,804	0,36	µg/l	93%	-0,88
I	2,10	0,24	µg/l	108%	0,90
J	1,98	0,59	µg/l	102%	0,18
K	1,90	0,285	µg/l	97%	-0,30
L	1,97	0,8	µg/l	101%	0,12
M			µg/l		
N	2,25	0,34	µg/l	115%	1,81
O	1,63	0,50	µg/l	84%	-1,93
P	1,99	0,021	µg/l	102%	0,24
Q	1,645		µg/l	84%	-1,84
R	2,19		µg/l	112%	1,45
S	2,04	0,0665	µg/l	105%	0,54
T	2,13	0,44	µg/l	109%	1,09
U			µg/l		
V	5,42 *	1,08	µg/l	278%	20,94
W	2,06	0,206	µg/l	106%	0,66
X			µg/l		
Y	1,50	0,01	µg/l	77%	-2,71
Z	1,77	0,018	µg/l	91%	-1,09

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,12 ± 0,49	1,95 ± 0,13	µg/l
Recov. ± CI(99%)	108,5 ± 24,9	100,0 ± 6,6	%
SD between labs	0,78	0,20	µg/l
RSD between labs	37,0	10,3	%
n for calculation	21	20	



Sample M178A
Parameter Uranium

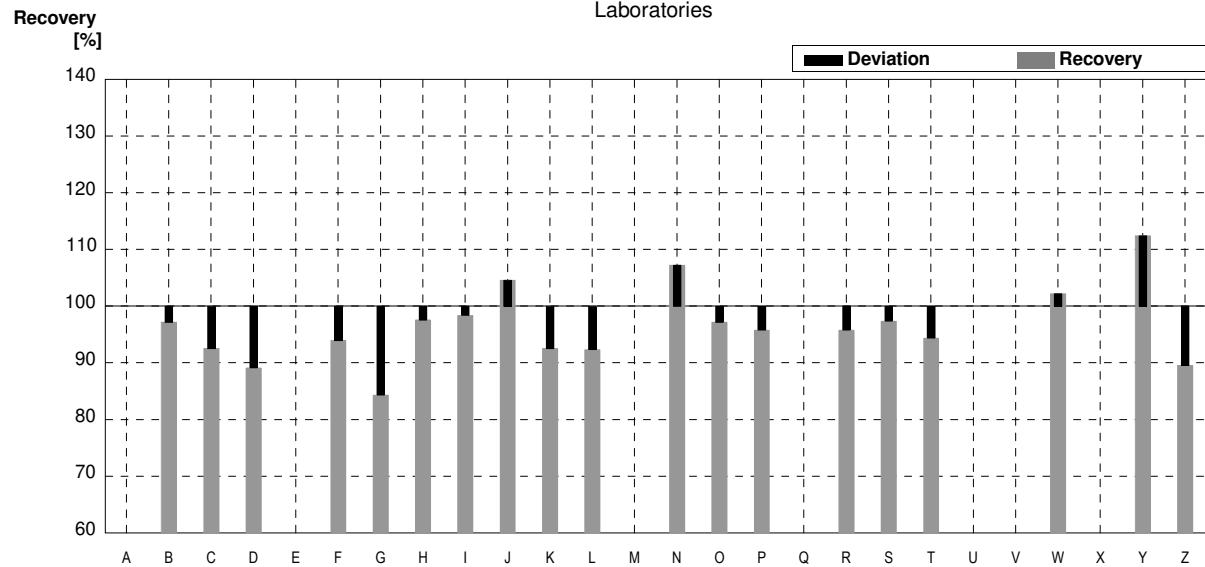
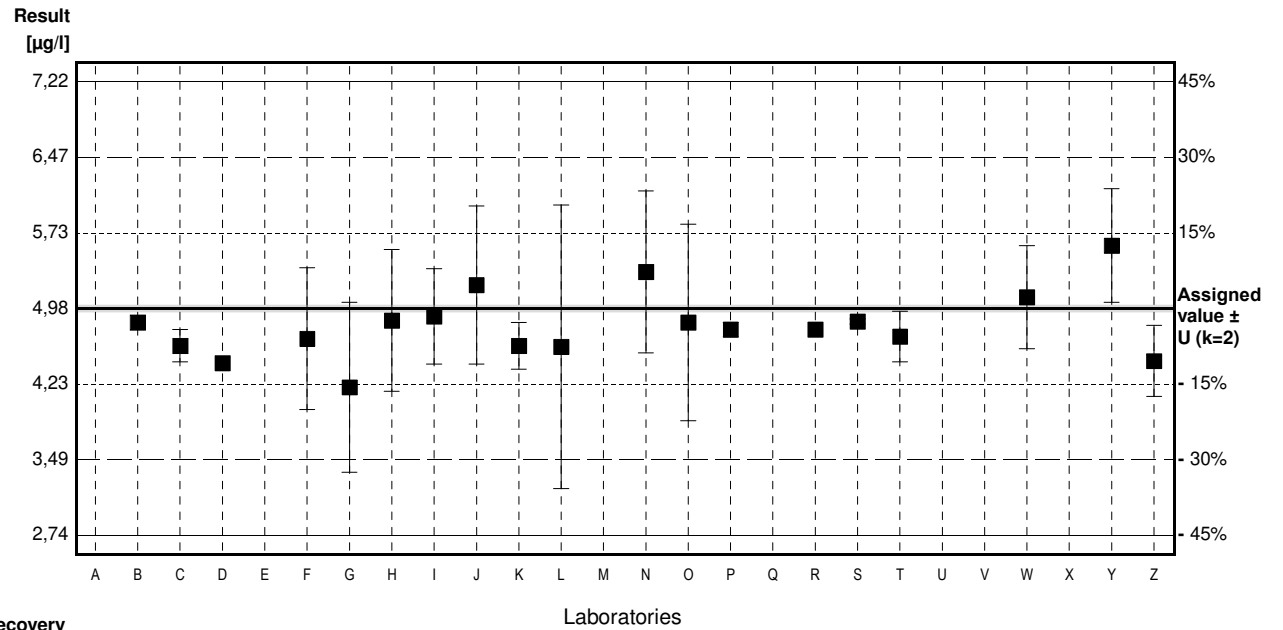
Assigned value ± U (k=2) 4,98 µg/l ± 0,03 µg/l

IFA result ± U (k=2) 4,24 µg/l ± 0,42 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	4,84		µg/l	97%	-0,52
C	4,61	0,16	µg/l	93%	-1,38
D	4,439		µg/l	89%	-2,01
E			µg/l		
F	4,68	0,70	µg/l	94%	-1,12
G	4,20	0,84	µg/l	84%	-2,90
H	4,860	0,7	µg/l	98%	-0,45
I	4,90	0,47	µg/l	98%	-0,30
J	5,21	0,78	µg/l	105%	0,86
K	4,61	0,231	µg/l	93%	-1,38
L	4,60	1,4	µg/l	92%	-1,41
M			µg/l		
N	5,34	0,80	µg/l	107%	1,34
O	4,84	0,97	µg/l	97%	-0,52
P	4,77	0,071	µg/l	96%	-0,78
Q			µg/l		
R	4,77		µg/l	96%	-0,78
S	4,85	0,0247	µg/l	97%	-0,48
T	4,70	0,25	µg/l	94%	-1,04
U			µg/l		
V			µg/l		
W	5,09	0,509	µg/l	102%	0,41
X			µg/l		
Y	5,60 *	0,56	µg/l	112%	2,31
Z	4,46	0,351	µg/l	90%	-1,93

	All results	Outliers excl.	Unit
Mean ± CI(99%)	4,81 ± 0,22	4,76 ± 0,19	µg/l
Recov. ± CI(99%)	96,6 ± 4,4	95,7 ± 3,8	%
SD between labs	0,33	0,27	µg/l
RSD between labs	6,8	5,8	%
n for calculation	19	18	



Sample M178B
Parameter Uranium

Assigned value ± U (k=2) 2,391 µg/l ± 0,018 µg/l

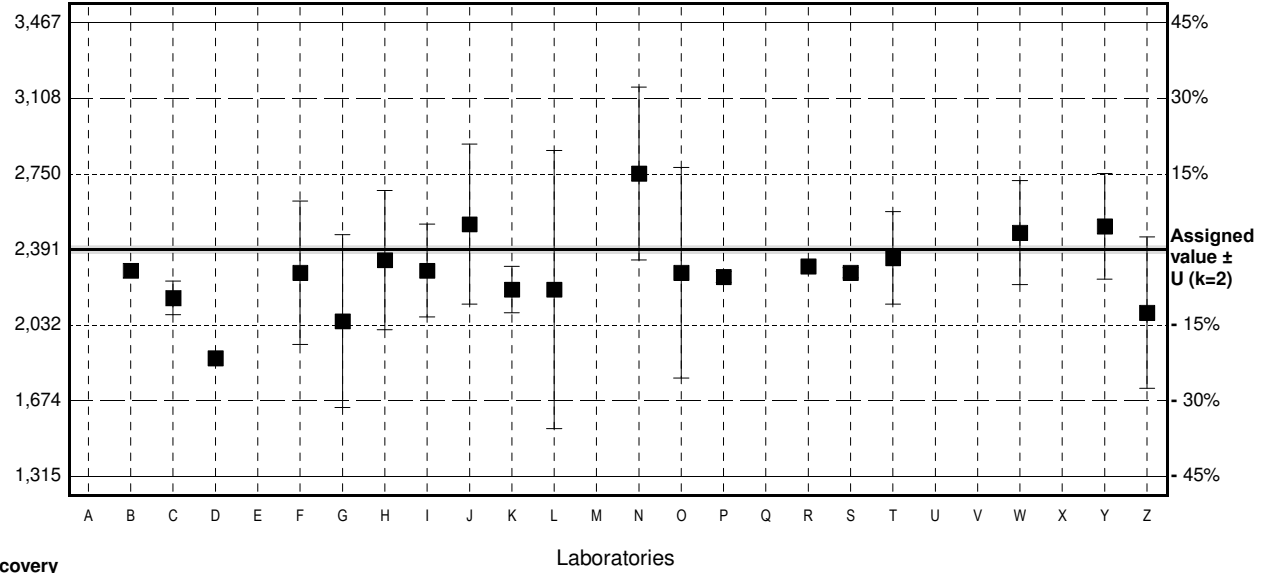
IFA result ± U (k=2) 1,80 µg/l ± 0,18 µg/l

Stability test µg/l

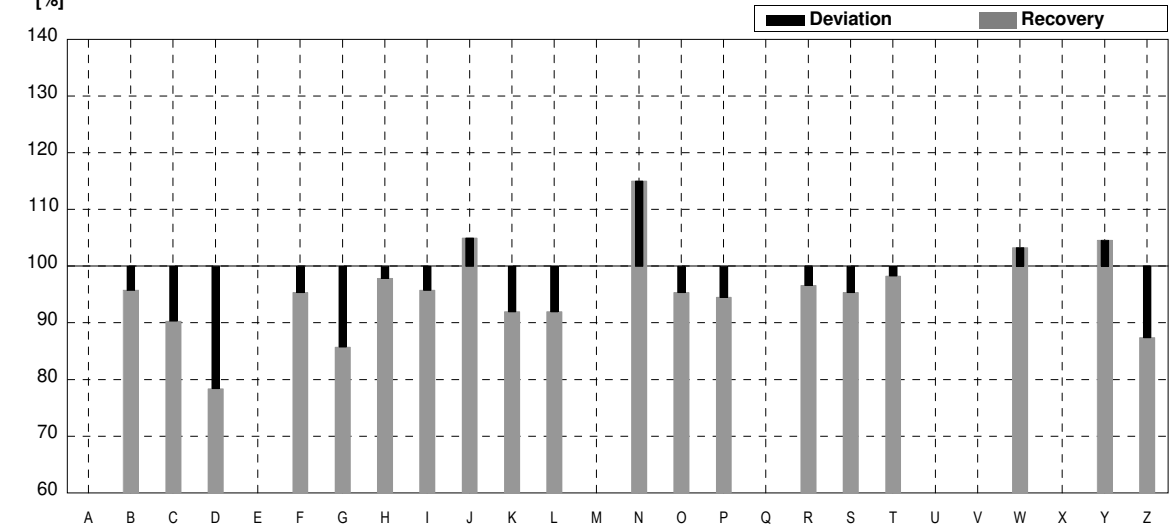
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	2,29		µg/l	96%	-0,78
C	2,16	0,08	µg/l	90%	-1,79
D	1,875 *		µg/l	78%	-4,00
E			µg/l		
F	2,28	0,34	µg/l	95%	-0,86
G	2,05	0,41	µg/l	86%	-2,64
H	2,34	0,33	µg/l	98%	-0,39
I	2,29	0,22	µg/l	96%	-0,78
J	2,51	0,38	µg/l	105%	0,92
K	2,20	0,110	µg/l	92%	-1,48
L	2,20	0,66	µg/l	92%	-1,48
M			µg/l		
N	2,75 *	0,41	µg/l	115%	2,78
O	2,28	0,50	µg/l	95%	-0,86
P	2,26	0,026	µg/l	95%	-1,01
Q			µg/l		
R	2,31		µg/l	97%	-0,63
S	2,28	0,0237	µg/l	95%	-0,86
T	2,35	0,22	µg/l	98%	-0,32
U			µg/l		
V			µg/l		
W	2,47	0,247	µg/l	103%	0,61
X			µg/l		
Y	2,50	0,25	µg/l	105%	0,84
Z	2,09	0,359	µg/l	87%	-2,33

	All results	Outliers excl.	Unit
Mean ± CI(99%)	2,289 ± 0,125	2,286 ± 0,091	µg/l
Recov. ± CI(99%)	95,7 ± 5,2	95,6 ± 3,8	%
SD between labs	0,190	0,128	µg/l
RSD between labs	8,3	5,6	%
n for calculation	19	17	

Result
[µg/l]



Recovery
[%]



Sample M178A

Parameter Zinc

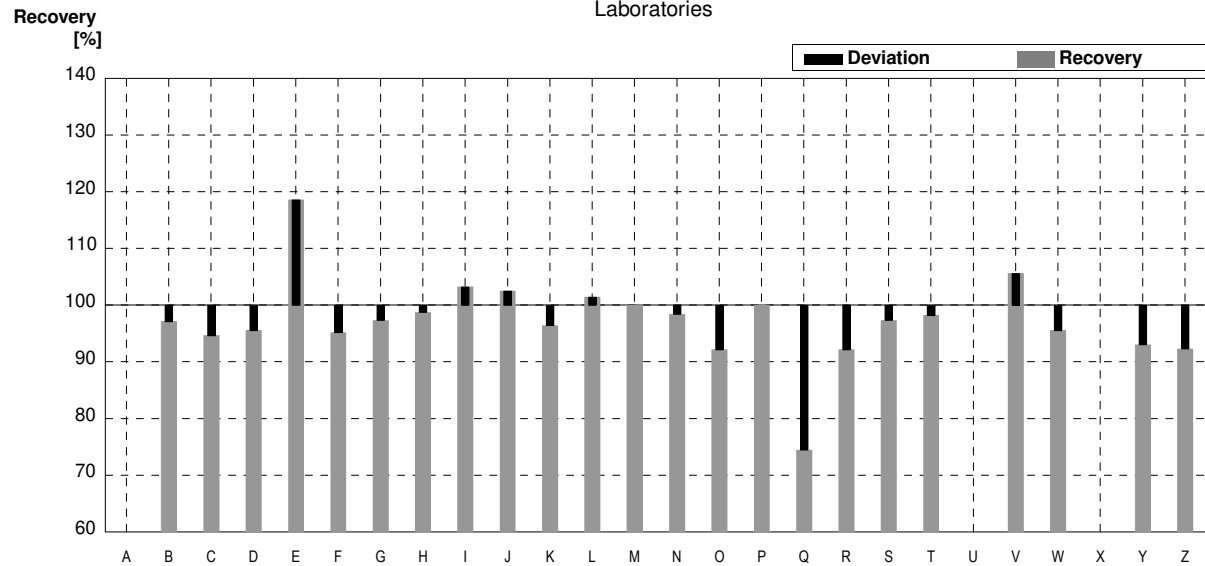
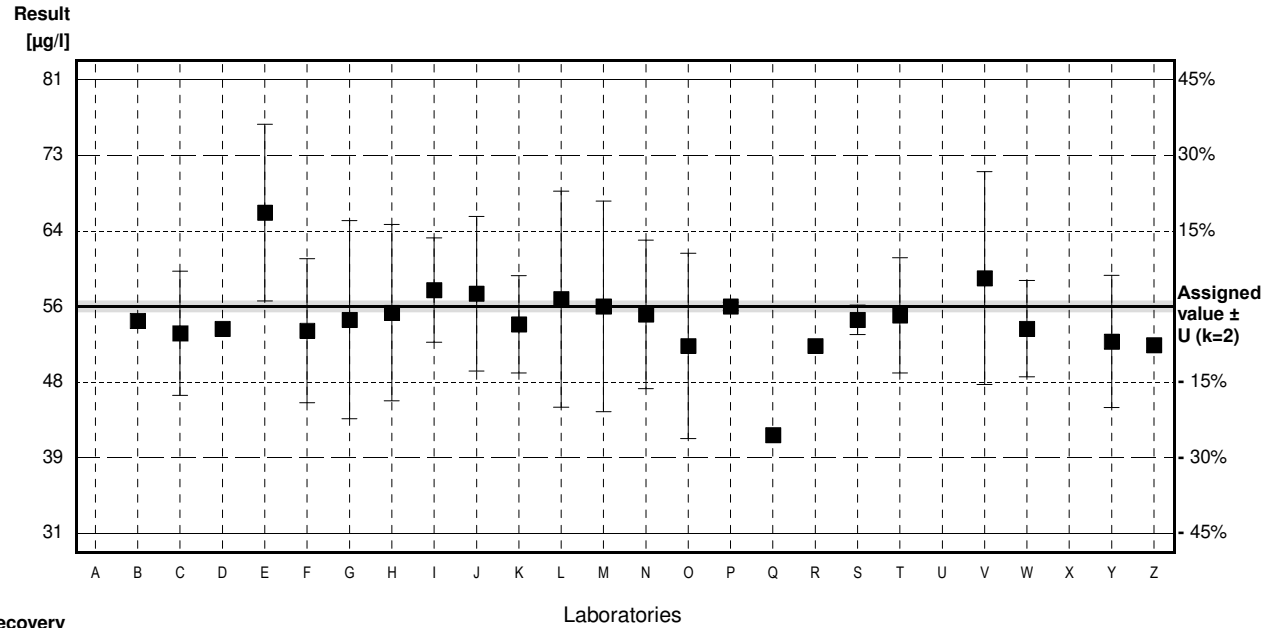
Assigned value ± U (k=2) 56 µg/l ± 1 µg/l

IFA result ± U (k=2) 64 µg/l ± 8 µg/l

Stability test µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	54,4		µg/l	97%	-0,44
C	53	6,9	µg/l	95%	-0,82
D	53,51		µg/l	96%	-0,68
E	66,4 *	9,8	µg/l	119%	2,86
F	53,3	8,0	µg/l	95%	-0,74
G	54,5	11	µg/l	97%	-0,41
H	55,292	9,79	µg/l	99%	-0,19
I	57,8	5,8	µg/l	103%	0,49
J	57,4	8,6	µg/l	103%	0,38
K	54,0	5,40	µg/l	96%	-0,55
L	56,8	12	µg/l	101%	0,22
M	56,0	11,70	µg/l	100%	0,00
N	55,1	8,26	µg/l	98%	-0,25
O	51,6	10,3	µg/l	92%	-1,21
P	56,0	0,458	µg/l	100%	0,00
Q	41,7 *		µg/l	74%	-3,93
R	51,6		µg/l	92%	-1,21
S	54,5	1,63	µg/l	97%	-0,41
T	55,0	6,4	µg/l	98%	-0,27
U			µg/l		
V	59,13	11,83	µg/l	106%	0,86
W	53,5	5,35	µg/l	96%	-0,69
X			µg/l		
Y	52,1	7,35	µg/l	93%	-1,07
Z	51,7	0,66	µg/l	92%	-1,18

	All results	Outliers excl.	Unit
Mean ± CI(99%)	55 ± 2	55 ± 1	µg/l
Recov. ± CI(99%)	97,4 ± 4,4	97,5 ± 2,3	%
SD between labs	4	2	µg/l
RSD between labs	7,8	3,8	%
n for calculation	23	21	



Sample M178B

Parameter Zinc

Assigned value ± U (k=2) 17,2 µg/l ± 0,6 µg/l

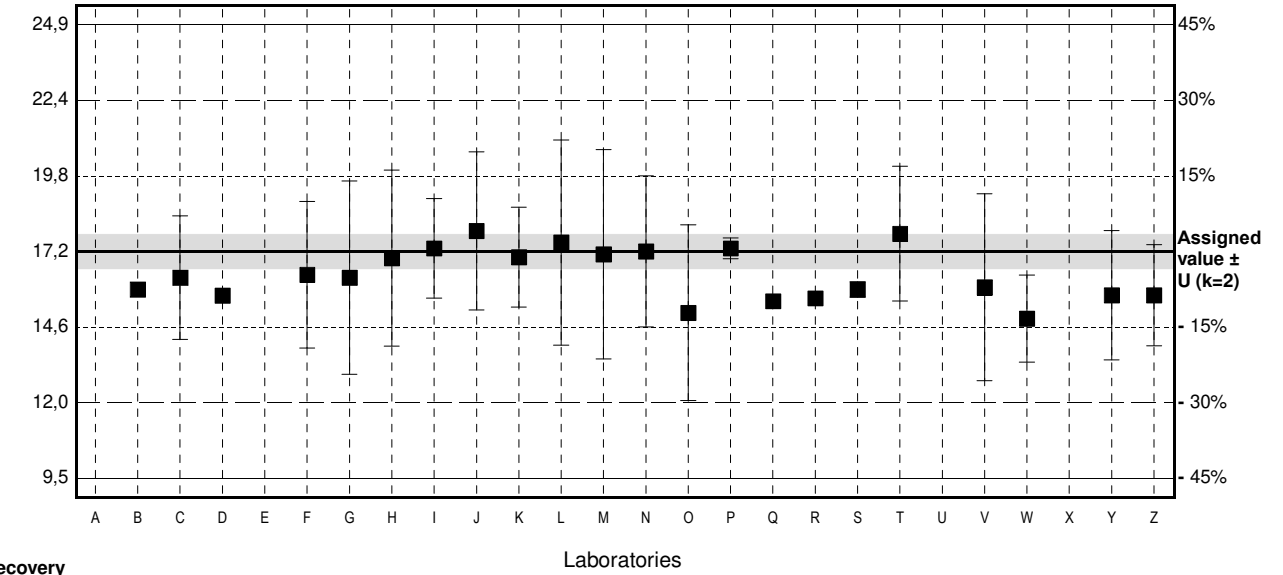
IFA result ± U (k=2) 18,2 µg/l ± 2,9 µg/l

Stability test µg/l

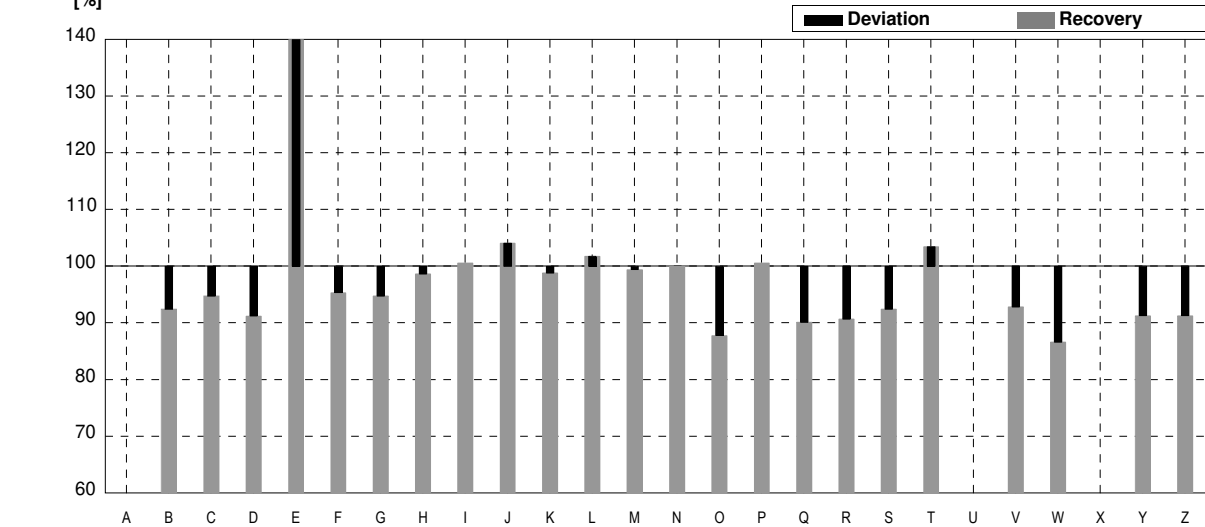
Lab Code	Result	±	Unit	Recovery	z-Score
A			µg/l		
B	15,9		µg/l	92%	-1,16
C	16,3	2,11	µg/l	95%	-0,81
D	15,69		µg/l	91%	-1,35
E	43,8 *	6,5	µg/l	255%	23,79
F	16,4	2,5	µg/l	95%	-0,72
G	16,3	3,3	µg/l	95%	-0,81
H	16,967	3	µg/l	99%	-0,21
I	17,3	1,7	µg/l	101%	0,09
J	17,9	2,7	µg/l	104%	0,63
K	17,0	1,70	µg/l	99%	-0,18
L	17,5	3,5	µg/l	102%	0,27
M	17,1	3,57	µg/l	99%	-0,09
N	17,2	2,58	µg/l	100%	0,00
O	15,1	3,0	µg/l	88%	-1,88
P	17,3	0,354	µg/l	101%	0,09
Q	15,5		µg/l	90%	-1,52
R	15,6		µg/l	91%	-1,43
S	15,9	0,262	µg/l	92%	-1,16
T	17,8	2,3	µg/l	103%	0,54
U			µg/l		
V	15,97	3,19	µg/l	93%	-1,10
W	14,9	1,49	µg/l	87%	-2,06
X			µg/l		
Y	15,7	2,21	µg/l	91%	-1,34
Z	15,7	1,73	µg/l	91%	-1,34

	All results	Outliers excl.	Unit
Mean ± CI(99%)	17,6 ± 3,4	16,4 ± 0,5	µg/l
Recov. ± CI(99%)	102,3 ± 19,7	95,4 ± 3,1	%
SD between labs	5,8	0,9	µg/l
RSD between labs	32,8	5,4	%
n for calculation	23	22	

Result
[µg/l]



Recovery
[%]





Labororientierte Auswertung
Laboratory Oriented Part

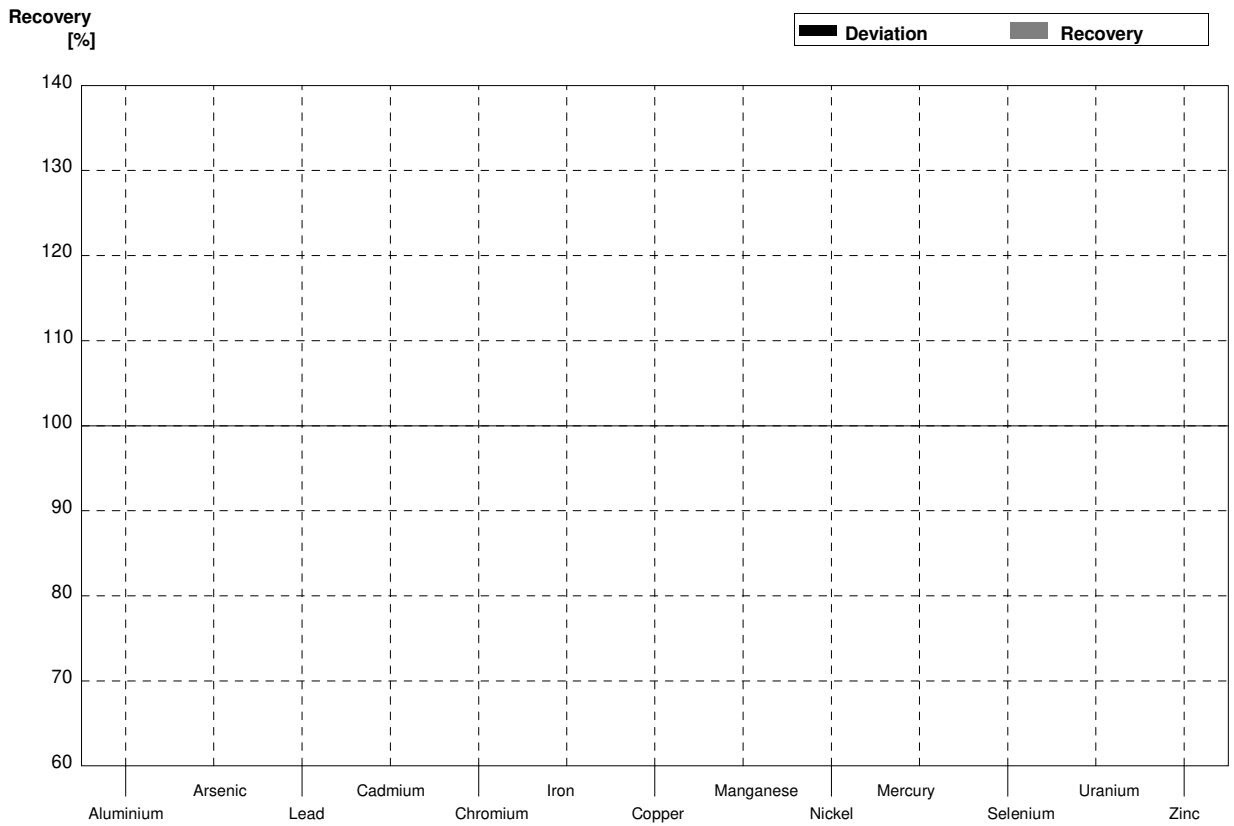
Eignungsprüfungsrunde / Proficiency testing round
M178

Metalle / Metals

Versand / Dispatch: 08.09.2025

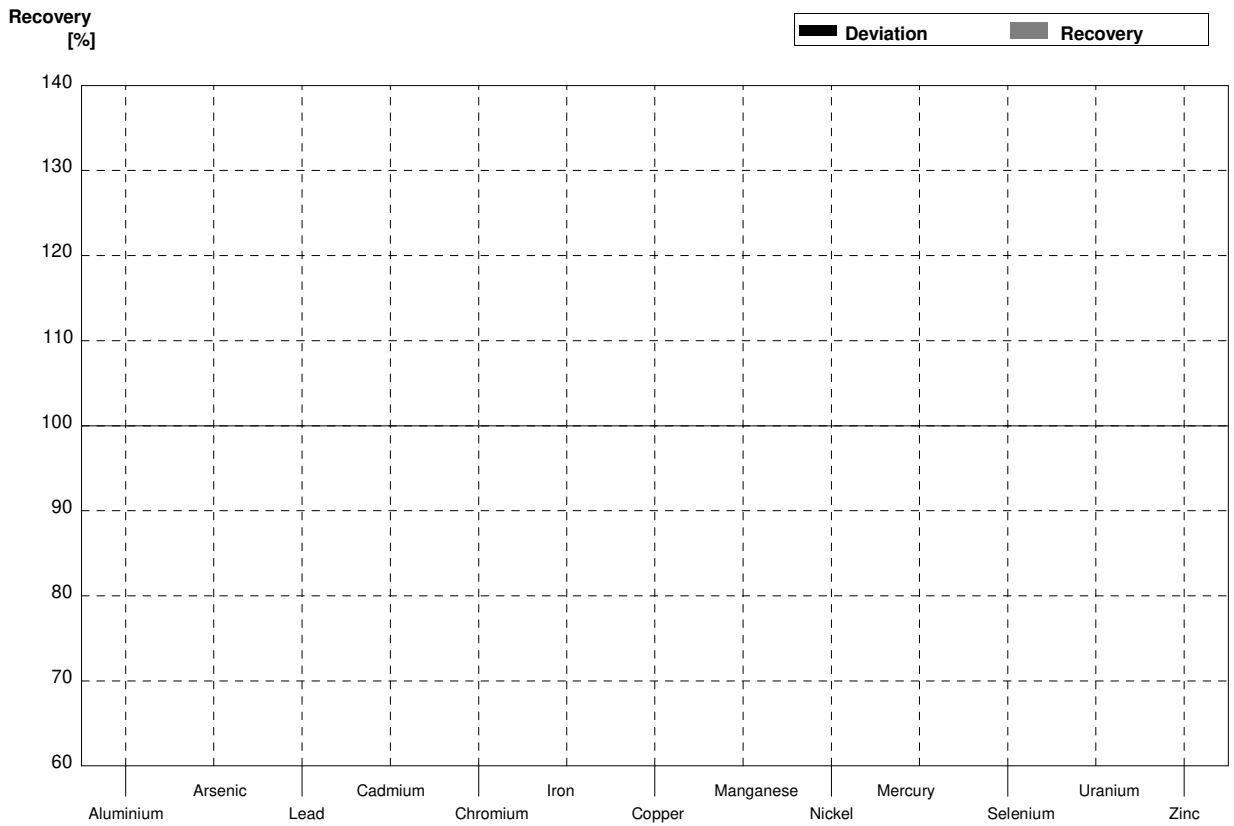
Sample M178A
Laboratory A

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18			$\mu\text{g/l}$	
Arsenic	1,075	0,015			$\mu\text{g/l}$	
Lead	4,23	0,03			$\mu\text{g/l}$	
Cadmium	0,993	0,011			$\mu\text{g/l}$	
Chromium	4,58	0,03			$\mu\text{g/l}$	
Iron	45,5	0,2			$\mu\text{g/l}$	
Copper	3,44	0,03			$\mu\text{g/l}$	
Manganese	21,94	0,13			$\mu\text{g/l}$	
Nickel	3,46	0,03			$\mu\text{g/l}$	
Mercury	1,800	0,018			$\mu\text{g/l}$	
Selenium	1,20	0,02			$\mu\text{g/l}$	
Uranium	4,98	0,03			$\mu\text{g/l}$	
Zinc	56	1			$\mu\text{g/l}$	



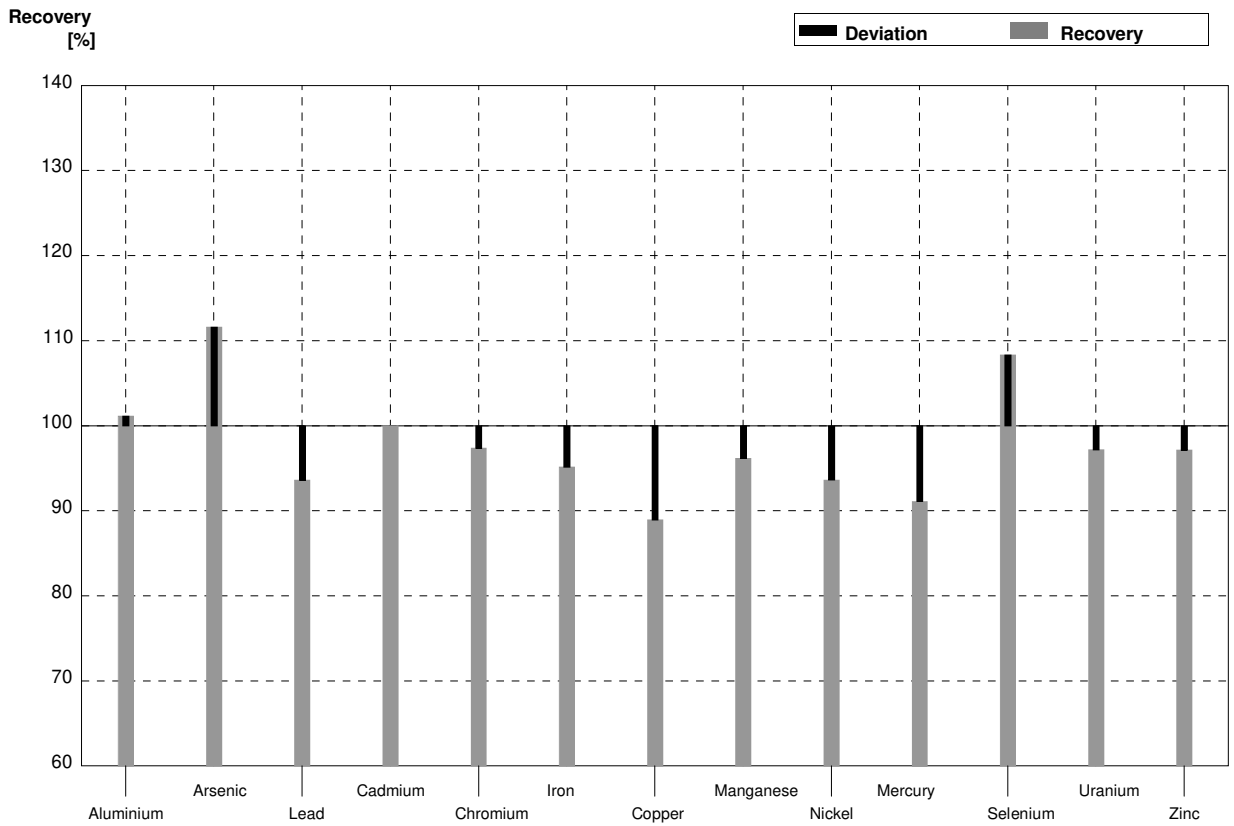
Sample M178B
Laboratory A

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2			$\mu\text{g/l}$	
Arsenic	1,592	0,016			$\mu\text{g/l}$	
Lead	2,55	0,02			$\mu\text{g/l}$	
Cadmium	1,916	0,014			$\mu\text{g/l}$	
Chromium	1,233	0,013			$\mu\text{g/l}$	
Iron	15,16	0,15			$\mu\text{g/l}$	
Copper	5,28	0,04			$\mu\text{g/l}$	
Manganese	15,10	0,11			$\mu\text{g/l}$	
Nickel	9,06	0,06			$\mu\text{g/l}$	
Mercury	1,004	0,016			$\mu\text{g/l}$	
Selenium	1,95	0,02			$\mu\text{g/l}$	
Uranium	2,391	0,018			$\mu\text{g/l}$	
Zinc	17,2	0,6			$\mu\text{g/l}$	



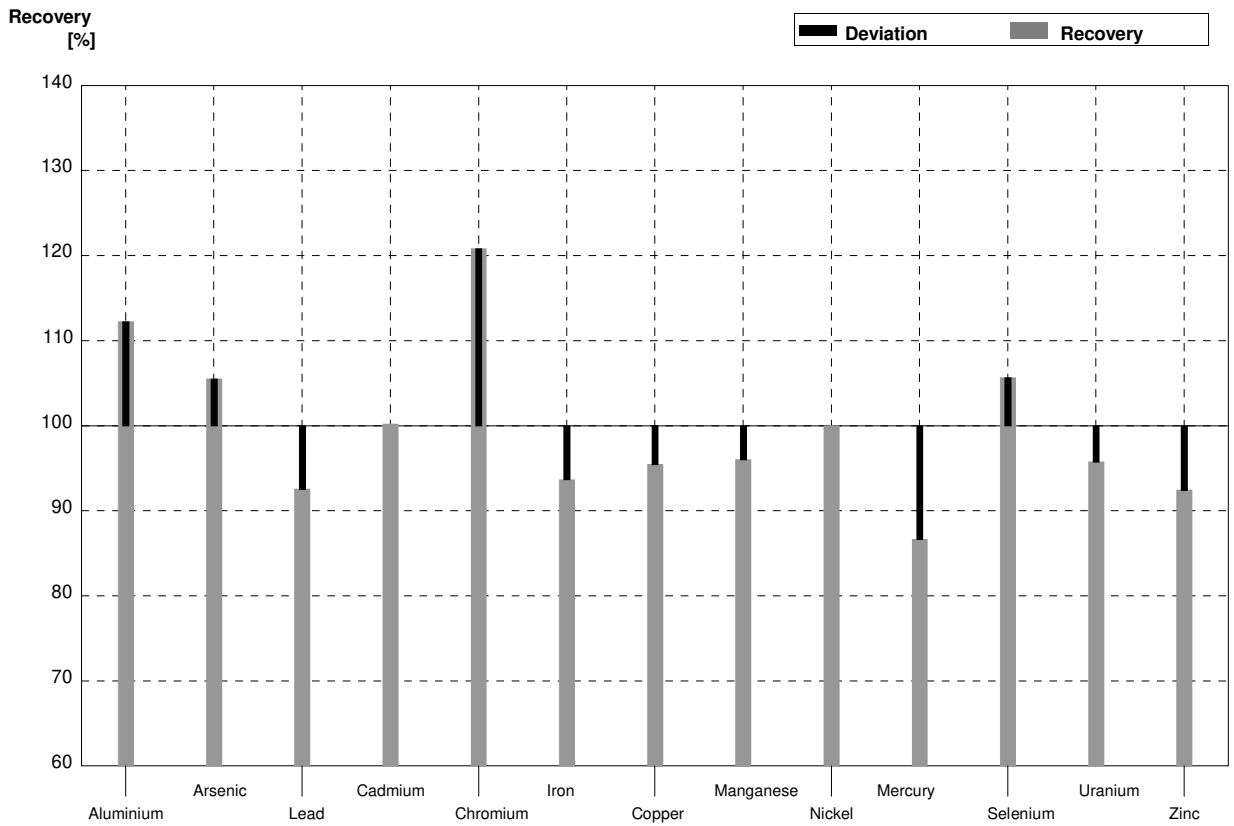
Sample M178A
Laboratory B

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,5		$\mu\text{g/l}$	101%
Arsenic	1,075	0,015	1,20		$\mu\text{g/l}$	112%
Lead	4,23	0,03	3,96		$\mu\text{g/l}$	94%
Cadmium	0,993	0,011	0,993		$\mu\text{g/l}$	100%
Chromium	4,58	0,03	4,46		$\mu\text{g/l}$	97%
Iron	45,5	0,2	43,3		$\mu\text{g/l}$	95%
Copper	3,44	0,03	3,06		$\mu\text{g/l}$	89%
Manganese	21,94	0,13	21,1		$\mu\text{g/l}$	96%
Nickel	3,46	0,03	3,24		$\mu\text{g/l}$	94%
Mercury	1,800	0,018	1,64		$\mu\text{g/l}$	91%
Selenium	1,20	0,02	1,30		$\mu\text{g/l}$	108%
Uranium	4,98	0,03	4,84		$\mu\text{g/l}$	97%
Zinc	56	1	54,4		$\mu\text{g/l}$	97%



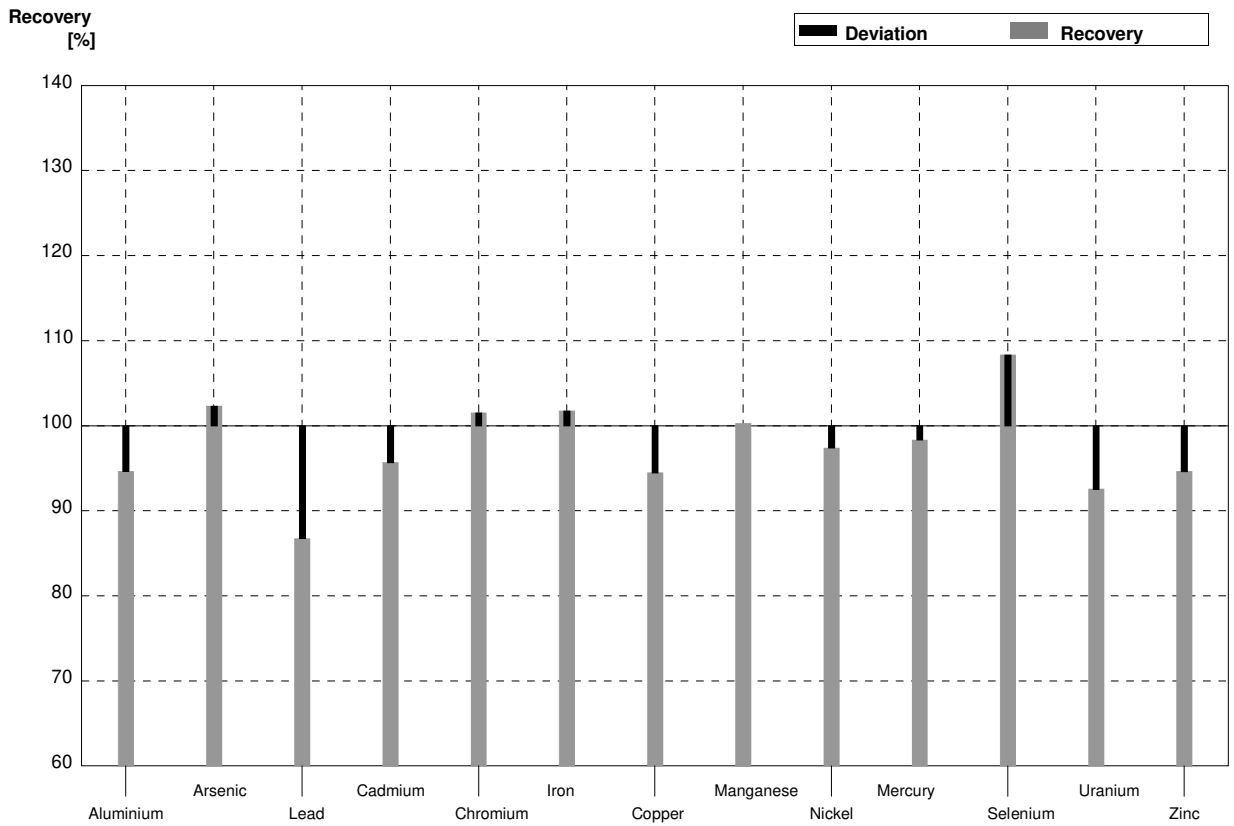
Sample M178B
Laboratory B

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	22,9		$\mu\text{g/l}$	112%
Arsenic	1,592	0,016	1,68		$\mu\text{g/l}$	106%
Lead	2,55	0,02	2,36		$\mu\text{g/l}$	93%
Cadmium	1,916	0,014	1,92		$\mu\text{g/l}$	100%
Chromium	1,233	0,013	1,49		$\mu\text{g/l}$	121%
Iron	15,16	0,15	14,2		$\mu\text{g/l}$	94%
Copper	5,28	0,04	5,04		$\mu\text{g/l}$	95%
Manganese	15,10	0,11	14,5		$\mu\text{g/l}$	96%
Nickel	9,06	0,06	9,06		$\mu\text{g/l}$	100%
Mercury	1,004	0,016	0,87		$\mu\text{g/l}$	87%
Selenium	1,95	0,02	2,06		$\mu\text{g/l}$	106%
Uranium	2,391	0,018	2,29		$\mu\text{g/l}$	96%
Zinc	17,2	0,6	15,9		$\mu\text{g/l}$	92%



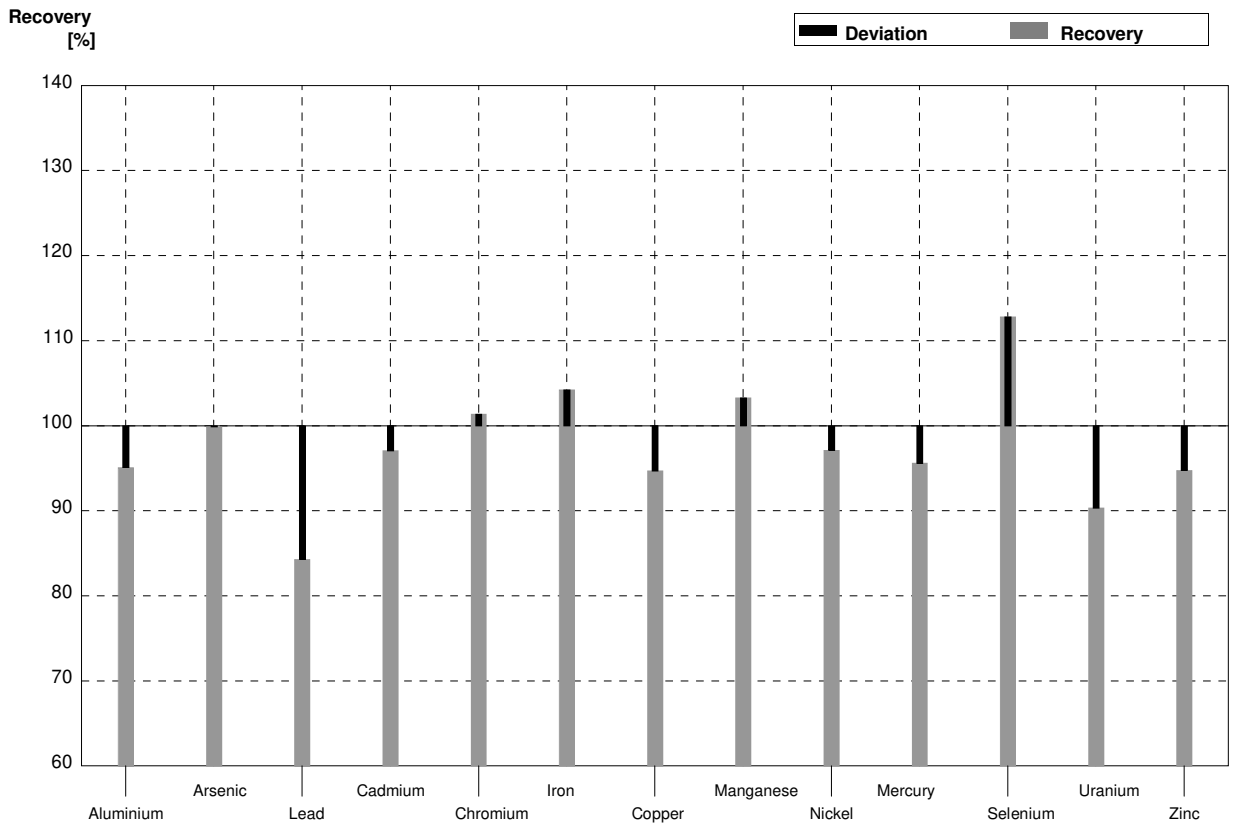
Sample M178A
Laboratory C

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	11,7	0,96	$\mu\text{g/l}$	95%
Arsenic	1,075	0,015	1,10	0,10	$\mu\text{g/l}$	102%
Lead	4,23	0,03	3,67	0,19	$\mu\text{g/l}$	87%
Cadmium	0,993	0,011	0,95	0,21	$\mu\text{g/l}$	96%
Chromium	4,58	0,03	4,65	0,73	$\mu\text{g/l}$	102%
Iron	45,5	0,2	46,3	7,4	$\mu\text{g/l}$	102%
Copper	3,44	0,03	3,25	0,51	$\mu\text{g/l}$	94%
Manganese	21,94	0,13	22,0	1,05	$\mu\text{g/l}$	100%
Nickel	3,46	0,03	3,37	0,31	$\mu\text{g/l}$	97%
Mercury	1,800	0,018	1,77	0,33	$\mu\text{g/l}$	98%
Selenium	1,20	0,02	1,30	0,07	$\mu\text{g/l}$	108%
Uranium	4,98	0,03	4,61	0,16	$\mu\text{g/l}$	93%
Zinc	56	1	53	6,9	$\mu\text{g/l}$	95%



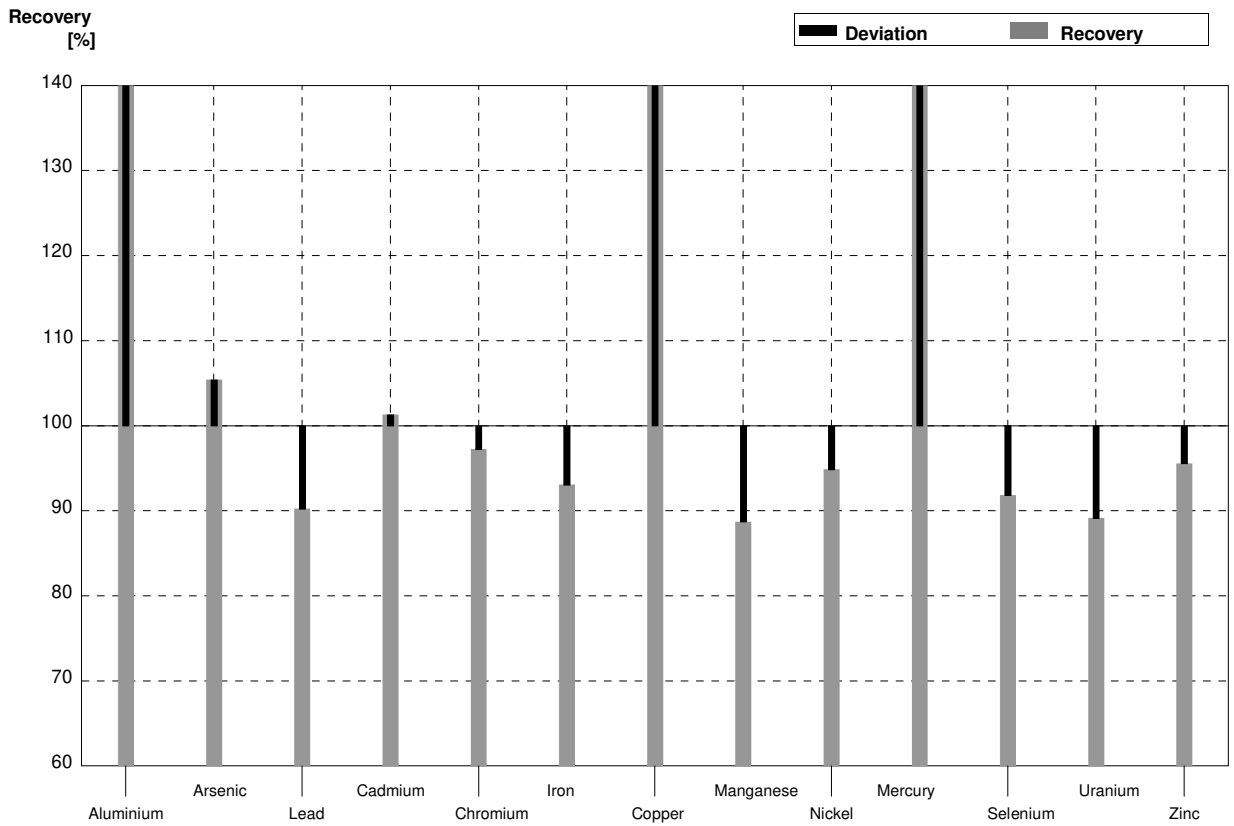
Sample M178B
Laboratory C

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	19,4	1,59	$\mu\text{g/l}$	95%
Arsenic	1,592	0,016	1,59	0,15	$\mu\text{g/l}$	100%
Lead	2,55	0,02	2,15	0,11	$\mu\text{g/l}$	84%
Cadmium	1,916	0,014	1,86	0,40	$\mu\text{g/l}$	97%
Chromium	1,233	0,013	1,25	0,20	$\mu\text{g/l}$	101%
Iron	15,16	0,15	15,8	2,5	$\mu\text{g/l}$	104%
Copper	5,28	0,04	5,0	0,79	$\mu\text{g/l}$	95%
Manganese	15,10	0,11	15,6	0,75	$\mu\text{g/l}$	103%
Nickel	9,06	0,06	8,8	0,81	$\mu\text{g/l}$	97%
Mercury	1,004	0,016	0,96	0,18	$\mu\text{g/l}$	96%
Selenium	1,95	0,02	2,20	0,12	$\mu\text{g/l}$	113%
Uranium	2,391	0,018	2,16	0,08	$\mu\text{g/l}$	90%
Zinc	17,2	0,6	16,3	2,11	$\mu\text{g/l}$	95%



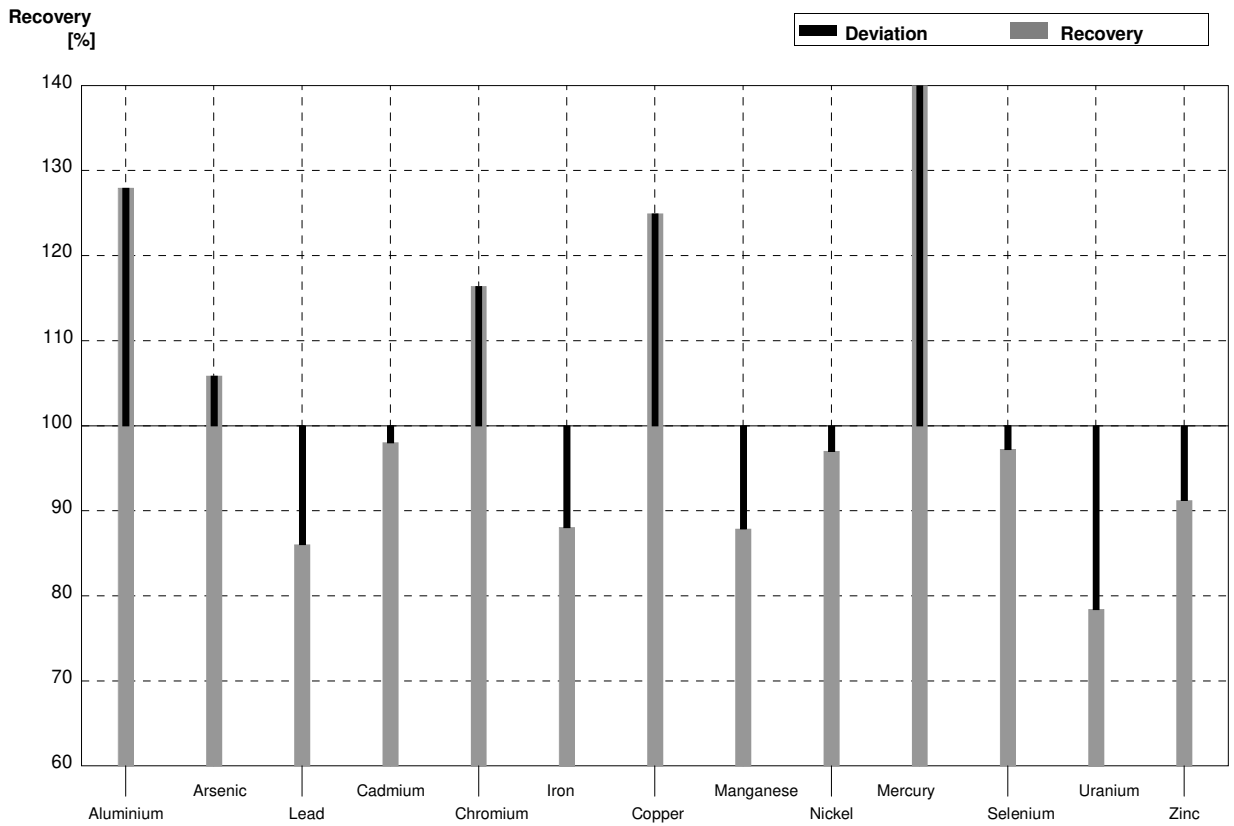
Sample M178A
Laboratory D

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	18,26		$\mu\text{g/l}$	148%
Arsenic	1,075	0,015	1,133		$\mu\text{g/l}$	105%
Lead	4,23	0,03	3,816		$\mu\text{g/l}$	90%
Cadmium	0,993	0,011	1,006		$\mu\text{g/l}$	101%
Chromium	4,58	0,03	4,453		$\mu\text{g/l}$	97%
Iron	45,5	0,2	42,34		$\mu\text{g/l}$	93%
Copper	3,44	0,03	4,830		$\mu\text{g/l}$	140%
Manganese	21,94	0,13	19,46		$\mu\text{g/l}$	89%
Nickel	3,46	0,03	3,282		$\mu\text{g/l}$	95%
Mercury	1,800	0,018	172,2		$\mu\text{g/l}$	9567%
Selenium	1,20	0,02	1,102		$\mu\text{g/l}$	92%
Uranium	4,98	0,03	4,439		$\mu\text{g/l}$	89%
Zinc	56	1	53,51		$\mu\text{g/l}$	96%



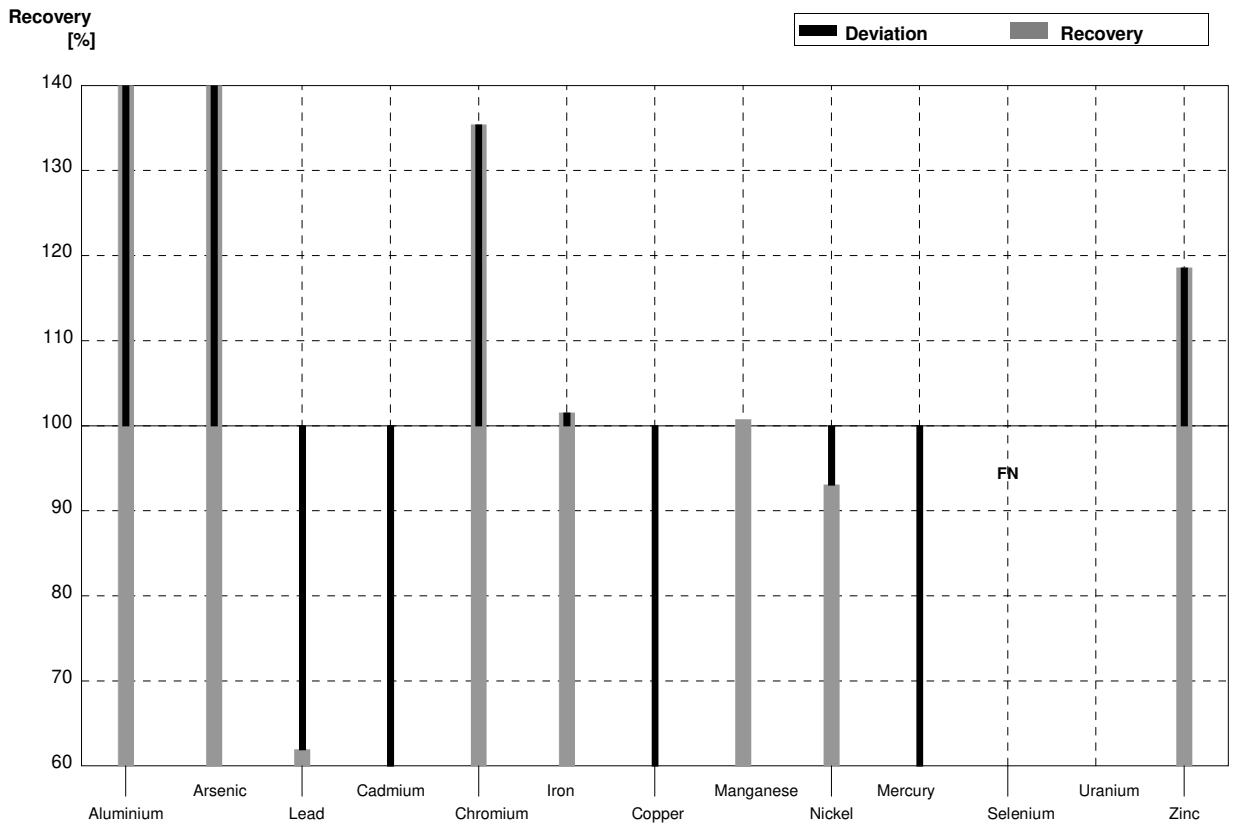
Sample M178B
Laboratory D

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	26,1		$\mu\text{g/l}$	128%
Arsenic	1,592	0,016	1,685		$\mu\text{g/l}$	106%
Lead	2,55	0,02	2,194		$\mu\text{g/l}$	86%
Cadmium	1,916	0,014	1,878		$\mu\text{g/l}$	98%
Chromium	1,233	0,013	1,435		$\mu\text{g/l}$	116%
Iron	15,16	0,15	13,35		$\mu\text{g/l}$	88%
Copper	5,28	0,04	6,596		$\mu\text{g/l}$	125%
Manganese	15,10	0,11	13,27		$\mu\text{g/l}$	88%
Nickel	9,06	0,06	8,788		$\mu\text{g/l}$	97%
Mercury	1,004	0,016	95,56		$\mu\text{g/l}$	9518%
Selenium	1,95	0,02	1,896		$\mu\text{g/l}$	97%
Uranium	2,391	0,018	1,875		$\mu\text{g/l}$	78%
Zinc	17,2	0,6	15,69		$\mu\text{g/l}$	91%



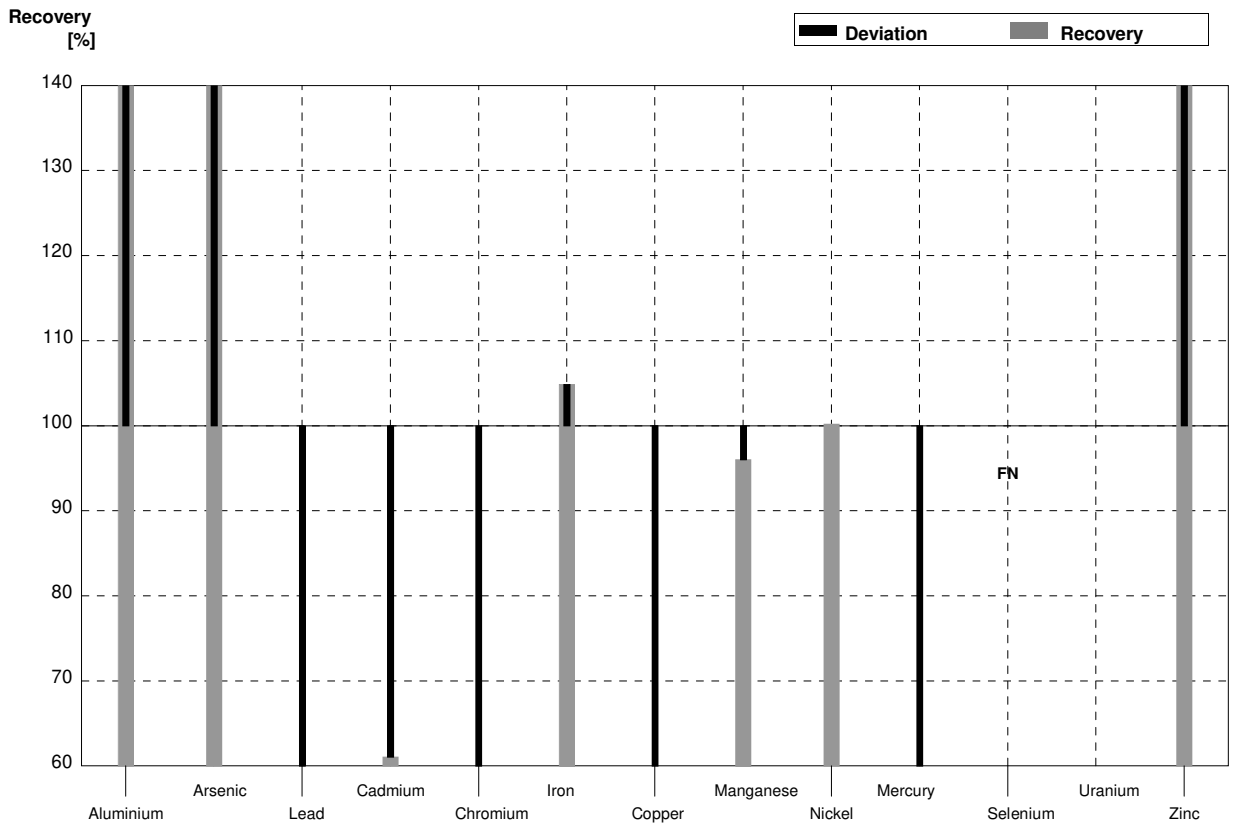
Sample M178A
Laboratory E

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	31,6	2,0	$\mu\text{g/l}$	256%
Arsenic	1,075	0,015	2,44	0,24	$\mu\text{g/l}$	227%
Lead	4,23	0,03	2,62	0,20	$\mu\text{g/l}$	62%
Cadmium	0,993	0,011	0,57	0,04	$\mu\text{g/l}$	57%
Chromium	4,58	0,03	6,2	0,4	$\mu\text{g/l}$	135%
Iron	45,5	0,2	46,2	3,2	$\mu\text{g/l}$	102%
Copper	3,44	0,03	1,88	0,12	$\mu\text{g/l}$	55%
Manganese	21,94	0,13	22,1	1,6	$\mu\text{g/l}$	101%
Nickel	3,46	0,03	3,22	0,23	$\mu\text{g/l}$	93%
Mercury	1,800	0,018	0,962	0,275	$\mu\text{g/l}$	53%
Selenium	1,20	0,02	<0,20		$\mu\text{g/l}$	FN
Uranium	4,98	0,03			$\mu\text{g/l}$	
Zinc	56	1	66,4	9,8	$\mu\text{g/l}$	119%



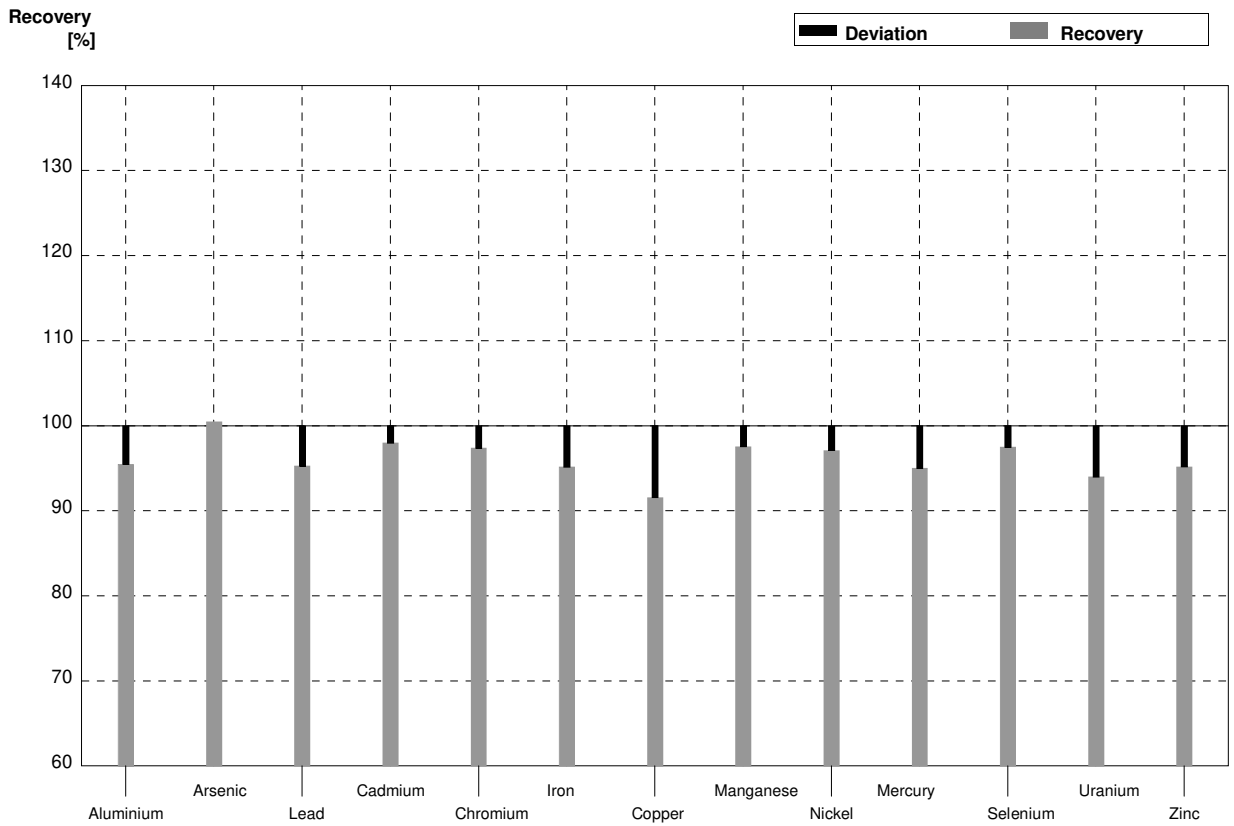
Sample M178B
Laboratory E

Parameter	Assigned value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	20,4	0,2	33,9	2,1	µg/l	166%
Arsenic	1,592	0,016	2,60	0,26	µg/l	163%
Lead	2,55	0,02	1,42	0,11	µg/l	56%
Cadmium	1,916	0,014	1,17	0,08	µg/l	61%
Chromium	1,233	0,013	0,54	0,04	µg/l	44%
Iron	15,16	0,15	15,9	1,1	µg/l	105%
Copper	5,28	0,04	3,13	0,20	µg/l	59%
Manganese	15,10	0,11	14,5	1,0	µg/l	96%
Nickel	9,06	0,06	9,08	0,66	µg/l	100%
Mercury	1,004	0,016	0,356	0,102	µg/l	35%
Selenium	1,95	0,02	<0,20		µg/l	FN
Uranium	2,391	0,018			µg/l	
Zinc	17,2	0,6	43,8	6,5	µg/l	255%



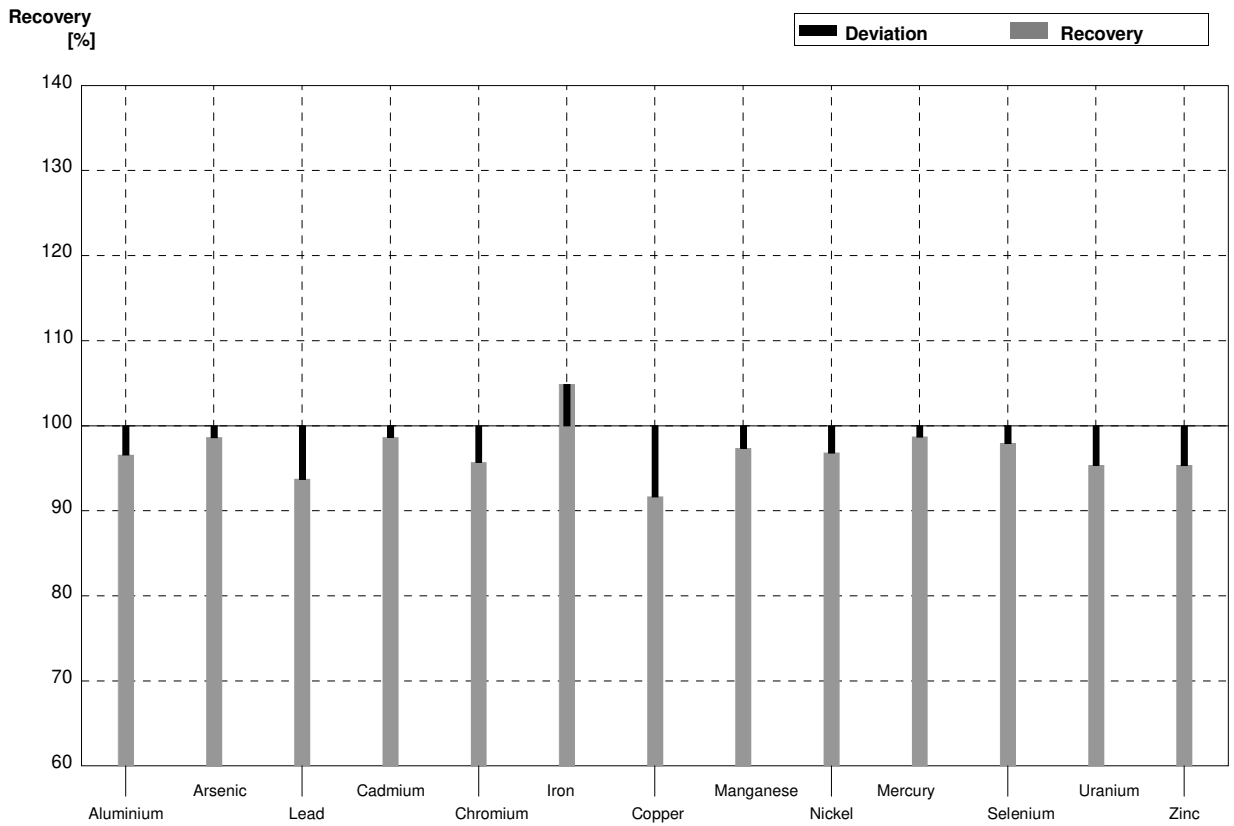
Sample M178A
Laboratory F

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	11,8	2,4	$\mu\text{g/l}$	95%
Arsenic	1,075	0,015	1,08	0,16	$\mu\text{g/l}$	100%
Lead	4,23	0,03	4,03	0,48	$\mu\text{g/l}$	95%
Cadmium	0,993	0,011	0,973	0,12	$\mu\text{g/l}$	98%
Chromium	4,58	0,03	4,46	0,67	$\mu\text{g/l}$	97%
Iron	45,5	0,2	43,3	6,5	$\mu\text{g/l}$	95%
Copper	3,44	0,03	3,15	0,38	$\mu\text{g/l}$	92%
Manganese	21,94	0,13	21,4	2,6	$\mu\text{g/l}$	98%
Nickel	3,46	0,03	3,36	0,37	$\mu\text{g/l}$	97%
Mercury	1,800	0,018	1,71	0,38	$\mu\text{g/l}$	95%
Selenium	1,20	0,02	1,17	0,18	$\mu\text{g/l}$	98%
Uranium	4,98	0,03	4,68	0,70	$\mu\text{g/l}$	94%
Zinc	56	1	53,3	8,0	$\mu\text{g/l}$	95%



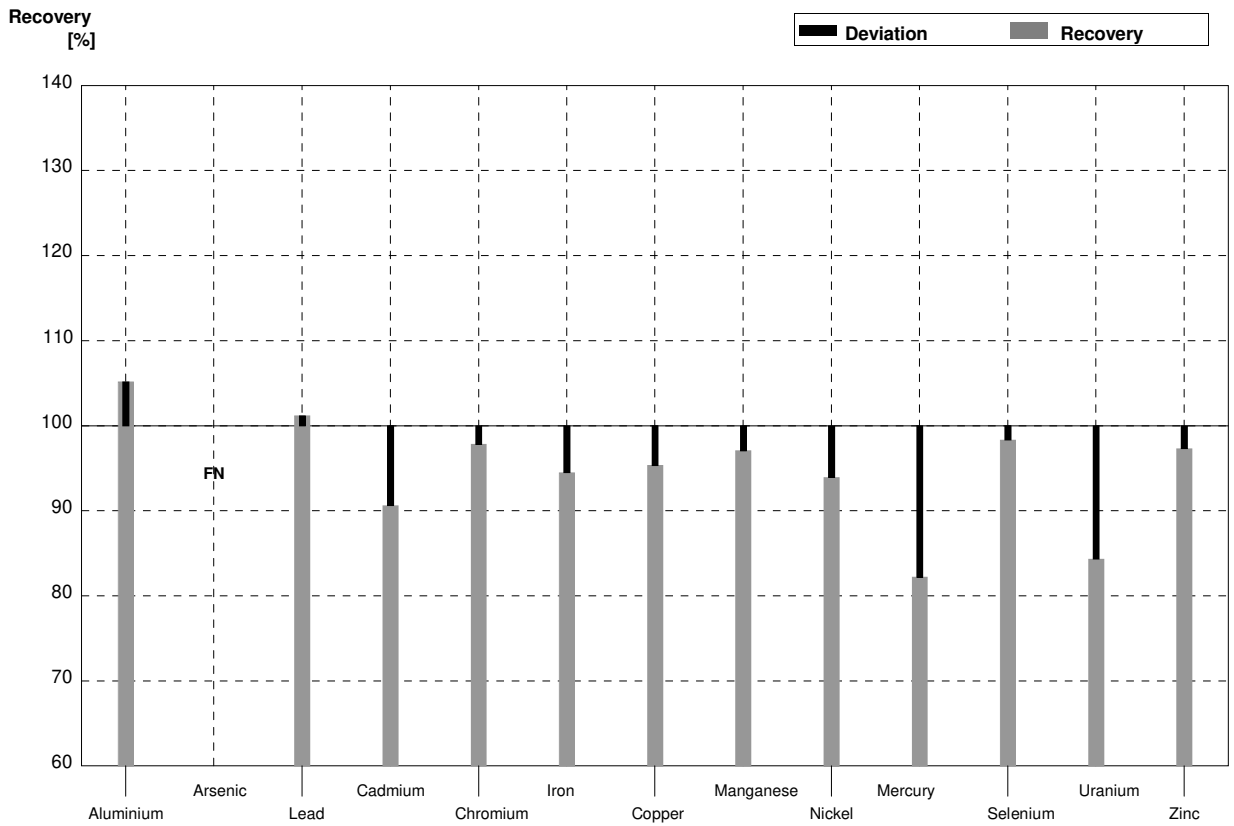
Sample M178B
Laboratory F

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	19,7	3,9	$\mu\text{g/l}$	97%
Arsenic	1,592	0,016	1,57	0,24	$\mu\text{g/l}$	99%
Lead	2,55	0,02	2,39	0,29	$\mu\text{g/l}$	94%
Cadmium	1,916	0,014	1,89	0,23	$\mu\text{g/l}$	99%
Chromium	1,233	0,013	1,18	0,18	$\mu\text{g/l}$	96%
Iron	15,16	0,15	15,9	2,4	$\mu\text{g/l}$	105%
Copper	5,28	0,04	4,84	0,58	$\mu\text{g/l}$	92%
Manganese	15,10	0,11	14,7	1,8	$\mu\text{g/l}$	97%
Nickel	9,06	0,06	8,77	0,96	$\mu\text{g/l}$	97%
Mercury	1,004	0,016	0,991	0,22	$\mu\text{g/l}$	99%
Selenium	1,95	0,02	1,91	0,29	$\mu\text{g/l}$	98%
Uranium	2,391	0,018	2,28	0,34	$\mu\text{g/l}$	95%
Zinc	17,2	0,6	16,4	2,5	$\mu\text{g/l}$	95%



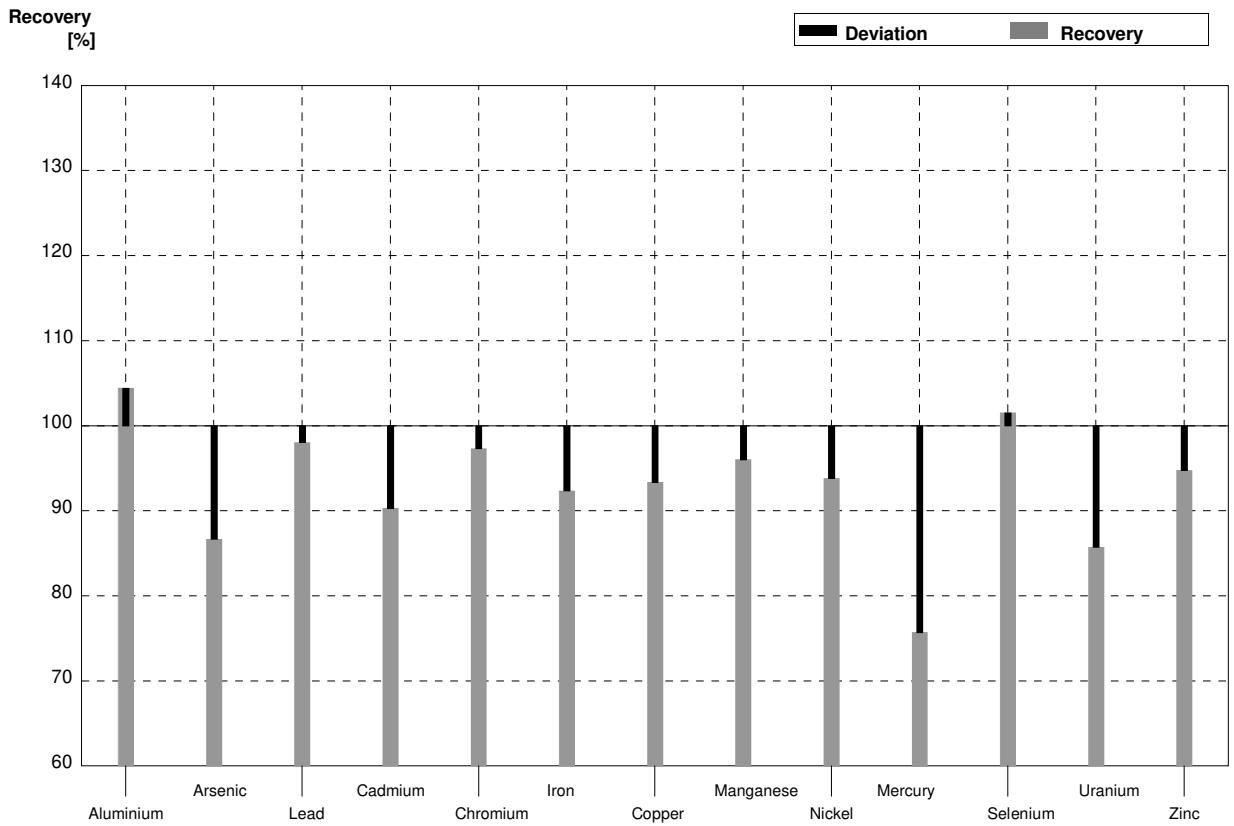
Sample M178A
Laboratory G

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	13,0	2,6	$\mu\text{g/l}$	105%
Arsenic	1,075	0,015	<1		$\mu\text{g/l}$	FN
Lead	4,23	0,03	4,28	0,86	$\mu\text{g/l}$	101%
Cadmium	0,993	0,011	0,900	0,18	$\mu\text{g/l}$	91%
Chromium	4,58	0,03	4,48	0,90	$\mu\text{g/l}$	98%
Iron	45,5	0,2	43,0	8,6	$\mu\text{g/l}$	95%
Copper	3,44	0,03	3,28	0,66	$\mu\text{g/l}$	95%
Manganese	21,94	0,13	21,3	4,3	$\mu\text{g/l}$	97%
Nickel	3,46	0,03	3,25	0,65	$\mu\text{g/l}$	94%
Mercury	1,800	0,018	1,48	0,30	$\mu\text{g/l}$	82%
Selenium	1,20	0,02	1,18	0,24	$\mu\text{g/l}$	98%
Uranium	4,98	0,03	4,20	0,84	$\mu\text{g/l}$	84%
Zinc	56	1	54,5	11	$\mu\text{g/l}$	97%



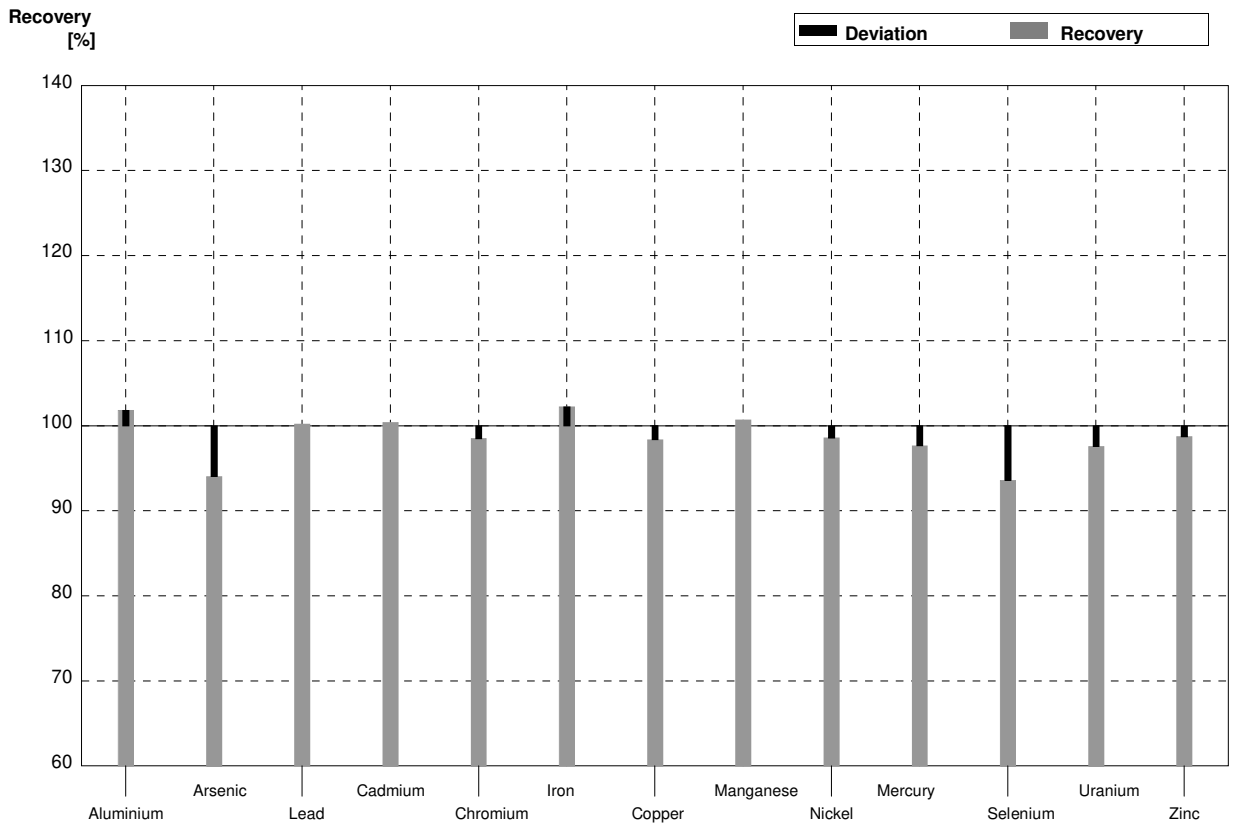
Sample M178B
Laboratory G

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	21,3	4,3	$\mu\text{g/l}$	104%
Arsenic	1,592	0,016	1,38	0,28	$\mu\text{g/l}$	87%
Lead	2,55	0,02	2,50	0,50	$\mu\text{g/l}$	98%
Cadmium	1,916	0,014	1,73	0,35	$\mu\text{g/l}$	90%
Chromium	1,233	0,013	1,20	0,24	$\mu\text{g/l}$	97%
Iron	15,16	0,15	14,0	2,8	$\mu\text{g/l}$	92%
Copper	5,28	0,04	4,93	0,99	$\mu\text{g/l}$	93%
Manganese	15,10	0,11	14,5	2,9	$\mu\text{g/l}$	96%
Nickel	9,06	0,06	8,50	1,7	$\mu\text{g/l}$	94%
Mercury	1,004	0,016	0,760	0,15	$\mu\text{g/l}$	76%
Selenium	1,95	0,02	1,98	0,40	$\mu\text{g/l}$	102%
Uranium	2,391	0,018	2,05	0,41	$\mu\text{g/l}$	86%
Zinc	17,2	0,6	16,3	3,3	$\mu\text{g/l}$	95%



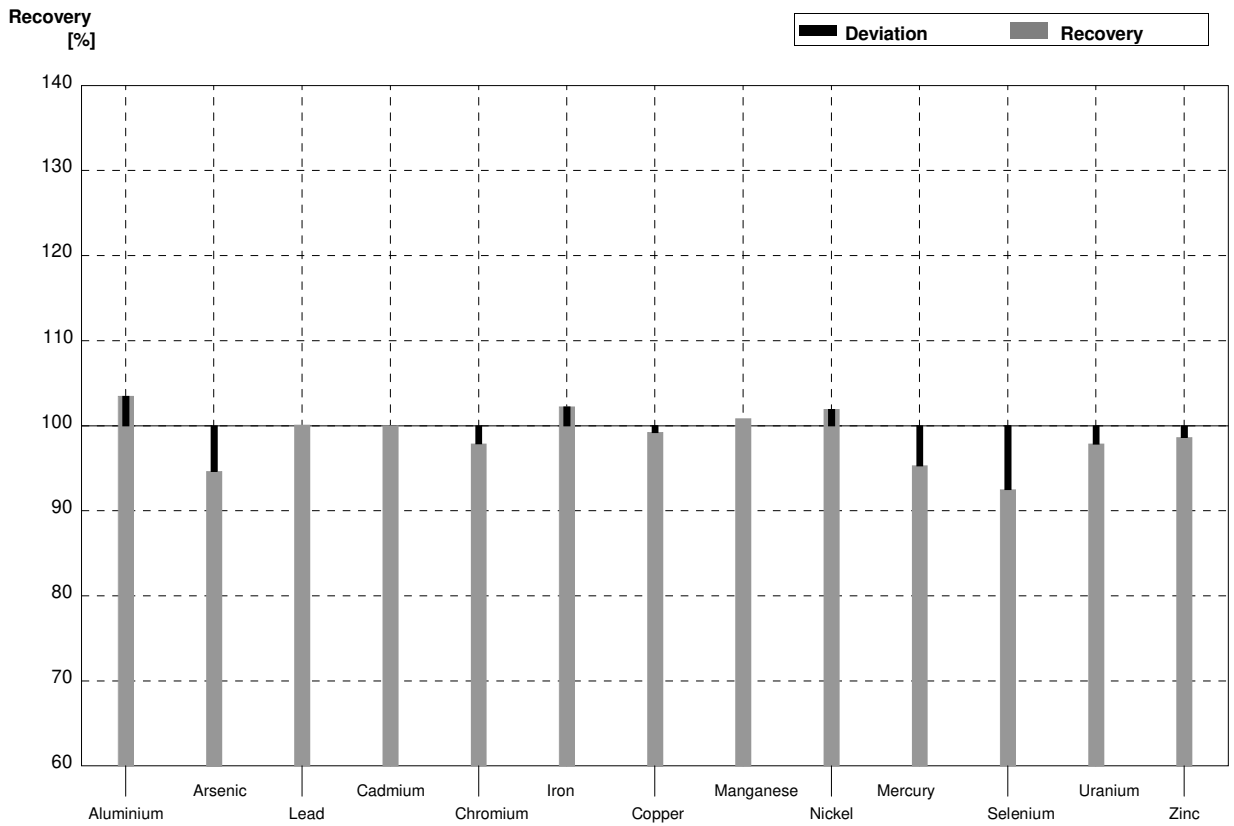
Sample M178A
Laboratory H

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,585	2,04	$\mu\text{g/l}$	102%
Arsenic	1,075	0,015	1,011	0,2	$\mu\text{g/l}$	94%
Lead	4,23	0,03	4,238	0,52	$\mu\text{g/l}$	100%
Cadmium	0,993	0,011	0,997	0,08	$\mu\text{g/l}$	100%
Chromium	4,58	0,03	4,511	0,33	$\mu\text{g/l}$	98%
Iron	45,5	0,2	46,513	4,74	$\mu\text{g/l}$	102%
Copper	3,44	0,03	3,384	0,38	$\mu\text{g/l}$	98%
Manganese	21,94	0,13	22,094	1,83	$\mu\text{g/l}$	101%
Nickel	3,46	0,03	3,411	0,33	$\mu\text{g/l}$	99%
Mercury	1,800	0,018	1,758	0,08	$\mu\text{g/l}$	98%
Selenium	1,20	0,02	1,123	0,22	$\mu\text{g/l}$	94%
Uranium	4,98	0,03	4,860	0,7	$\mu\text{g/l}$	98%
Zinc	56	1	55,292	9,79	$\mu\text{g/l}$	99%



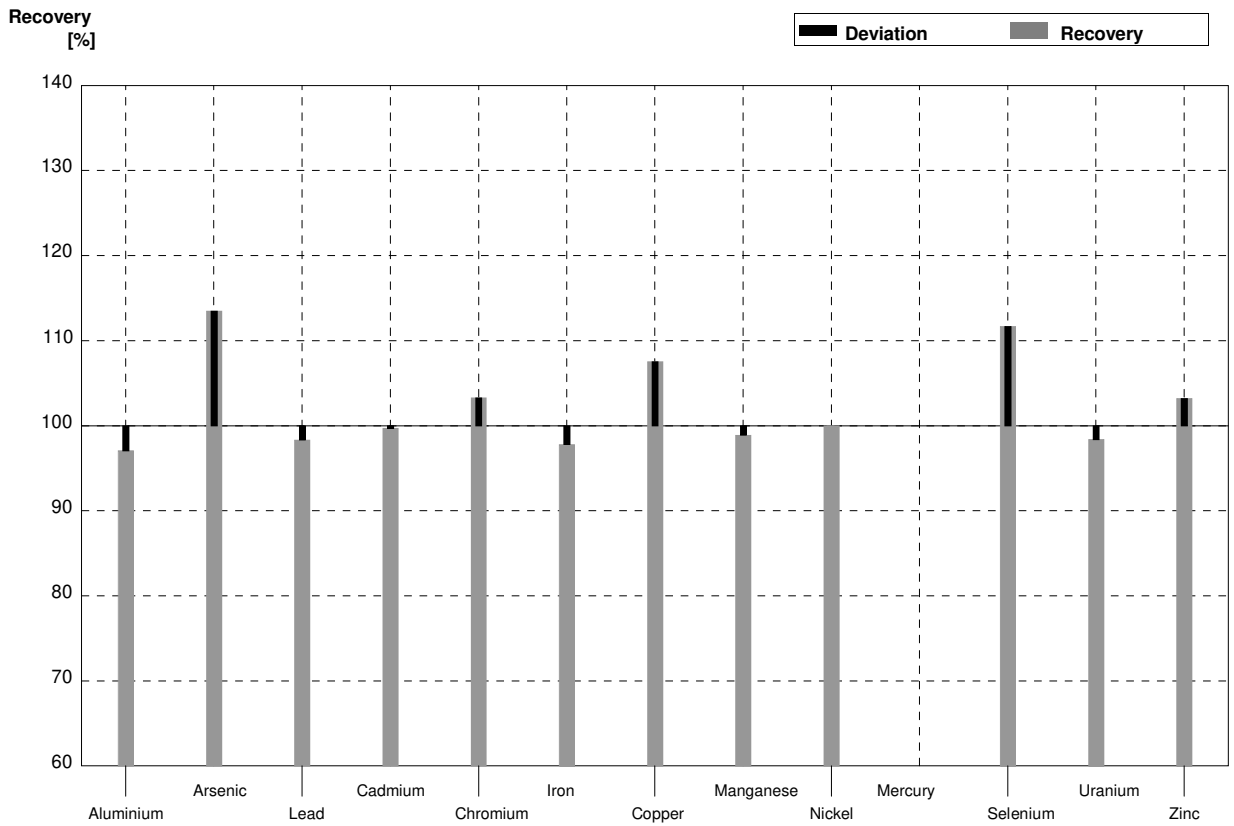
Sample M178B
Laboratory H

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	21,11	3,42	$\mu\text{g/l}$	103%
Arsenic	1,592	0,016	1,507	0,3	$\mu\text{g/l}$	95%
Lead	2,55	0,02	2,553	0,31	$\mu\text{g/l}$	100%
Cadmium	1,916	0,014	1,916	0,16	$\mu\text{g/l}$	100%
Chromium	1,233	0,013	1,207	0,09	$\mu\text{g/l}$	98%
Iron	15,16	0,15	15,497	1,58	$\mu\text{g/l}$	102%
Copper	5,28	0,04	5,239	0,59	$\mu\text{g/l}$	99%
Manganese	15,10	0,11	15,231	1,26	$\mu\text{g/l}$	101%
Nickel	9,06	0,06	9,235	0,89	$\mu\text{g/l}$	102%
Mercury	1,004	0,016	0,957	0,04	$\mu\text{g/l}$	95%
Selenium	1,95	0,02	1,804	0,36	$\mu\text{g/l}$	93%
Uranium	2,391	0,018	2,34	0,33	$\mu\text{g/l}$	98%
Zinc	17,2	0,6	16,967	3	$\mu\text{g/l}$	99%



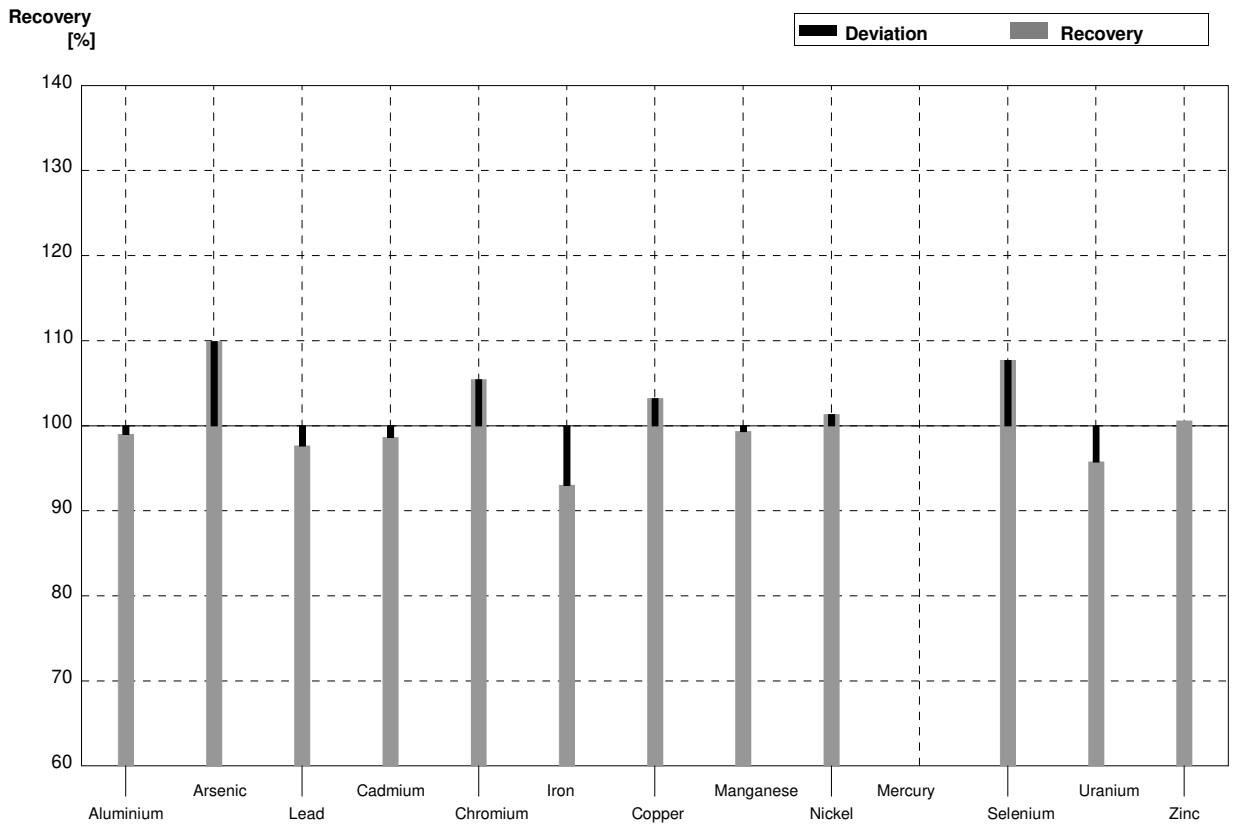
Sample M178A
Laboratory I

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,0	0,91	$\mu\text{g/l}$	97%
Arsenic	1,075	0,015	1,22	0,15	$\mu\text{g/l}$	113%
Lead	4,23	0,03	4,16	0,36	$\mu\text{g/l}$	98%
Cadmium	0,993	0,011	0,990	0,11	$\mu\text{g/l}$	100%
Chromium	4,58	0,03	4,73	0,35	$\mu\text{g/l}$	103%
Iron	45,5	0,2	44,5	2,2	$\mu\text{g/l}$	98%
Copper	3,44	0,03	3,70	0,30	$\mu\text{g/l}$	108%
Manganese	21,94	0,13	21,7	1,68	$\mu\text{g/l}$	99%
Nickel	3,46	0,03	3,46	0,26	$\mu\text{g/l}$	100%
Mercury	1,800	0,018			$\mu\text{g/l}$	
Selenium	1,20	0,02	1,34	0,16	$\mu\text{g/l}$	112%
Uranium	4,98	0,03	4,90	0,47	$\mu\text{g/l}$	98%
Zinc	56	1	57,8	5,8	$\mu\text{g/l}$	103%



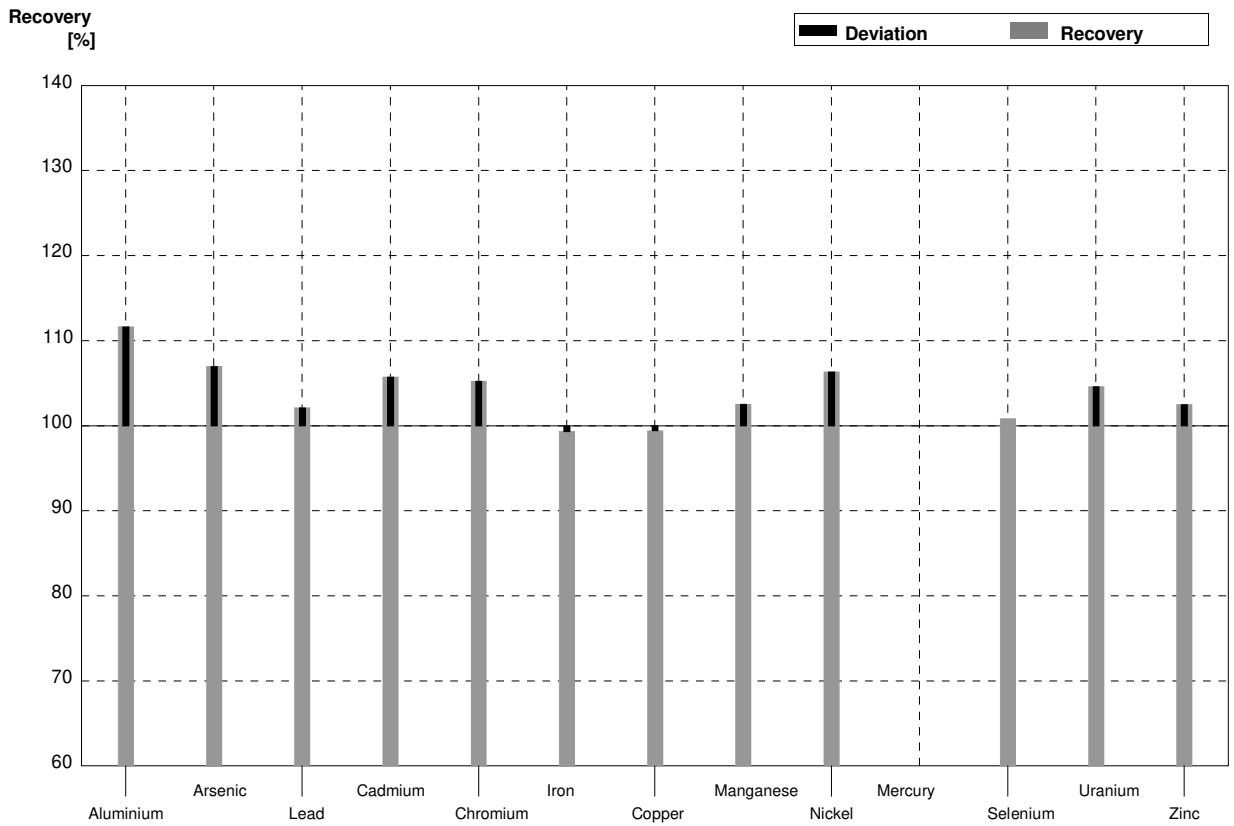
Sample M178B
Laboratory I

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	20,2	1,52	$\mu\text{g/l}$	99%
Arsenic	1,592	0,016	1,75	0,21	$\mu\text{g/l}$	110%
Lead	2,55	0,02	2,49	0,21	$\mu\text{g/l}$	98%
Cadmium	1,916	0,014	1,89	0,22	$\mu\text{g/l}$	99%
Chromium	1,233	0,013	1,30	0,10	$\mu\text{g/l}$	105%
Iron	15,16	0,15	14,1	0,7	$\mu\text{g/l}$	93%
Copper	5,28	0,04	5,45	0,44	$\mu\text{g/l}$	103%
Manganese	15,10	0,11	15,0	1,16	$\mu\text{g/l}$	99%
Nickel	9,06	0,06	9,18	0,68	$\mu\text{g/l}$	101%
Mercury	1,004	0,016			$\mu\text{g/l}$	
Selenium	1,95	0,02	2,10	0,24	$\mu\text{g/l}$	108%
Uranium	2,391	0,018	2,29	0,22	$\mu\text{g/l}$	96%
Zinc	17,2	0,6	17,3	1,7	$\mu\text{g/l}$	101%



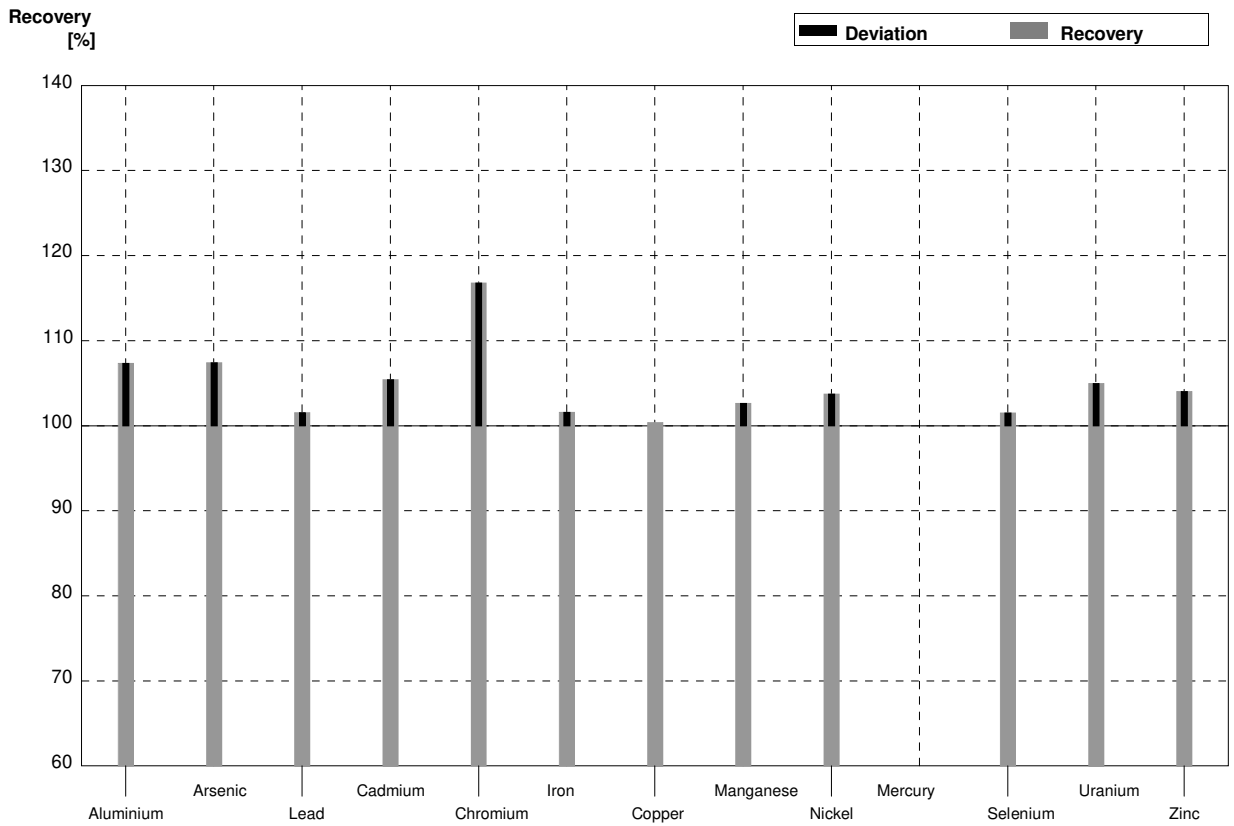
Sample M178A
Laboratory J

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	13,8	4,1	$\mu\text{g/l}$	112%
Arsenic	1,075	0,015	1,15	0,35	$\mu\text{g/l}$	107%
Lead	4,23	0,03	4,32	0,65	$\mu\text{g/l}$	102%
Cadmium	0,993	0,011	1,05	0,16	$\mu\text{g/l}$	106%
Chromium	4,58	0,03	4,82	1,45	$\mu\text{g/l}$	105%
Iron	45,5	0,2	45,2	6,8	$\mu\text{g/l}$	99%
Copper	3,44	0,03	3,42	1,02	$\mu\text{g/l}$	99%
Manganese	21,94	0,13	22,5	3,4	$\mu\text{g/l}$	103%
Nickel	3,46	0,03	3,68	1,10	$\mu\text{g/l}$	106%
Mercury	1,800	0,018			$\mu\text{g/l}$	
Selenium	1,20	0,02	1,21	0,36	$\mu\text{g/l}$	101%
Uranium	4,98	0,03	5,21	0,78	$\mu\text{g/l}$	105%
Zinc	56	1	57,4	8,6	$\mu\text{g/l}$	103%



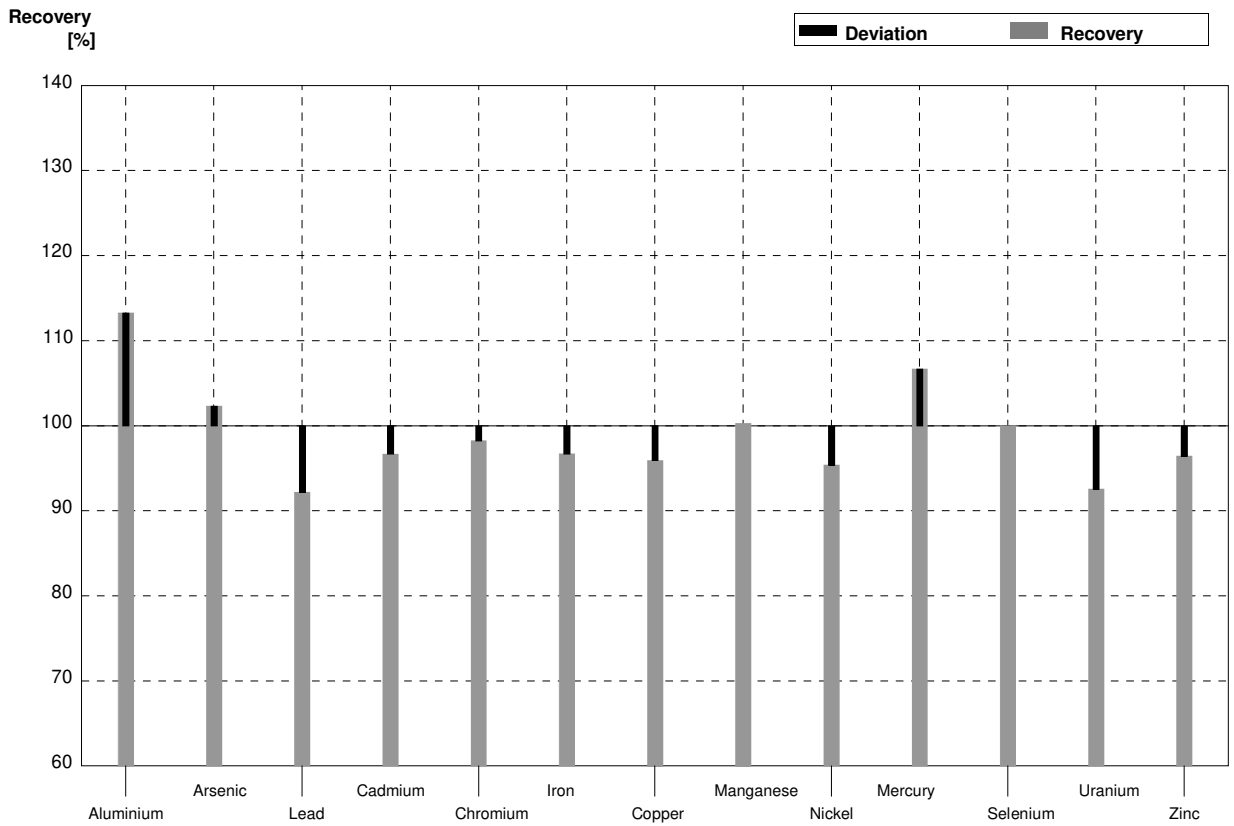
Sample M178B
Laboratory J

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	21,9	6,6	$\mu\text{g/l}$	107%
Arsenic	1,592	0,016	1,71	0,51	$\mu\text{g/l}$	107%
Lead	2,55	0,02	2,59	0,39	$\mu\text{g/l}$	102%
Cadmium	1,916	0,014	2,02	0,30	$\mu\text{g/l}$	105%
Chromium	1,233	0,013	1,44	0,43	$\mu\text{g/l}$	117%
Iron	15,16	0,15	15,4	4,6	$\mu\text{g/l}$	102%
Copper	5,28	0,04	5,30	1,59	$\mu\text{g/l}$	100%
Manganese	15,10	0,11	15,5	2,3	$\mu\text{g/l}$	103%
Nickel	9,06	0,06	9,40	2,82	$\mu\text{g/l}$	104%
Mercury	1,004	0,016			$\mu\text{g/l}$	
Selenium	1,95	0,02	1,98	0,59	$\mu\text{g/l}$	102%
Uranium	2,391	0,018	2,51	0,38	$\mu\text{g/l}$	105%
Zinc	17,2	0,6	17,9	2,7	$\mu\text{g/l}$	104%



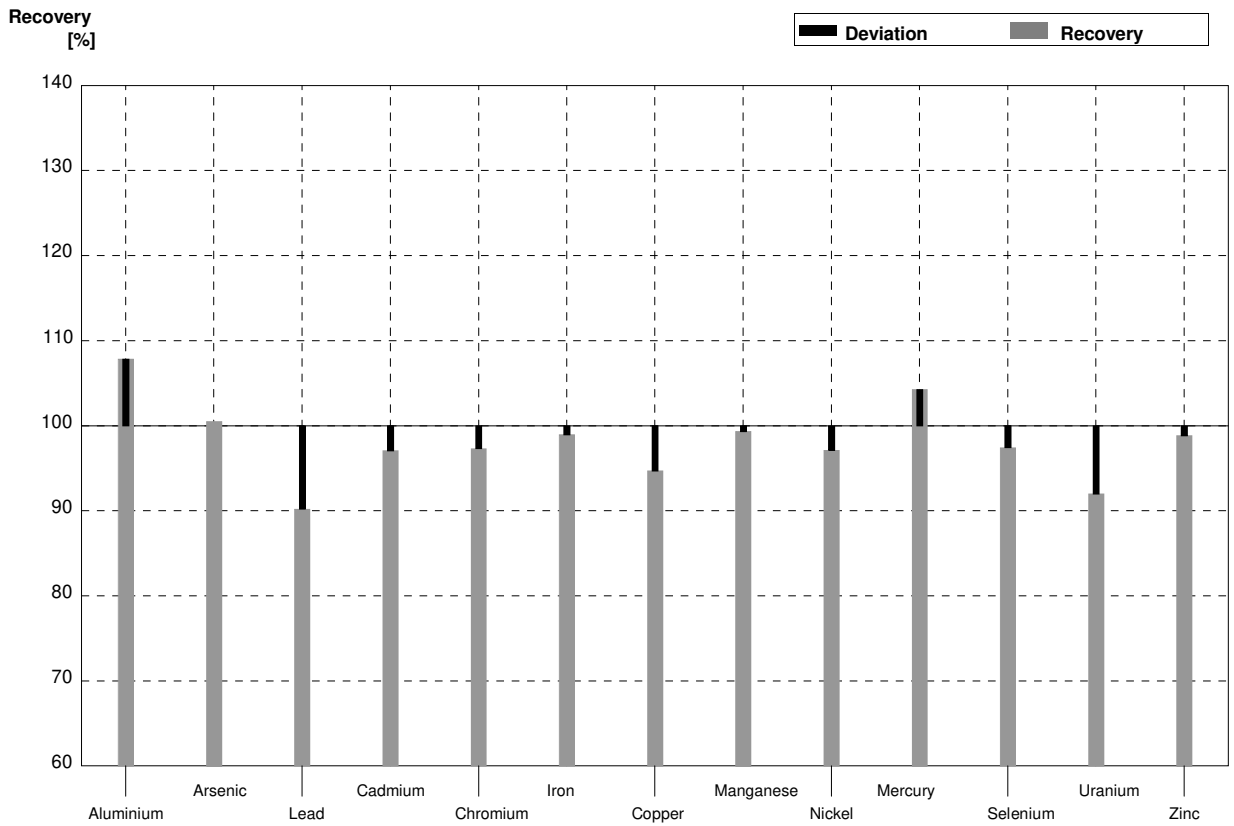
Sample M178A
Laboratory K

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	14,00	1,40	$\mu\text{g/l}$	113%
Arsenic	1,075	0,015	1,10	0,132	$\mu\text{g/l}$	102%
Lead	4,23	0,03	3,90	0,312	$\mu\text{g/l}$	92%
Cadmium	0,993	0,011	0,96	0,0768	$\mu\text{g/l}$	97%
Chromium	4,58	0,03	4,50	0,540	$\mu\text{g/l}$	98%
Iron	45,5	0,2	44,0	11,44	$\mu\text{g/l}$	97%
Copper	3,44	0,03	3,30	0,264	$\mu\text{g/l}$	96%
Manganese	21,94	0,13	22,0	2,20	$\mu\text{g/l}$	100%
Nickel	3,46	0,03	3,30	0,330	$\mu\text{g/l}$	95%
Mercury	1,800	0,018	1,92	0,288	$\mu\text{g/l}$	107%
Selenium	1,20	0,02	1,20	0,180	$\mu\text{g/l}$	100%
Uranium	4,98	0,03	4,61	0,231	$\mu\text{g/l}$	93%
Zinc	56	1	54,0	5,40	$\mu\text{g/l}$	96%



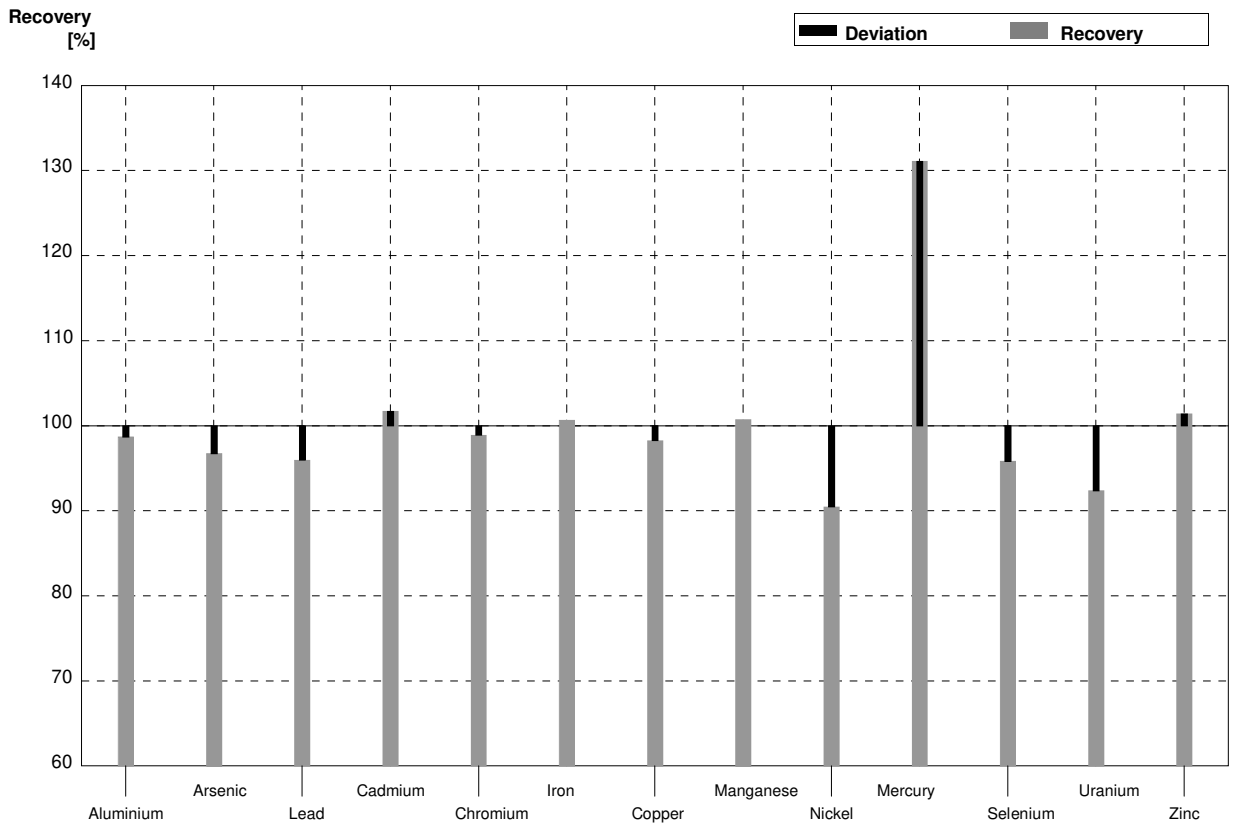
Sample M178B
Laboratory K

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	22,0	2,20	$\mu\text{g/l}$	108%
Arsenic	1,592	0,016	1,60	0,192	$\mu\text{g/l}$	101%
Lead	2,55	0,02	2,30	0,184	$\mu\text{g/l}$	90%
Cadmium	1,916	0,014	1,86	0,1488	$\mu\text{g/l}$	97%
Chromium	1,233	0,013	1,20	0,144	$\mu\text{g/l}$	97%
Iron	15,16	0,15	15,0	3,90	$\mu\text{g/l}$	99%
Copper	5,28	0,04	5,00	0,400	$\mu\text{g/l}$	95%
Manganese	15,10	0,11	15,0	1,50	$\mu\text{g/l}$	99%
Nickel	9,06	0,06	8,80	0,880	$\mu\text{g/l}$	97%
Mercury	1,004	0,016	1,047	0,1571	$\mu\text{g/l}$	104%
Selenium	1,95	0,02	1,90	0,285	$\mu\text{g/l}$	97%
Uranium	2,391	0,018	2,20	0,110	$\mu\text{g/l}$	92%
Zinc	17,2	0,6	17,0	1,70	$\mu\text{g/l}$	99%



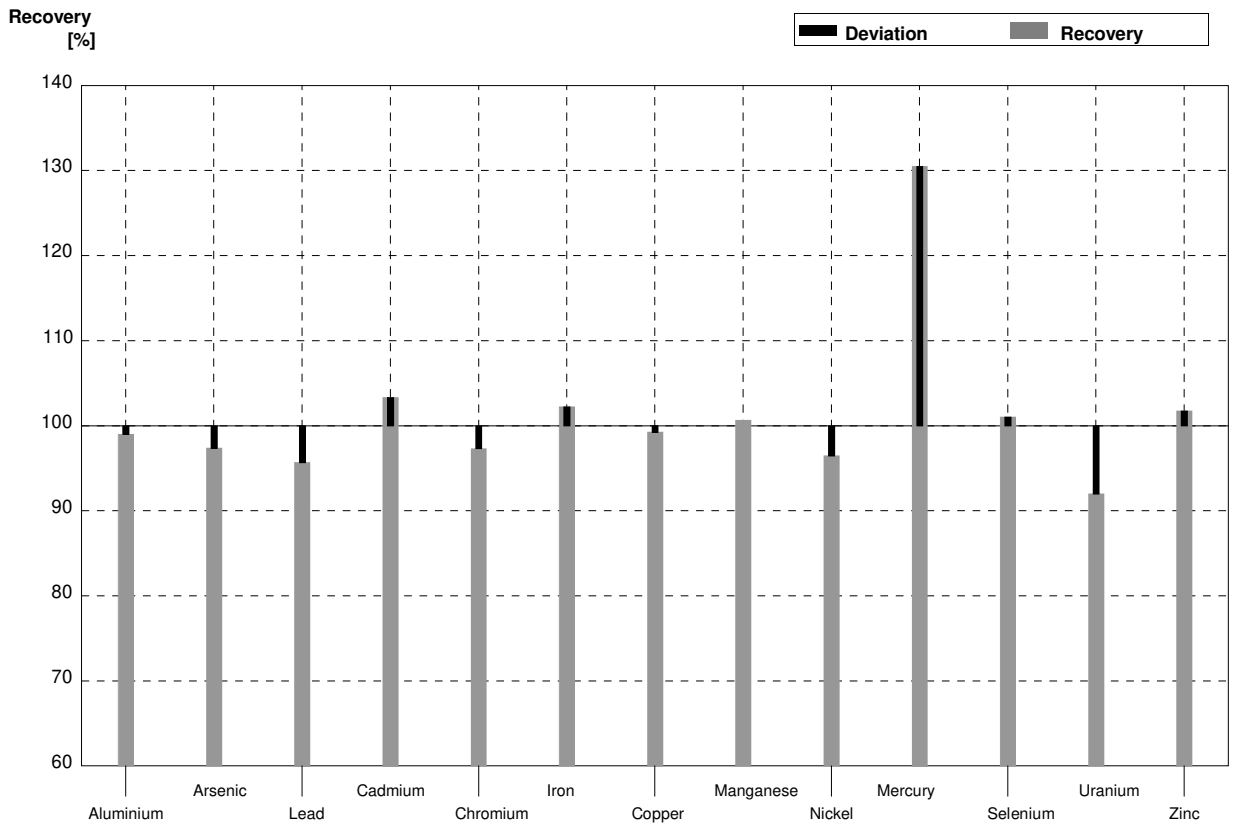
Sample M178A
Laboratory L

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,2	3,1	$\mu\text{g/l}$	99%
Arsenic	1,075	0,015	1,04	0,32	$\mu\text{g/l}$	97%
Lead	4,23	0,03	4,06	1,02	$\mu\text{g/l}$	96%
Cadmium	0,993	0,011	1,01	0,26	$\mu\text{g/l}$	102%
Chromium	4,58	0,03	4,53	1,4	$\mu\text{g/l}$	99%
Iron	45,5	0,2	45,8	13,8	$\mu\text{g/l}$	101%
Copper	3,44	0,03	3,38	0,85	$\mu\text{g/l}$	98%
Manganese	21,94	0,13	22,1	6,7	$\mu\text{g/l}$	101%
Nickel	3,46	0,03	3,13	0,79	$\mu\text{g/l}$	90%
Mercury	1,800	0,018	2,36	0,71	$\mu\text{g/l}$	131%
Selenium	1,20	0,02	1,15	0,46	$\mu\text{g/l}$	96%
Uranium	4,98	0,03	4,60	1,4	$\mu\text{g/l}$	92%
Zinc	56	1	56,8	12	$\mu\text{g/l}$	101%



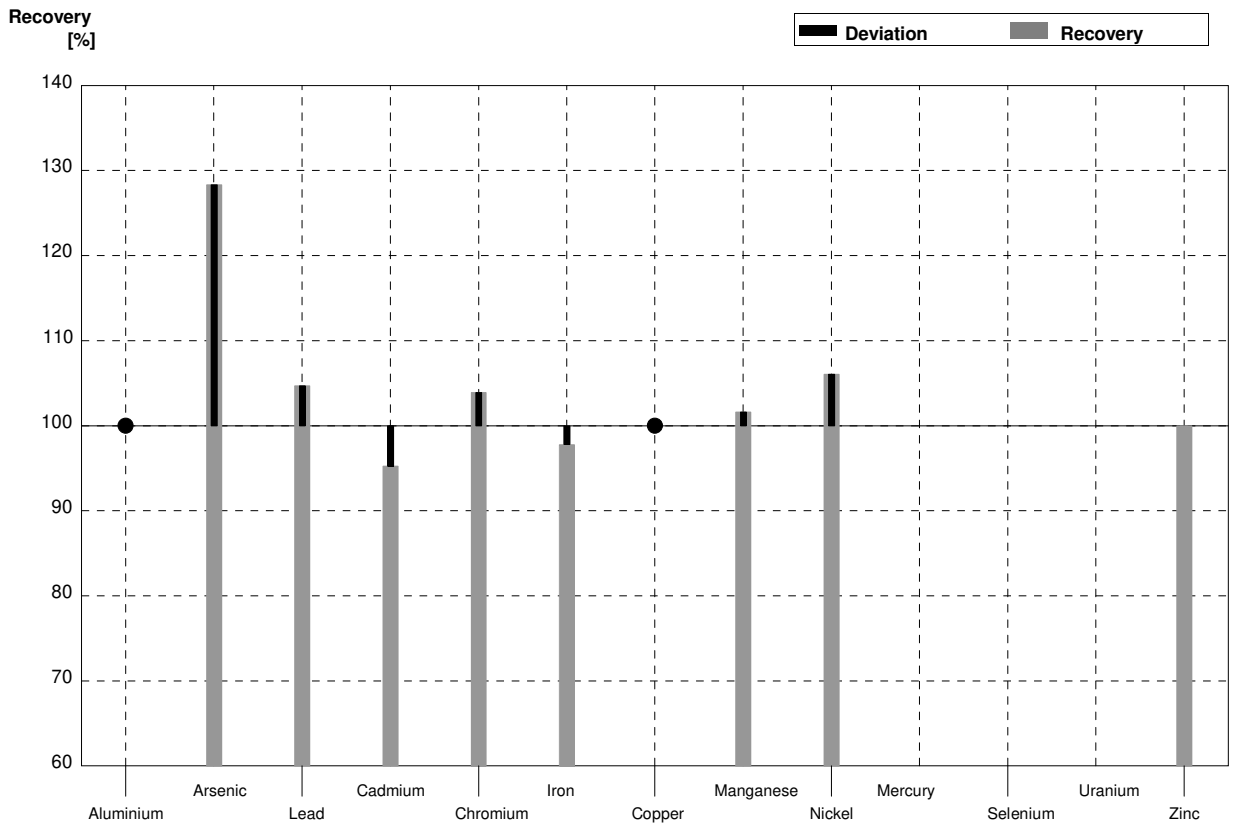
Sample M178B
Laboratory L

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	20,2	5,1	$\mu\text{g/l}$	99%
Arsenic	1,592	0,016	1,55	0,47	$\mu\text{g/l}$	97%
Lead	2,55	0,02	2,44	0,61	$\mu\text{g/l}$	96%
Cadmium	1,916	0,014	1,98	0,50	$\mu\text{g/l}$	103%
Chromium	1,233	0,013	1,20	0,36	$\mu\text{g/l}$	97%
Iron	15,16	0,15	15,5	4,7	$\mu\text{g/l}$	102%
Copper	5,28	0,04	5,24	1,3	$\mu\text{g/l}$	99%
Manganese	15,10	0,11	15,2	4,6	$\mu\text{g/l}$	101%
Nickel	9,06	0,06	8,74	2,2	$\mu\text{g/l}$	96%
Mercury	1,004	0,016	1,31	0,40	$\mu\text{g/l}$	130%
Selenium	1,95	0,02	1,97	0,8	$\mu\text{g/l}$	101%
Uranium	2,391	0,018	2,20	0,66	$\mu\text{g/l}$	92%
Zinc	17,2	0,6	17,5	3,5	$\mu\text{g/l}$	102%



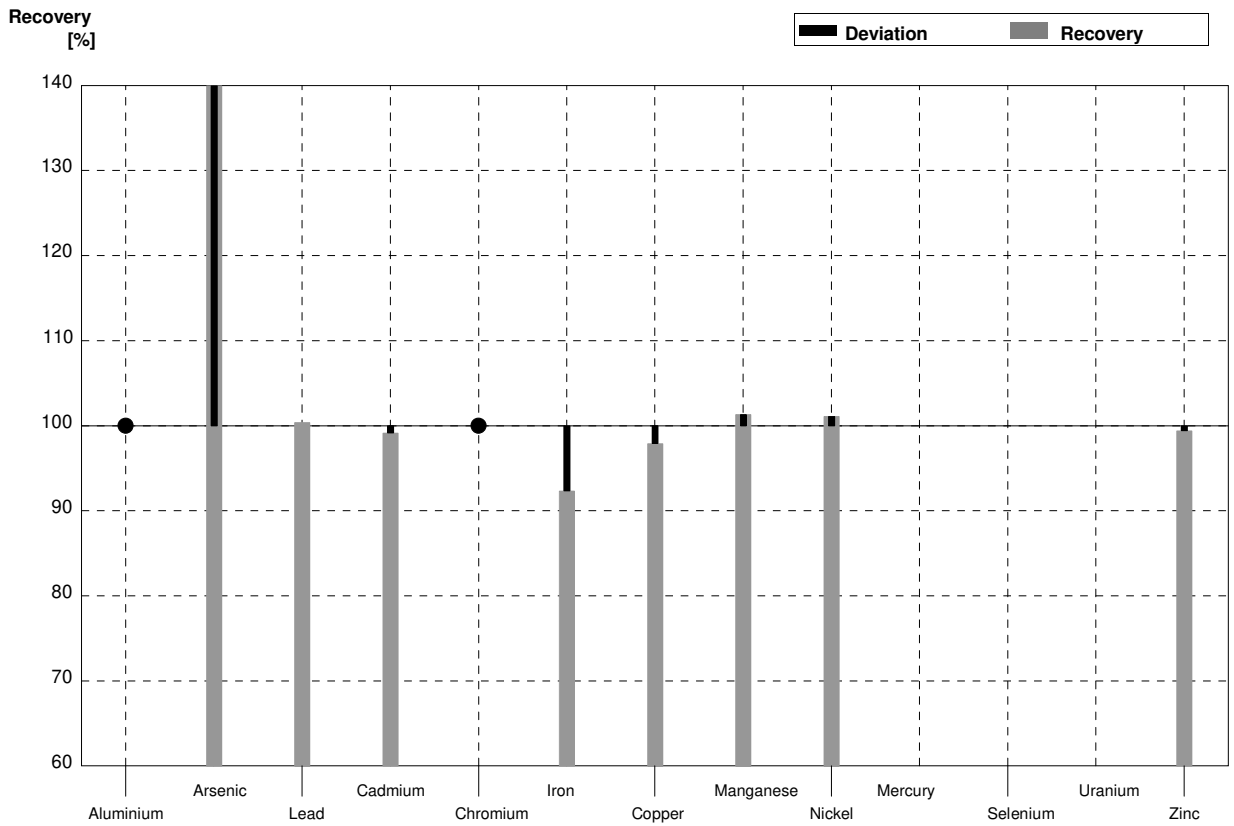
Sample M178A
Laboratory M

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	<40		$\mu\text{g/l}$	•
Arsenic	1,075	0,015	1,38	0,21	$\mu\text{g/l}$	128%
Lead	4,23	0,03	4,43	0,85	$\mu\text{g/l}$	105%
Cadmium	0,993	0,011	0,946	0,19	$\mu\text{g/l}$	95%
Chromium	4,58	0,03	4,76	0,57	$\mu\text{g/l}$	104%
Iron	45,5	0,2	44,5	5,16	$\mu\text{g/l}$	98%
Copper	3,44	0,03	<5		$\mu\text{g/l}$	•
Manganese	21,94	0,13	22,3	1,31	$\mu\text{g/l}$	102%
Nickel	3,46	0,03	3,67	0,57	$\mu\text{g/l}$	106%
Mercury	1,800	0,018			$\mu\text{g/l}$	
Selenium	1,20	0,02			$\mu\text{g/l}$	
Uranium	4,98	0,03			$\mu\text{g/l}$	
Zinc	56	1	56,0	11,70	$\mu\text{g/l}$	100%



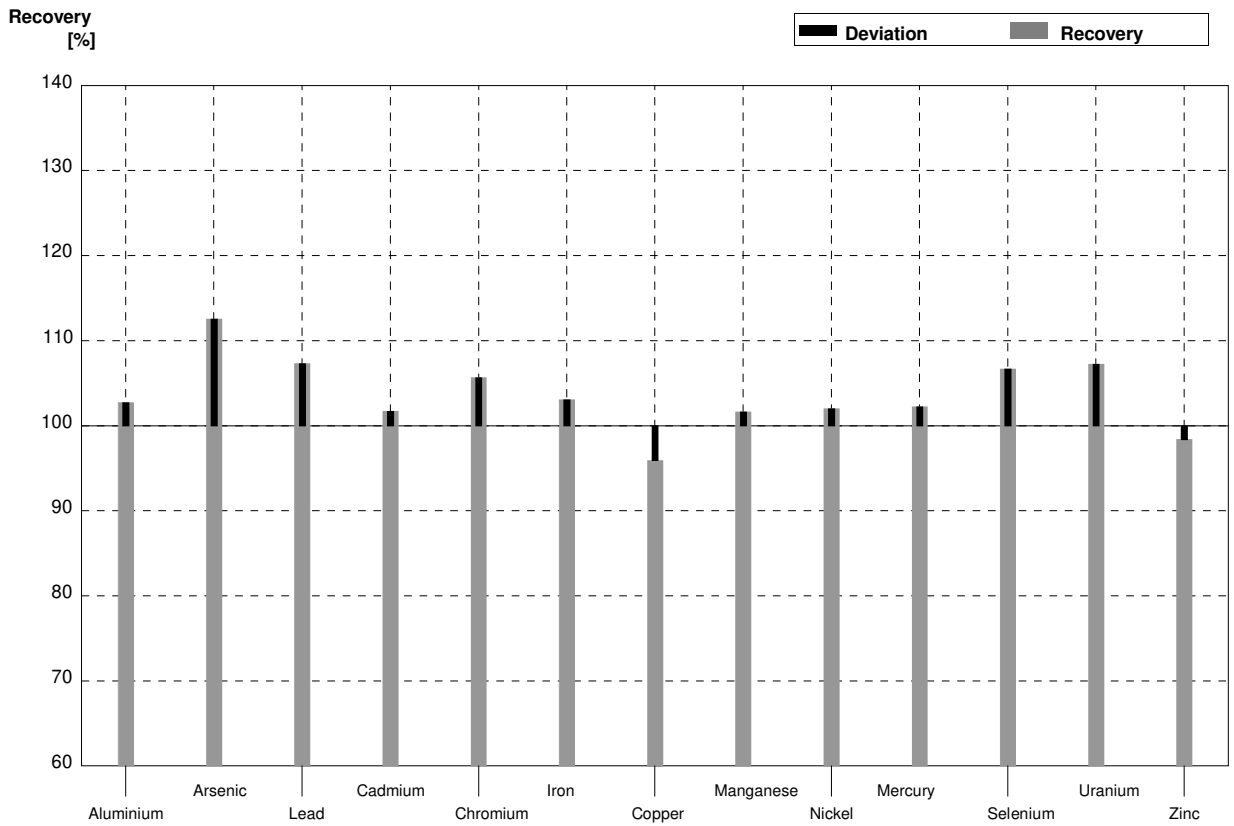
Sample M178B
Laboratory M

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	<40		$\mu\text{g/l}$	•
Arsenic	1,592	0,016	2,26	0,29	$\mu\text{g/l}$	142%
Lead	2,55	0,02	2,56	0,49	$\mu\text{g/l}$	100%
Cadmium	1,916	0,014	1,90	0,38	$\mu\text{g/l}$	99%
Chromium	1,233	0,013	<2		$\mu\text{g/l}$	•
Iron	15,16	0,15	14,0	1,62	$\mu\text{g/l}$	92%
Copper	5,28	0,04	5,17	0,61	$\mu\text{g/l}$	98%
Manganese	15,10	0,11	15,3	0,90	$\mu\text{g/l}$	101%
Nickel	9,06	0,06	9,16	1,41	$\mu\text{g/l}$	101%
Mercury	1,004	0,016			$\mu\text{g/l}$	
Selenium	1,95	0,02			$\mu\text{g/l}$	
Uranium	2,391	0,018			$\mu\text{g/l}$	
Zinc	17,2	0,6	17,1	3,57	$\mu\text{g/l}$	99%



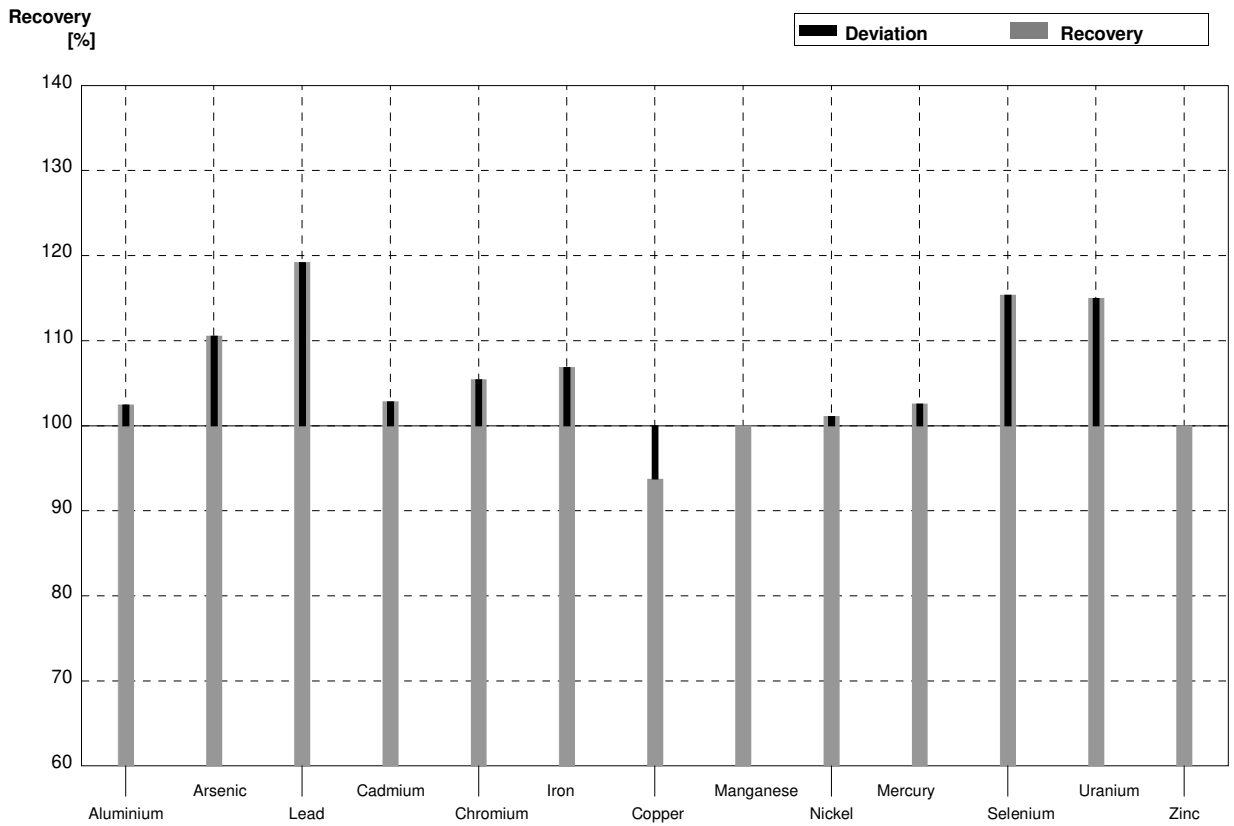
Sample M178A
Laboratory N

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,7	1,90	$\mu\text{g/l}$	103%
Arsenic	1,075	0,015	1,21	0,18	$\mu\text{g/l}$	113%
Lead	4,23	0,03	4,54	0,68	$\mu\text{g/l}$	107%
Cadmium	0,993	0,011	1,01	0,15	$\mu\text{g/l}$	102%
Chromium	4,58	0,03	4,84	0,73	$\mu\text{g/l}$	106%
Iron	45,5	0,2	46,9	7,04	$\mu\text{g/l}$	103%
Copper	3,44	0,03	3,30	0,50	$\mu\text{g/l}$	96%
Manganese	21,94	0,13	22,3	3,34	$\mu\text{g/l}$	102%
Nickel	3,46	0,03	3,53	0,53	$\mu\text{g/l}$	102%
Mercury	1,800	0,018	1,84	0,28	$\mu\text{g/l}$	102%
Selenium	1,20	0,02	1,28	0,19	$\mu\text{g/l}$	107%
Uranium	4,98	0,03	5,34	0,80	$\mu\text{g/l}$	107%
Zinc	56	1	55,1	8,26	$\mu\text{g/l}$	98%



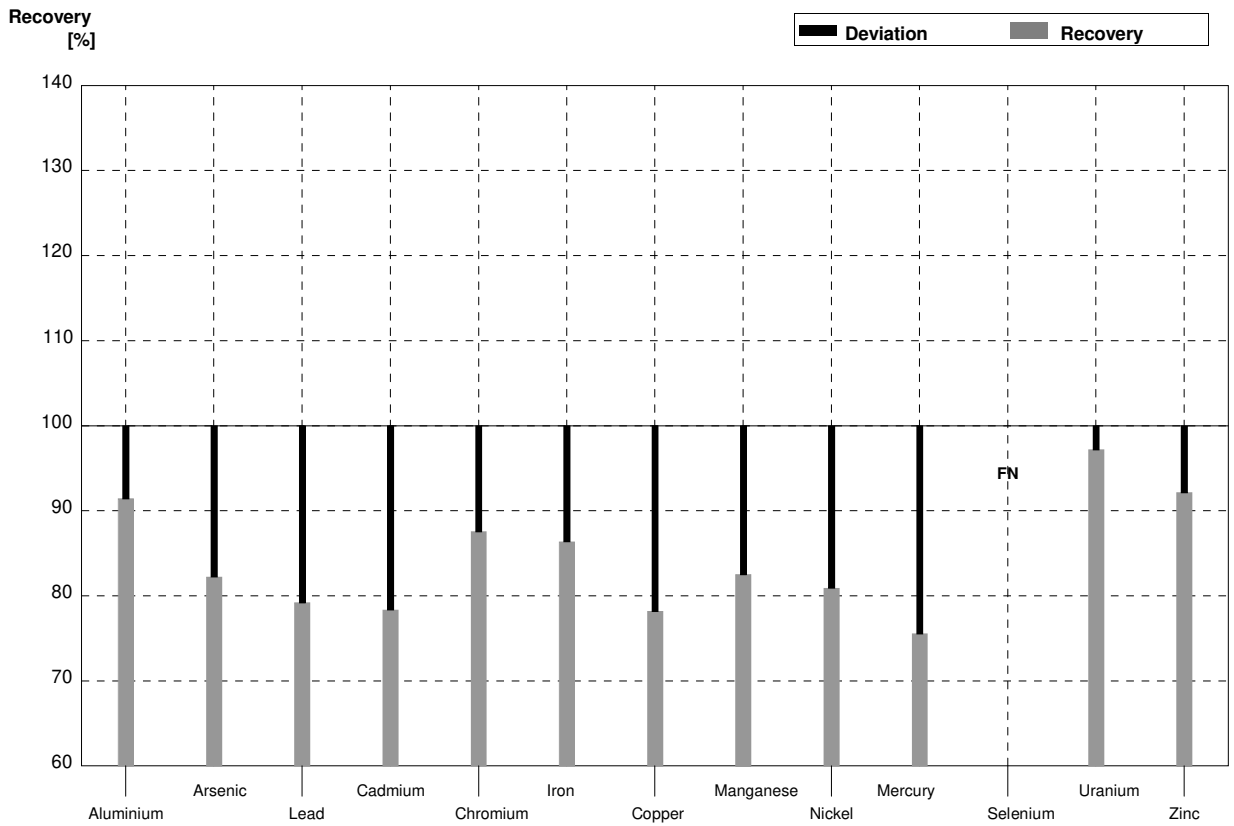
Sample M178B
Laboratory N

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	20,9	3,14	$\mu\text{g/l}$	102%
Arsenic	1,592	0,016	1,76	0,26	$\mu\text{g/l}$	111%
Lead	2,55	0,02	3,04	0,46	$\mu\text{g/l}$	119%
Cadmium	1,916	0,014	1,97	0,30	$\mu\text{g/l}$	103%
Chromium	1,233	0,013	1,30	0,20	$\mu\text{g/l}$	105%
Iron	15,16	0,15	16,2	2,43	$\mu\text{g/l}$	107%
Copper	5,28	0,04	4,95	0,74	$\mu\text{g/l}$	94%
Manganese	15,10	0,11	15,1	2,26	$\mu\text{g/l}$	100%
Nickel	9,06	0,06	9,16	1,37	$\mu\text{g/l}$	101%
Mercury	1,004	0,016	1,03	0,15	$\mu\text{g/l}$	103%
Selenium	1,95	0,02	2,25	0,34	$\mu\text{g/l}$	115%
Uranium	2,391	0,018	2,75	0,41	$\mu\text{g/l}$	115%
Zinc	17,2	0,6	17,2	2,58	$\mu\text{g/l}$	100%



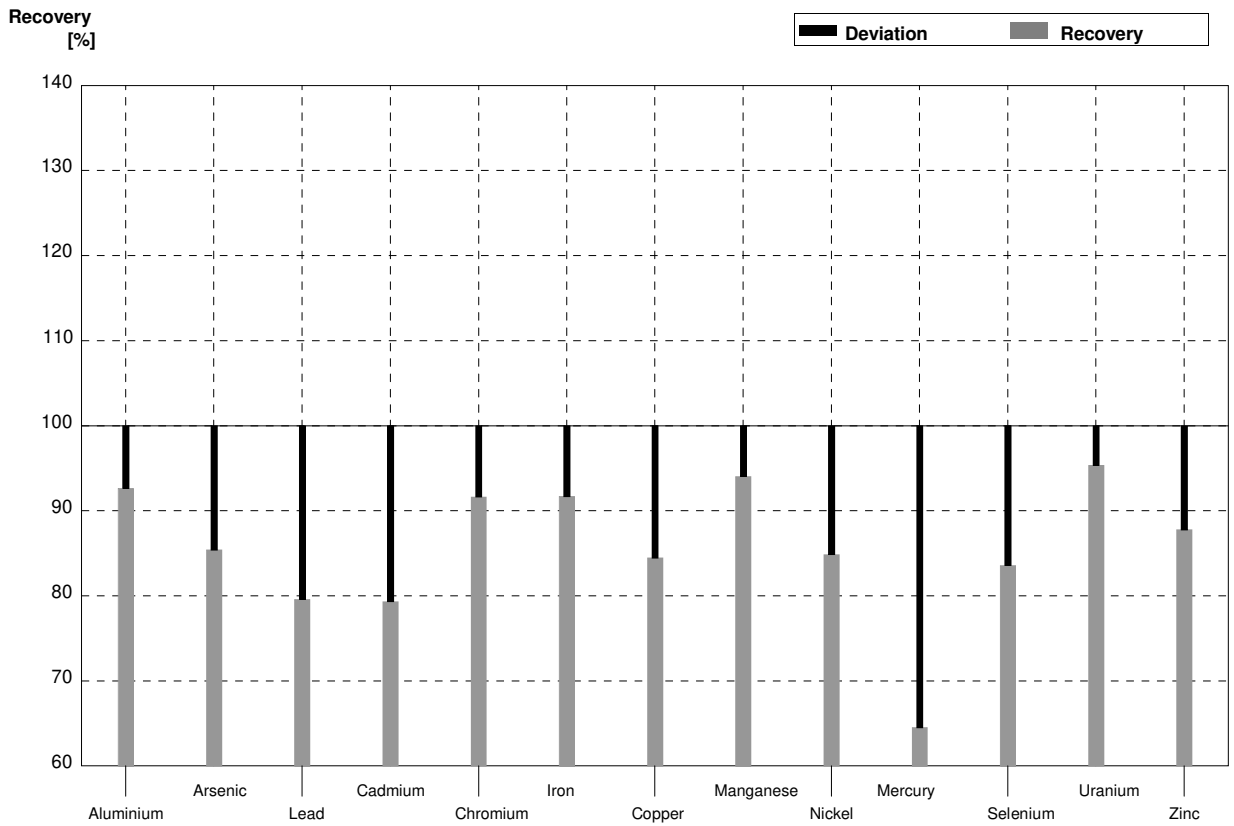
Sample M178A
Laboratory O

Parameter	Assigned value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	12,36	0,18	11,3	2,3	µg/l	91%
Arsenic	1,075	0,015	0,884	0,177	µg/l	82%
Lead	4,23	0,03	3,35	0,67	µg/l	79%
Cadmium	0,993	0,011	0,778	0,156	µg/l	78%
Chromium	4,58	0,03	4,01	0,80	µg/l	88%
Iron	45,5	0,2	39,3	7,9	µg/l	86%
Copper	3,44	0,03	2,69	0,54	µg/l	78%
Manganese	21,94	0,13	18,1	3,6	µg/l	82%
Nickel	3,46	0,03	2,80	0,56	µg/l	81%
Mercury	1,800	0,018	1,36	0,27	µg/l	76%
Selenium	1,20	0,02	<1,0	0,50	µg/l	FN
Uranium	4,98	0,03	4,84	0,97	µg/l	97%
Zinc	56	1	51,6	10,3	µg/l	92%



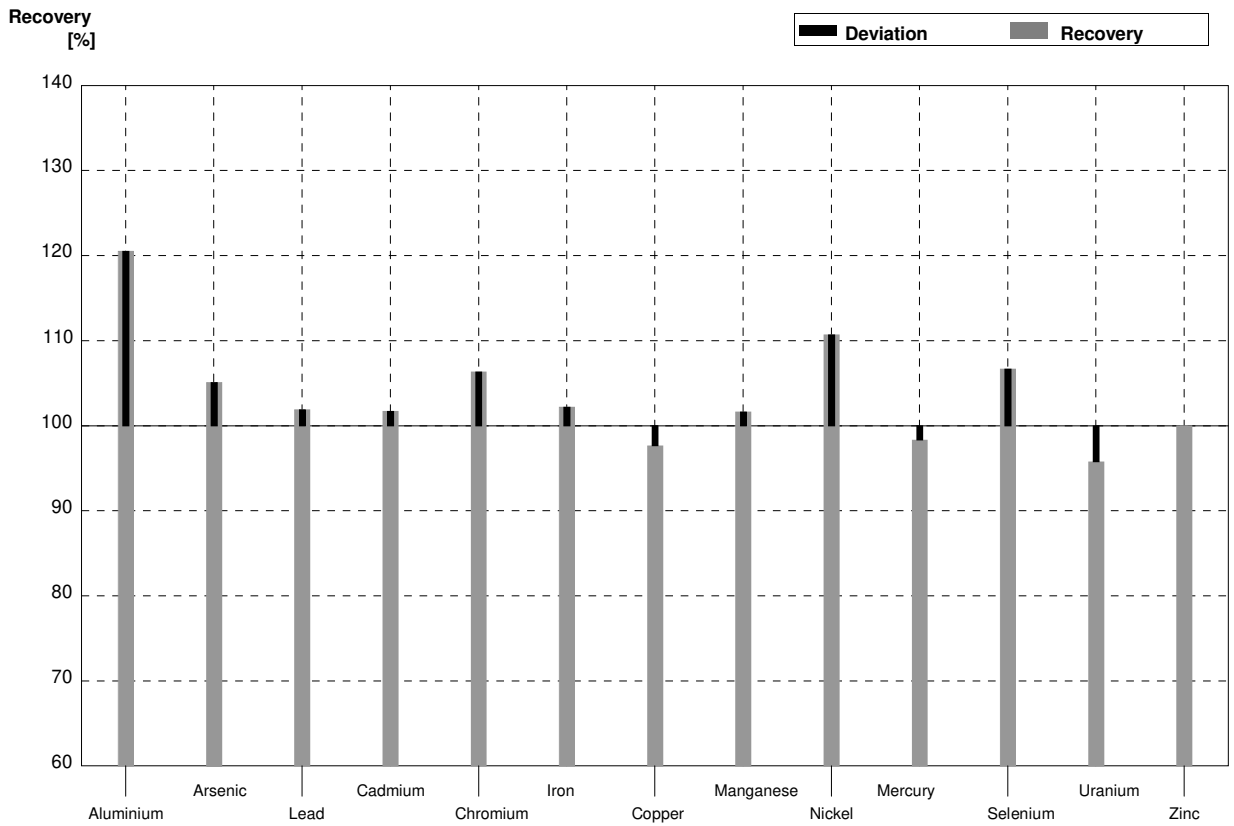
Sample M178B
Laboratory O

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	18,9	3,8	$\mu\text{g/l}$	93%
Arsenic	1,592	0,016	1,36	0,27	$\mu\text{g/l}$	85%
Lead	2,55	0,02	2,03	0,50	$\mu\text{g/l}$	80%
Cadmium	1,916	0,014	1,52	0,30	$\mu\text{g/l}$	79%
Chromium	1,233	0,013	1,13	0,23	$\mu\text{g/l}$	92%
Iron	15,16	0,15	13,9	2,8	$\mu\text{g/l}$	92%
Copper	5,28	0,04	4,46	0,89	$\mu\text{g/l}$	84%
Manganese	15,10	0,11	14,2	2,8	$\mu\text{g/l}$	94%
Nickel	9,06	0,06	7,69	1,54	$\mu\text{g/l}$	85%
Mercury	1,004	0,016	0,648	0,130	$\mu\text{g/l}$	65%
Selenium	1,95	0,02	1,63	0,50	$\mu\text{g/l}$	84%
Uranium	2,391	0,018	2,28	0,50	$\mu\text{g/l}$	95%
Zinc	17,2	0,6	15,1	3,0	$\mu\text{g/l}$	88%



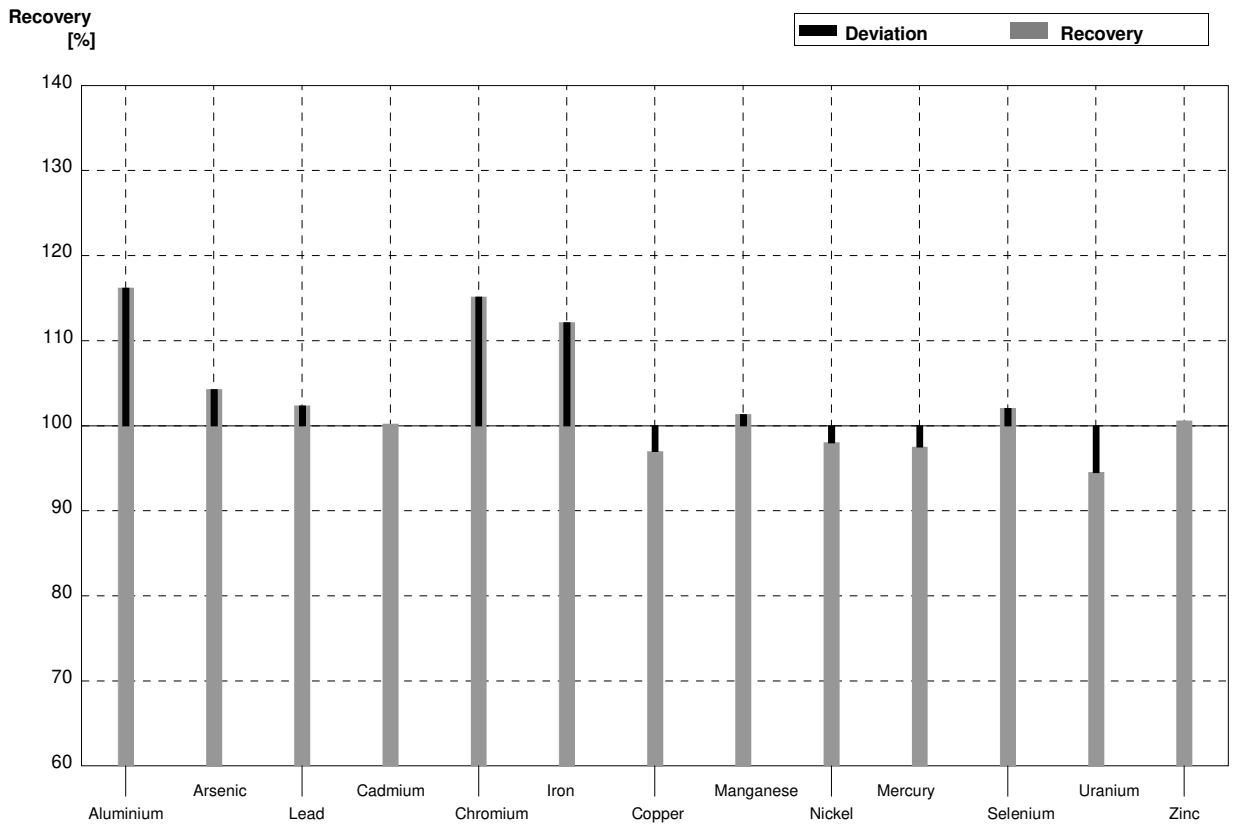
Sample M178A
Laboratory P

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	14,9	0,153	$\mu\text{g/l}$	121%
Arsenic	1,075	0,015	1,13	0,015	$\mu\text{g/l}$	105%
Lead	4,23	0,03	4,31	0,023	$\mu\text{g/l}$	102%
Cadmium	0,993	0,011	1,01	0,033	$\mu\text{g/l}$	102%
Chromium	4,58	0,03	4,87	0,046	$\mu\text{g/l}$	106%
Iron	45,5	0,2	46,5	0,265	$\mu\text{g/l}$	102%
Copper	3,44	0,03	3,36	0,056	$\mu\text{g/l}$	98%
Manganese	21,94	0,13	22,3	0,05	$\mu\text{g/l}$	102%
Nickel	3,46	0,03	3,83	0,060	$\mu\text{g/l}$	111%
Mercury	1,800	0,018	1,77	0,015	$\mu\text{g/l}$	98%
Selenium	1,20	0,02	1,28	0,025	$\mu\text{g/l}$	107%
Uranium	4,98	0,03	4,77	0,071	$\mu\text{g/l}$	96%
Zinc	56	1	56,0	0,458	$\mu\text{g/l}$	100%



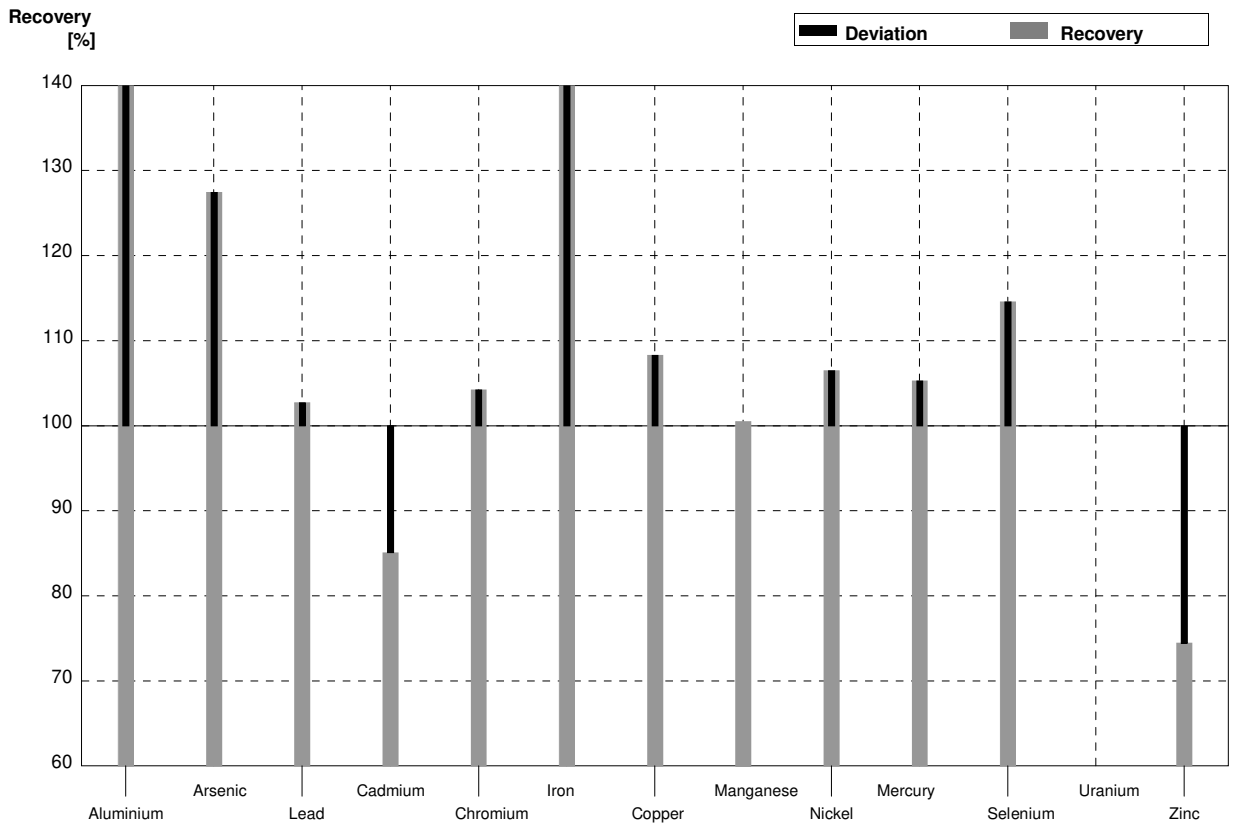
Sample M178B
Laboratory P

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	23,7	0,503	$\mu\text{g/l}$	116%
Arsenic	1,592	0,016	1,66	0,023	$\mu\text{g/l}$	104%
Lead	2,55	0,02	2,61	0,057	$\mu\text{g/l}$	102%
Cadmium	1,916	0,014	1,92	0,057	$\mu\text{g/l}$	100%
Chromium	1,233	0,013	1,42	0,035	$\mu\text{g/l}$	115%
Iron	15,16	0,15	17,0	0,458	$\mu\text{g/l}$	112%
Copper	5,28	0,04	5,12	0,044	$\mu\text{g/l}$	97%
Manganese	15,10	0,11	15,3	0,100	$\mu\text{g/l}$	101%
Nickel	9,06	0,06	8,88	0,076	$\mu\text{g/l}$	98%
Mercury	1,004	0,016	0,979	0,019	$\mu\text{g/l}$	98%
Selenium	1,95	0,02	1,99	0,021	$\mu\text{g/l}$	102%
Uranium	2,391	0,018	2,26	0,026	$\mu\text{g/l}$	95%
Zinc	17,2	0,6	17,3	0,354	$\mu\text{g/l}$	101%



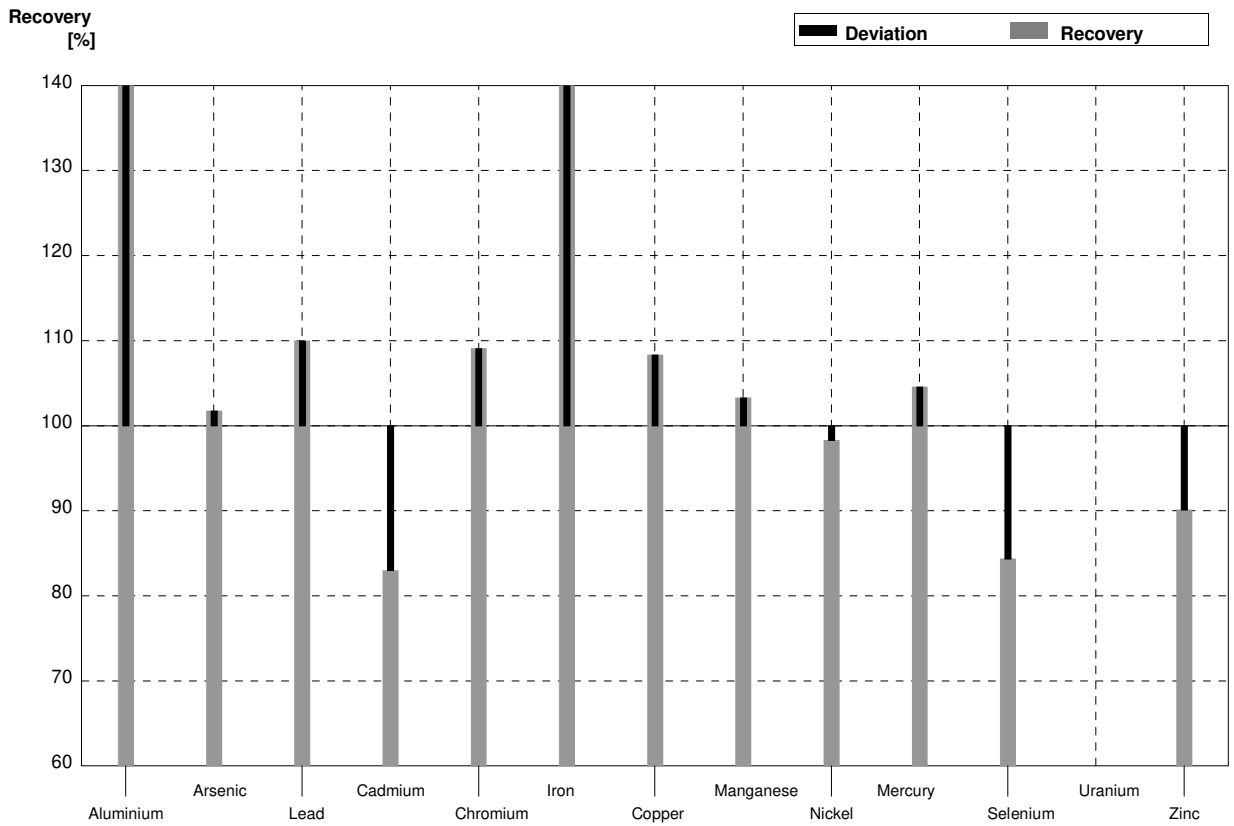
Sample M178A
Laboratory Q

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	49,15		$\mu\text{g/l}$	398%
Arsenic	1,075	0,015	1,37		$\mu\text{g/l}$	127%
Lead	4,23	0,03	4,345		$\mu\text{g/l}$	103%
Cadmium	0,993	0,011	0,845		$\mu\text{g/l}$	85%
Chromium	4,58	0,03	4,775		$\mu\text{g/l}$	104%
Iron	45,5	0,2	79,25		$\mu\text{g/l}$	174%
Copper	3,44	0,03	3,725		$\mu\text{g/l}$	108%
Manganese	21,94	0,13	22,05		$\mu\text{g/l}$	101%
Nickel	3,46	0,03	3,685		$\mu\text{g/l}$	107%
Mercury	1,800	0,018	1,895	0,661	$\mu\text{g/l}$	105%
Selenium	1,20	0,02	1,375		$\mu\text{g/l}$	115%
Uranium	4,98	0,03			$\mu\text{g/l}$	
Zinc	56	1	41,7		$\mu\text{g/l}$	74%



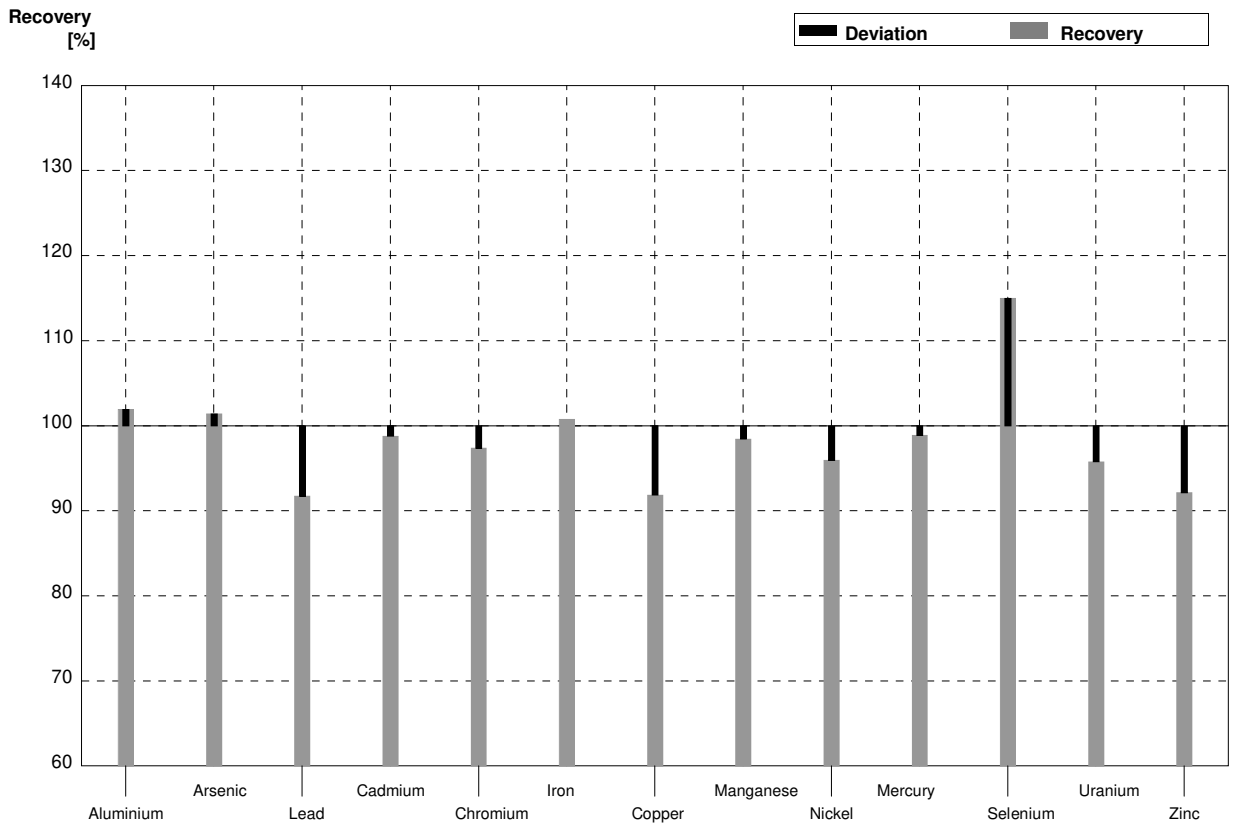
Sample M178B
Laboratory Q

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	69,0		$\mu\text{g/l}$	338%
Arsenic	1,592	0,016	1,620		$\mu\text{g/l}$	102%
Lead	2,55	0,02	2,805		$\mu\text{g/l}$	110%
Cadmium	1,916	0,014	1,590		$\mu\text{g/l}$	83%
Chromium	1,233	0,013	1,345		$\mu\text{g/l}$	109%
Iron	15,16	0,15	25,85		$\mu\text{g/l}$	171%
Copper	5,28	0,04	5,720		$\mu\text{g/l}$	108%
Manganese	15,10	0,11	15,60		$\mu\text{g/l}$	103%
Nickel	9,06	0,06	8,905		$\mu\text{g/l}$	98%
Mercury	1,004	0,016	1,050	0,366	$\mu\text{g/l}$	105%
Selenium	1,95	0,02	1,645		$\mu\text{g/l}$	84%
Uranium	2,391	0,018			$\mu\text{g/l}$	
Zinc	17,2	0,6	15,5		$\mu\text{g/l}$	90%



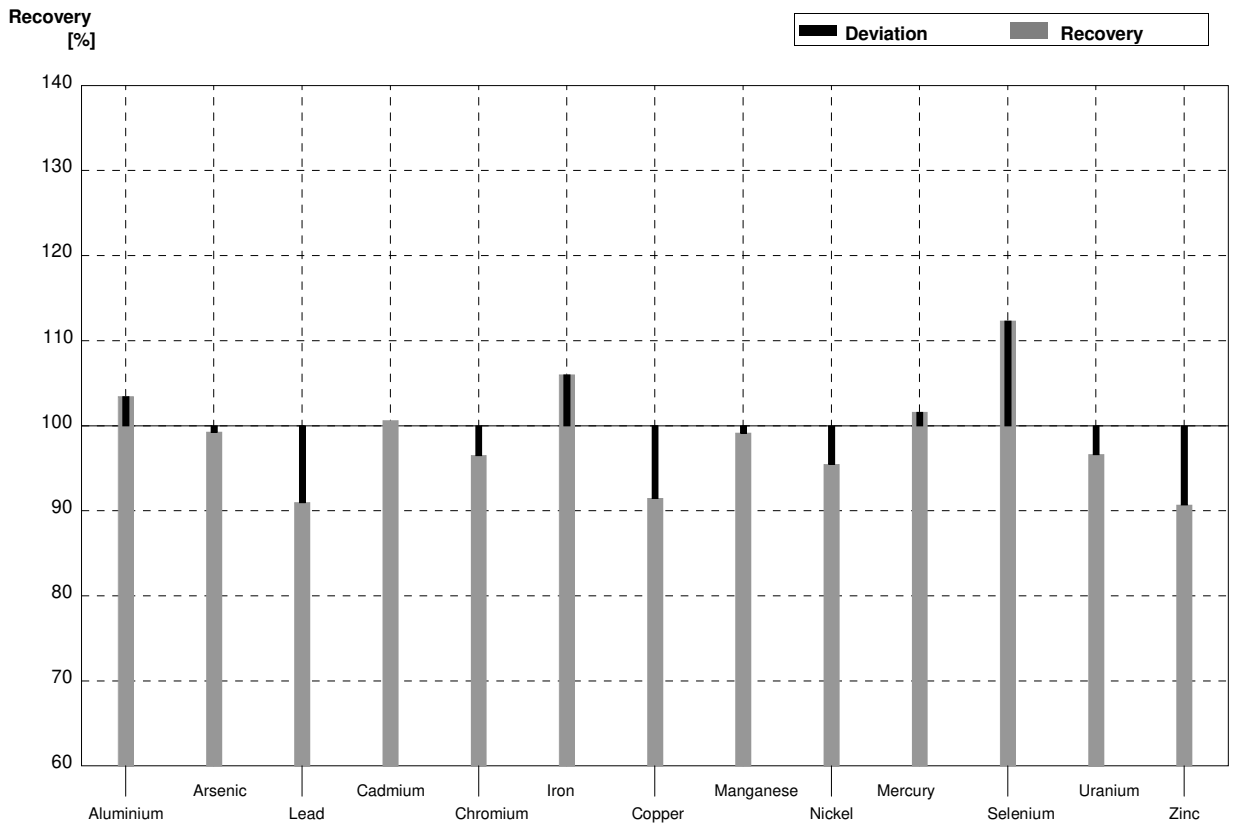
Sample M178A
Laboratory R

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,6		$\mu\text{g/l}$	102%
Arsenic	1,075	0,015	1,09		$\mu\text{g/l}$	101%
Lead	4,23	0,03	3,88		$\mu\text{g/l}$	92%
Cadmium	0,993	0,011	0,981		$\mu\text{g/l}$	99%
Chromium	4,58	0,03	4,46		$\mu\text{g/l}$	97%
Iron	45,5	0,2	45,85		$\mu\text{g/l}$	101%
Copper	3,44	0,03	3,16		$\mu\text{g/l}$	92%
Manganese	21,94	0,13	21,6		$\mu\text{g/l}$	98%
Nickel	3,46	0,03	3,32		$\mu\text{g/l}$	96%
Mercury	1,800	0,018	1,78		$\mu\text{g/l}$	99%
Selenium	1,20	0,02	1,38		$\mu\text{g/l}$	115%
Uranium	4,98	0,03	4,77		$\mu\text{g/l}$	96%
Zinc	56	1	51,6		$\mu\text{g/l}$	92%



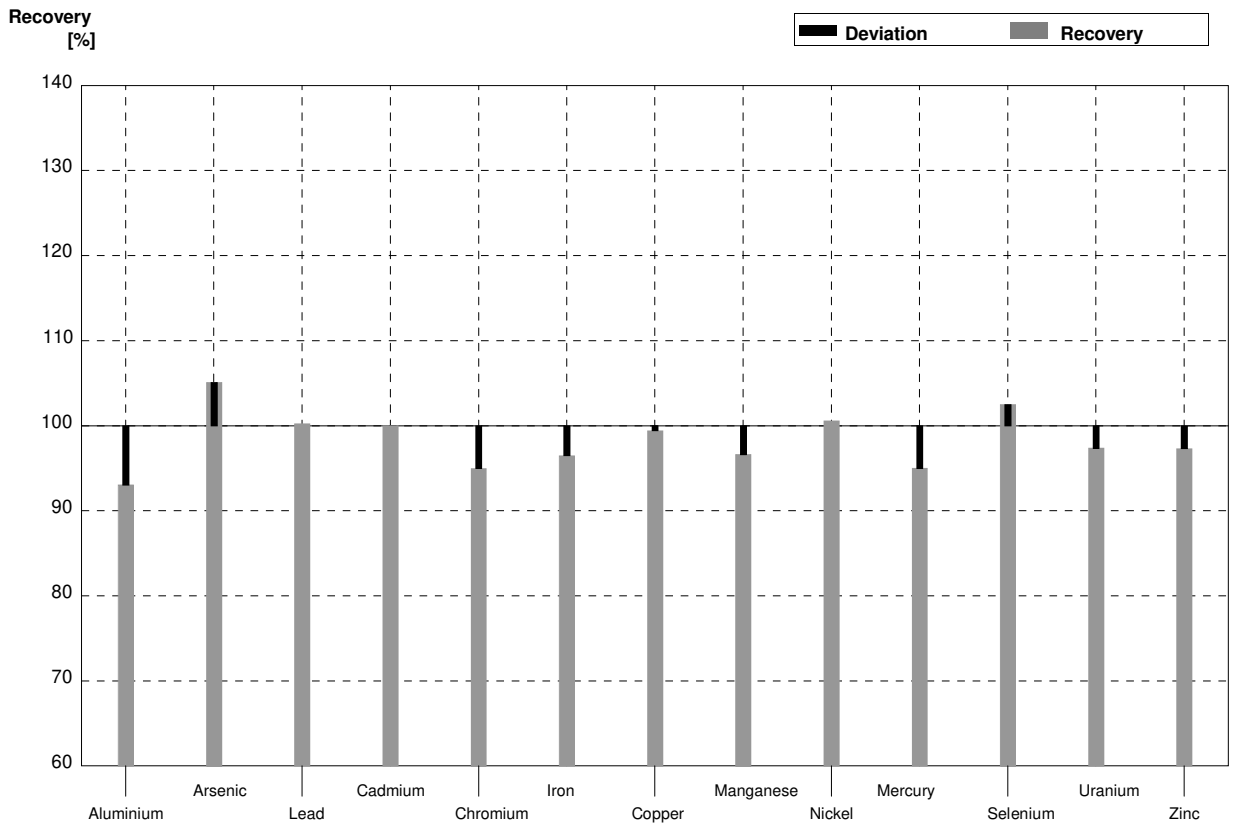
Sample M178B
Laboratory R

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	21,1		$\mu\text{g/l}$	103%
Arsenic	1,592	0,016	1,58		$\mu\text{g/l}$	99%
Lead	2,55	0,02	2,32		$\mu\text{g/l}$	91%
Cadmium	1,916	0,014	1,928		$\mu\text{g/l}$	101%
Chromium	1,233	0,013	1,19		$\mu\text{g/l}$	97%
Iron	15,16	0,15	16,07		$\mu\text{g/l}$	106%
Copper	5,28	0,04	4,83		$\mu\text{g/l}$	91%
Manganese	15,10	0,11	14,97		$\mu\text{g/l}$	99%
Nickel	9,06	0,06	8,65		$\mu\text{g/l}$	95%
Mercury	1,004	0,016	1,02		$\mu\text{g/l}$	102%
Selenium	1,95	0,02	2,19		$\mu\text{g/l}$	112%
Uranium	2,391	0,018	2,31		$\mu\text{g/l}$	97%
Zinc	17,2	0,6	15,6		$\mu\text{g/l}$	91%



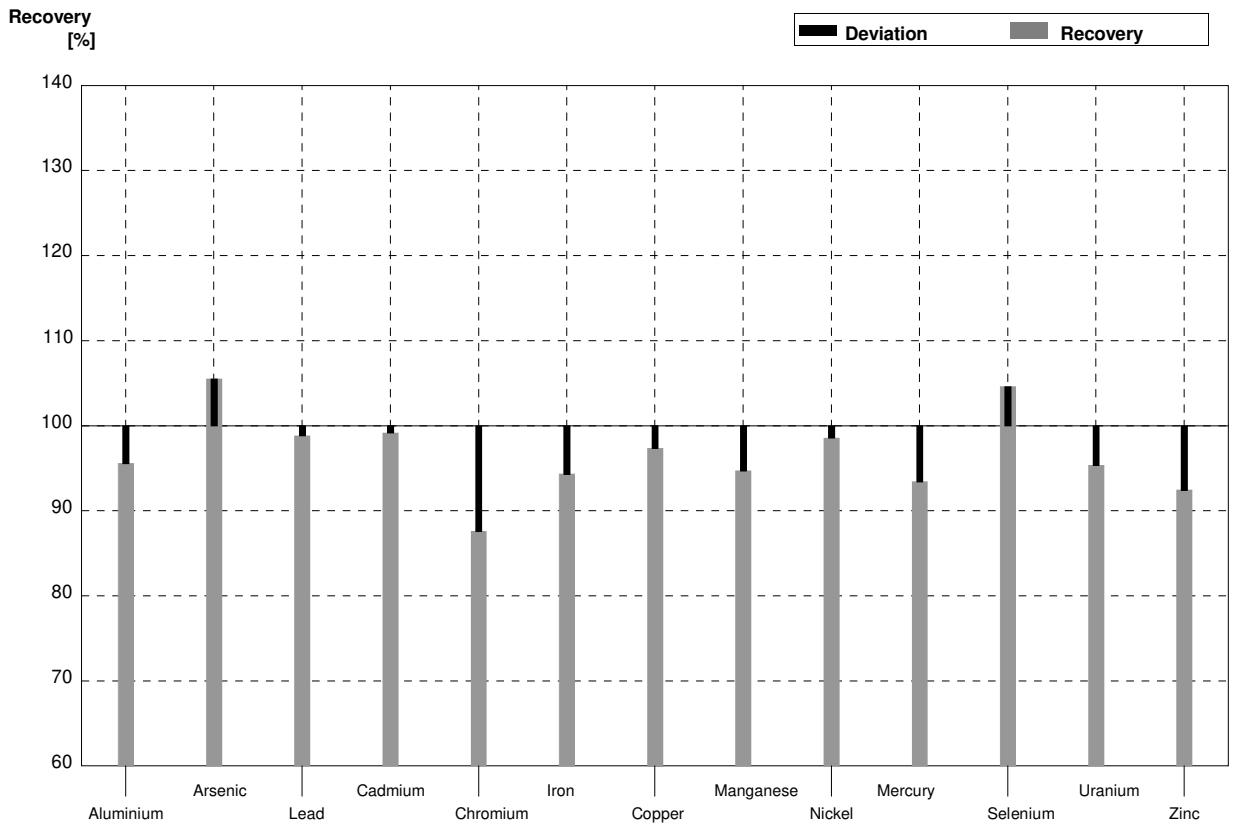
Sample M178A
Laboratory S

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	11,5	0,229	$\mu\text{g/l}$	93%
Arsenic	1,075	0,015	1,13	0,0632	$\mu\text{g/l}$	105%
Lead	4,23	0,03	4,24	0,0319	$\mu\text{g/l}$	100%
Cadmium	0,993	0,011	0,993	0,00792	$\mu\text{g/l}$	100%
Chromium	4,58	0,03	4,35	0,147	$\mu\text{g/l}$	95%
Iron	45,5	0,2	43,9	0,222	$\mu\text{g/l}$	96%
Copper	3,44	0,03	3,42	0,0480	$\mu\text{g/l}$	99%
Manganese	21,94	0,13	21,2	0,654	$\mu\text{g/l}$	97%
Nickel	3,46	0,03	3,48	0,0687	$\mu\text{g/l}$	101%
Mercury	1,800	0,018	1,71	0,0288	$\mu\text{g/l}$	95%
Selenium	1,20	0,02	1,23	0,0698	$\mu\text{g/l}$	103%
Uranium	4,98	0,03	4,85	0,0247	$\mu\text{g/l}$	97%
Zinc	56	1	54,5	1,63	$\mu\text{g/l}$	97%



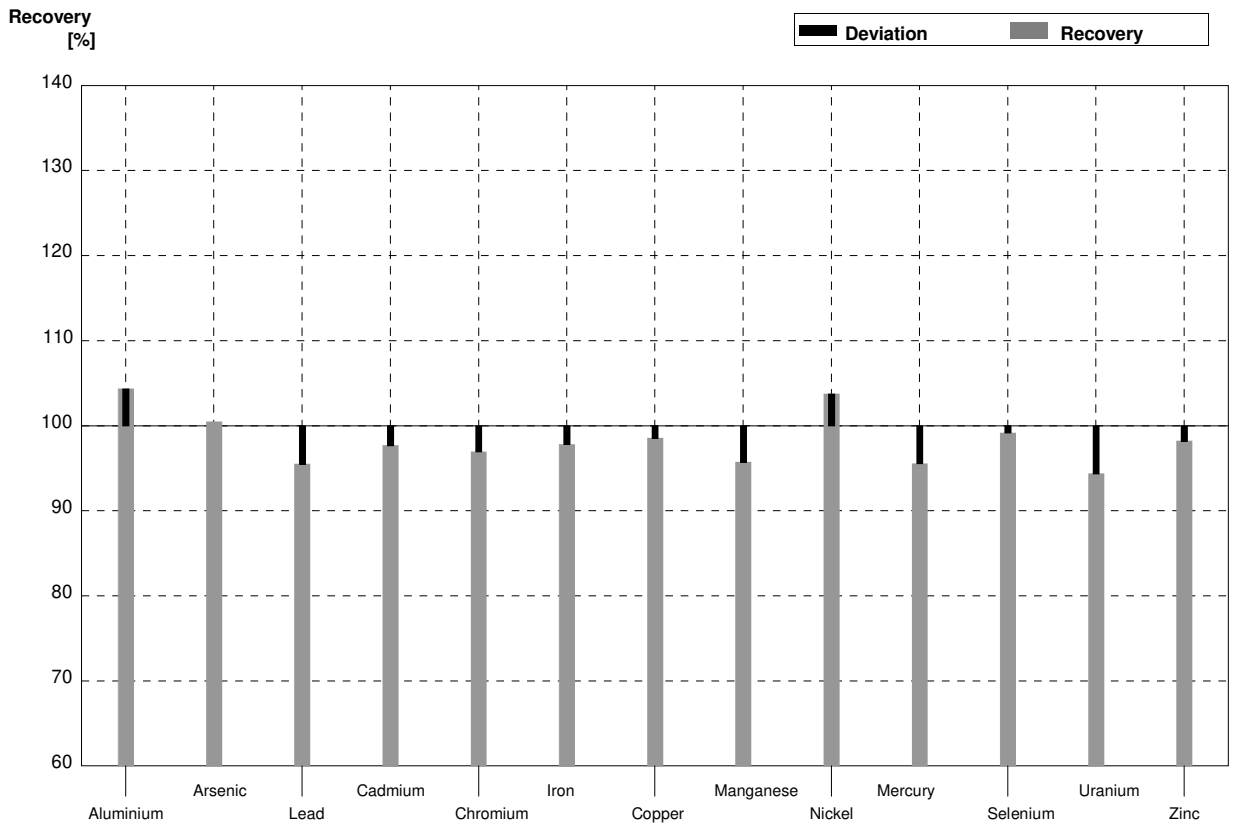
Sample M178B
Laboratory S

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	19,5	0,200	$\mu\text{g/l}$	96%
Arsenic	1,592	0,016	1,68	0,0608	$\mu\text{g/l}$	106%
Lead	2,55	0,02	2,52	0,0341	$\mu\text{g/l}$	99%
Cadmium	1,916	0,014	1,90	0,0197	$\mu\text{g/l}$	99%
Chromium	1,233	0,013	1,08	0,196	$\mu\text{g/l}$	88%
Iron	15,16	0,15	14,3	0,239	$\mu\text{g/l}$	94%
Copper	5,28	0,04	5,14	0,0461	$\mu\text{g/l}$	97%
Manganese	15,10	0,11	14,3	0,681	$\mu\text{g/l}$	95%
Nickel	9,06	0,06	8,93	0,0735	$\mu\text{g/l}$	99%
Mercury	1,004	0,016	0,938	0,0275	$\mu\text{g/l}$	93%
Selenium	1,95	0,02	2,04	0,0665	$\mu\text{g/l}$	105%
Uranium	2,391	0,018	2,28	0,0237	$\mu\text{g/l}$	95%
Zinc	17,2	0,6	15,9	0,262	$\mu\text{g/l}$	92%



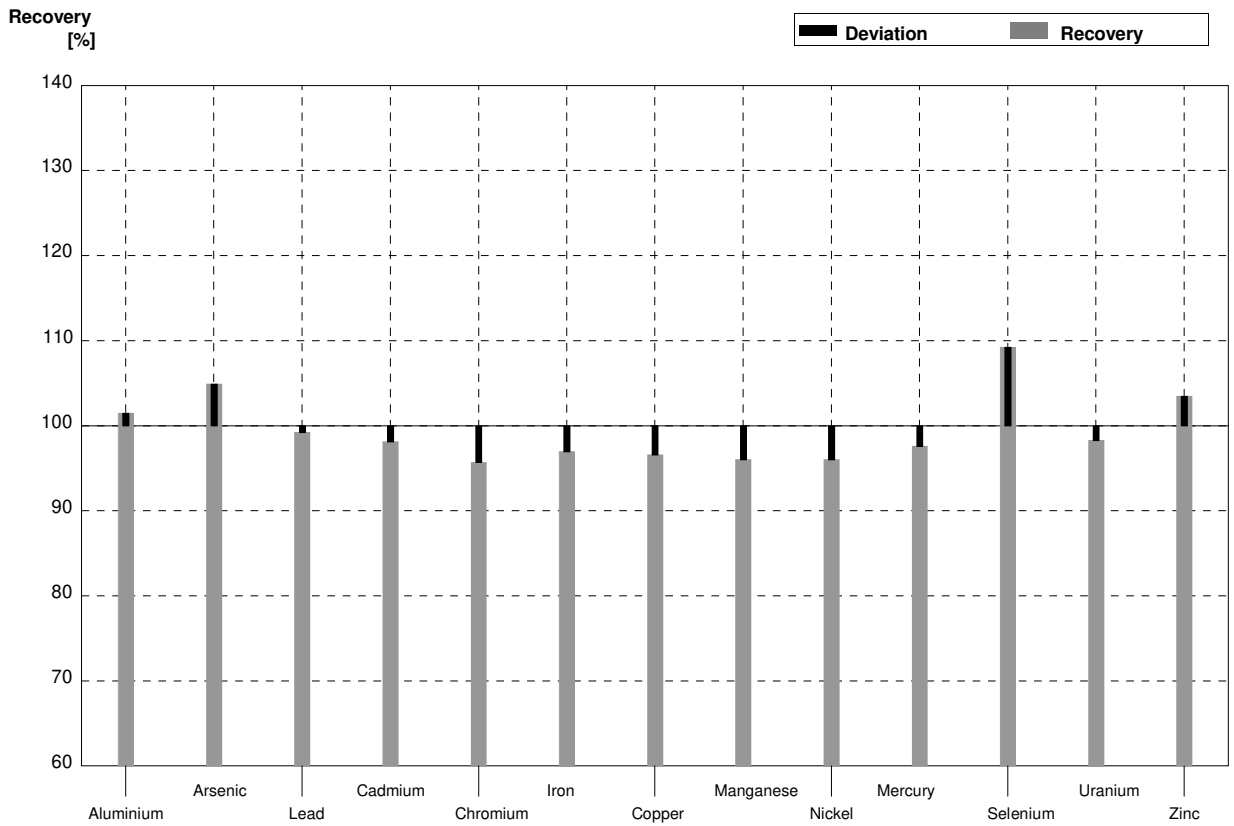
Sample M178A
Laboratory T

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,9	2,2	$\mu\text{g/l}$	104%
Arsenic	1,075	0,015	1,08	0,30	$\mu\text{g/l}$	100%
Lead	4,23	0,03	4,04	0,37	$\mu\text{g/l}$	96%
Cadmium	0,993	0,011	0,97	0,12	$\mu\text{g/l}$	98%
Chromium	4,58	0,03	4,44	0,41	$\mu\text{g/l}$	97%
Iron	45,5	0,2	44,5	4,0	$\mu\text{g/l}$	98%
Copper	3,44	0,03	3,39	0,44	$\mu\text{g/l}$	99%
Manganese	21,94	0,13	21,0	1,3	$\mu\text{g/l}$	96%
Nickel	3,46	0,03	3,59	0,43	$\mu\text{g/l}$	104%
Mercury	1,800	0,018	1,72	0,29	$\mu\text{g/l}$	96%
Selenium	1,20	0,02	1,19	0,33	$\mu\text{g/l}$	99%
Uranium	4,98	0,03	4,70	0,25	$\mu\text{g/l}$	94%
Zinc	56	1	55,0	6,4	$\mu\text{g/l}$	98%



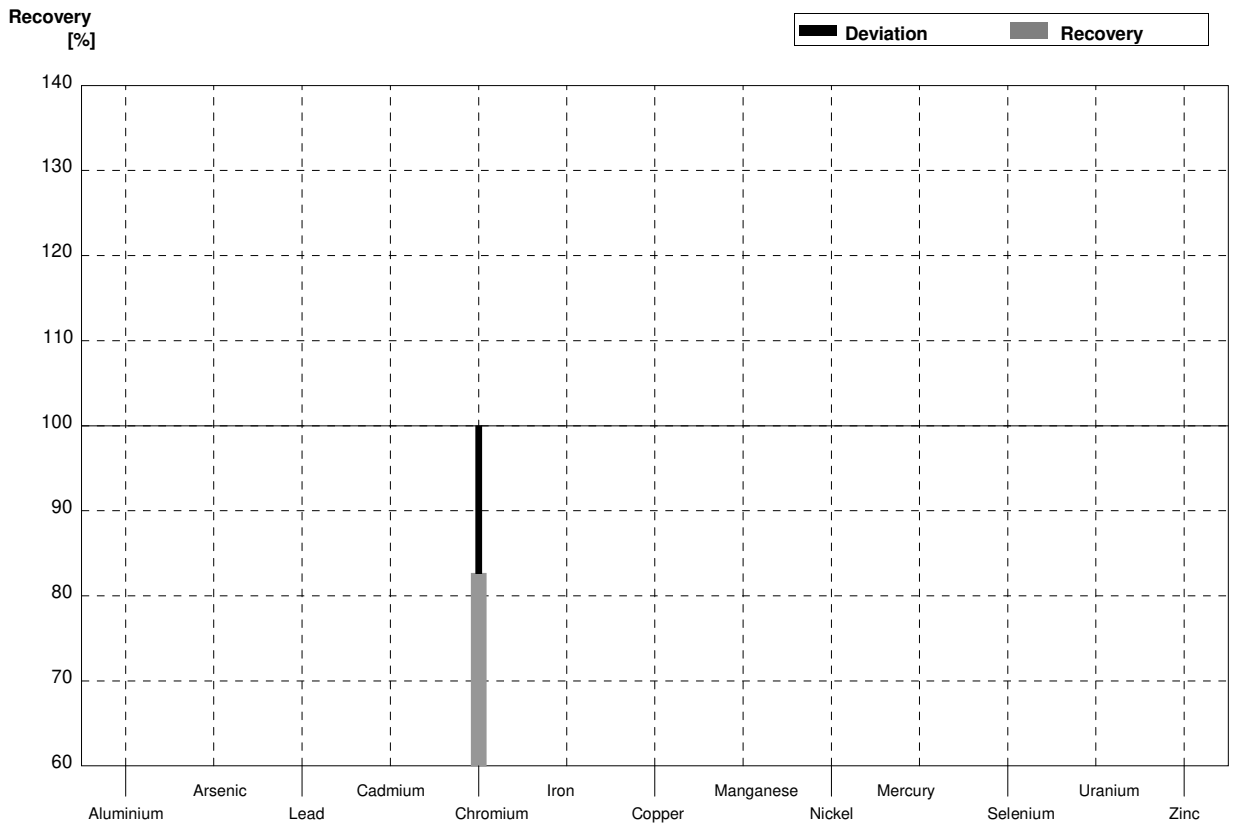
Sample M178B
Laboratory T

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	20,7	3,0	$\mu\text{g/l}$	101%
Arsenic	1,592	0,016	1,67	0,34	$\mu\text{g/l}$	105%
Lead	2,55	0,02	2,53	0,25	$\mu\text{g/l}$	99%
Cadmium	1,916	0,014	1,88	0,19	$\mu\text{g/l}$	98%
Chromium	1,233	0,013	1,18	0,31	$\mu\text{g/l}$	96%
Iron	15,16	0,15	14,7	1,6	$\mu\text{g/l}$	97%
Copper	5,28	0,04	5,1	0,5	$\mu\text{g/l}$	97%
Manganese	15,10	0,11	14,5	1,0	$\mu\text{g/l}$	96%
Nickel	9,06	0,06	8,7	0,7	$\mu\text{g/l}$	96%
Mercury	1,004	0,016	0,98	0,17	$\mu\text{g/l}$	98%
Selenium	1,95	0,02	2,13	0,44	$\mu\text{g/l}$	109%
Uranium	2,391	0,018	2,35	0,22	$\mu\text{g/l}$	98%
Zinc	17,2	0,6	17,8	2,3	$\mu\text{g/l}$	103%



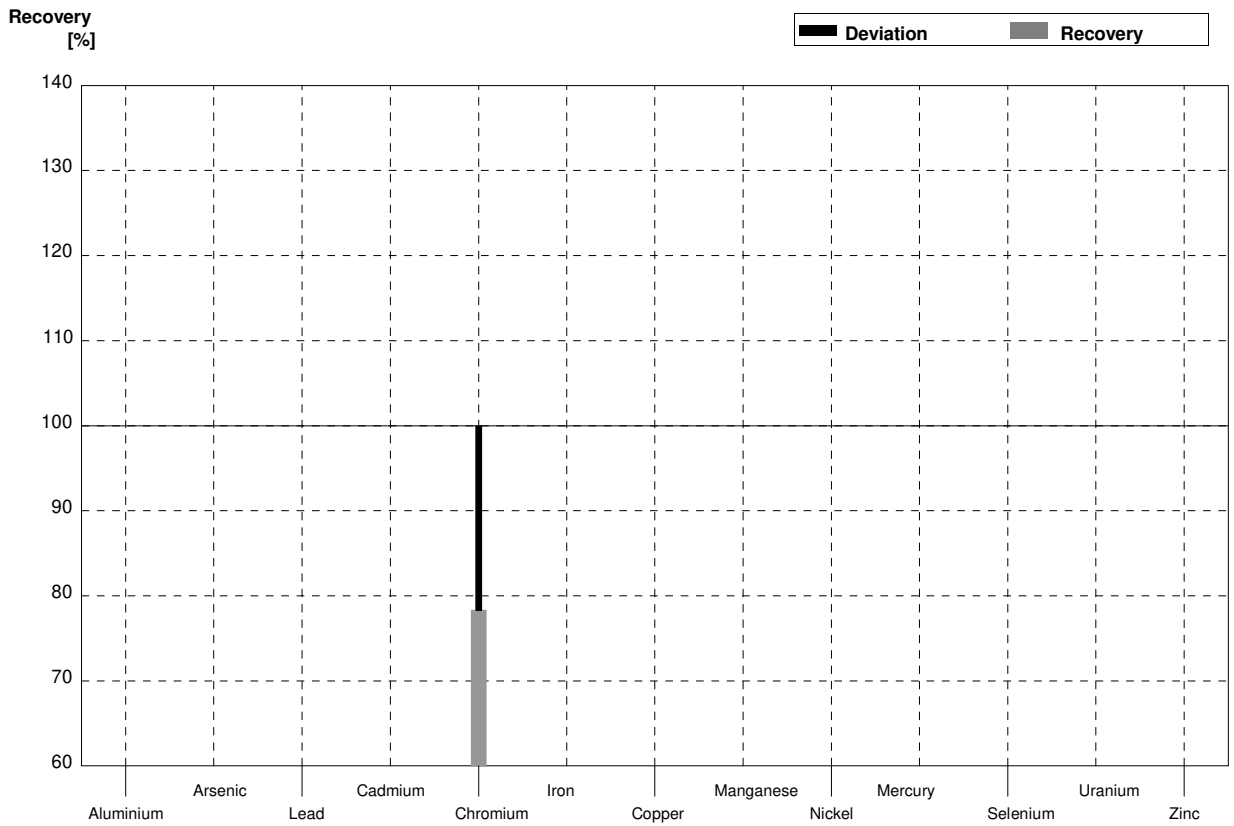
Sample M178A
Laboratory U

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18			$\mu\text{g/l}$	
Arsenic	1,075	0,015			$\mu\text{g/l}$	
Lead	4,23	0,03			$\mu\text{g/l}$	
Cadmium	0,993	0,011			$\mu\text{g/l}$	
Chromium	4,58	0,03	3,786		$\mu\text{g/l}$	83%
Iron	45,5	0,2			$\mu\text{g/l}$	
Copper	3,44	0,03			$\mu\text{g/l}$	
Manganese	21,94	0,13			$\mu\text{g/l}$	
Nickel	3,46	0,03			$\mu\text{g/l}$	
Mercury	1,800	0,018			$\mu\text{g/l}$	
Selenium	1,20	0,02			$\mu\text{g/l}$	
Uranium	4,98	0,03			$\mu\text{g/l}$	
Zinc	56	1			$\mu\text{g/l}$	



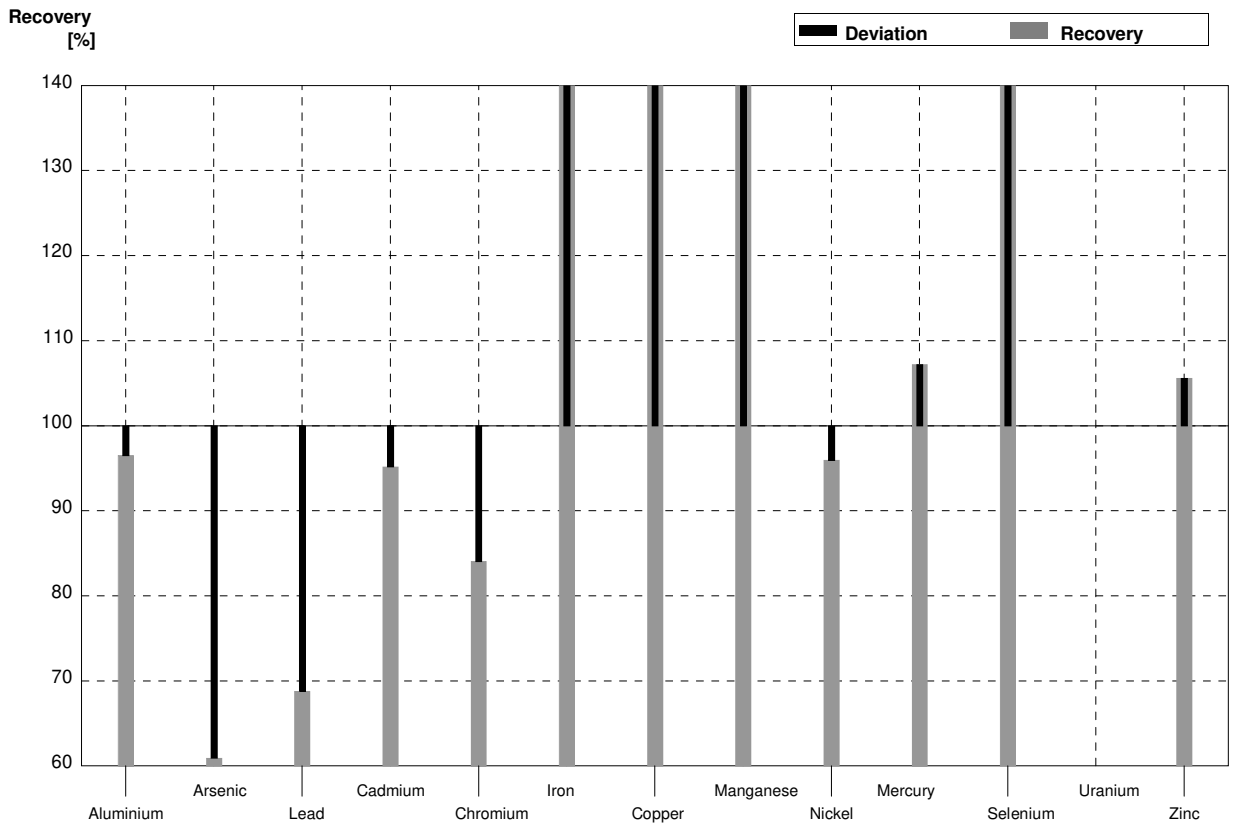
Sample M178B
Laboratory U

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2			$\mu\text{g/l}$	
Arsenic	1,592	0,016			$\mu\text{g/l}$	
Lead	2,55	0,02			$\mu\text{g/l}$	
Cadmium	1,916	0,014			$\mu\text{g/l}$	
Chromium	1,233	0,013	0,9659		$\mu\text{g/l}$	78%
Iron	15,16	0,15			$\mu\text{g/l}$	
Copper	5,28	0,04			$\mu\text{g/l}$	
Manganese	15,10	0,11			$\mu\text{g/l}$	
Nickel	9,06	0,06			$\mu\text{g/l}$	
Mercury	1,004	0,016			$\mu\text{g/l}$	
Selenium	1,95	0,02			$\mu\text{g/l}$	
Uranium	2,391	0,018			$\mu\text{g/l}$	
Zinc	17,2	0,6			$\mu\text{g/l}$	



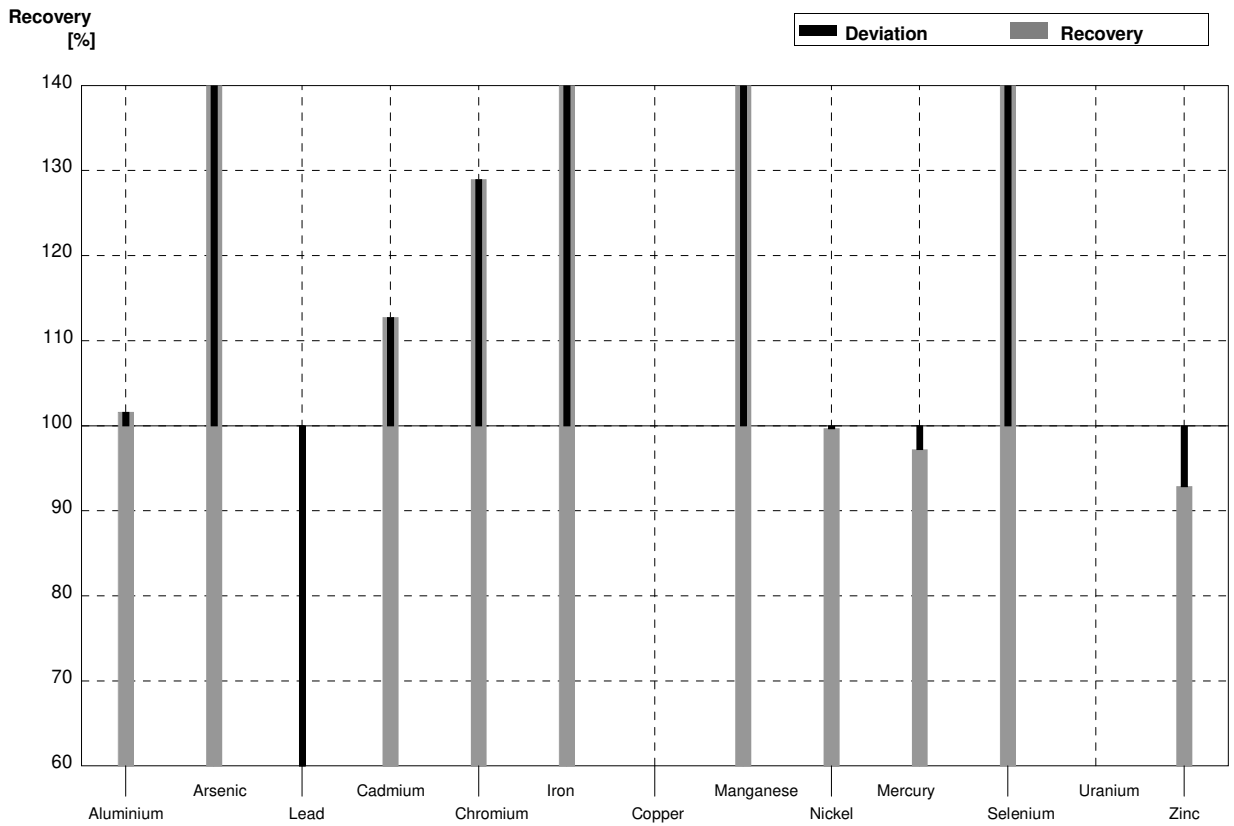
Sample M178A
Laboratory V

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	11,93	2,39	$\mu\text{g/l}$	97%
Arsenic	1,075	0,015	0,655	0,131	$\mu\text{g/l}$	61%
Lead	4,23	0,03	2,91	0,582	$\mu\text{g/l}$	69%
Cadmium	0,993	0,011	0,945	0,189	$\mu\text{g/l}$	95%
Chromium	4,58	0,03	3,85	0,770	$\mu\text{g/l}$	84%
Iron	45,5	0,2	92,7	18,5	$\mu\text{g/l}$	204%
Copper	3,44	0,03	9,96	1,99	$\mu\text{g/l}$	290%
Manganese	21,94	0,13	33,8	6,76	$\mu\text{g/l}$	154%
Nickel	3,46	0,03	3,32	0,664	$\mu\text{g/l}$	96%
Mercury	1,800	0,018	1,93	0,386	$\mu\text{g/l}$	107%
Selenium	1,20	0,02	3,29	0,658	$\mu\text{g/l}$	274%
Uranium	4,98	0,03			$\mu\text{g/l}$	
Zinc	56	1	59,13	11,83	$\mu\text{g/l}$	106%



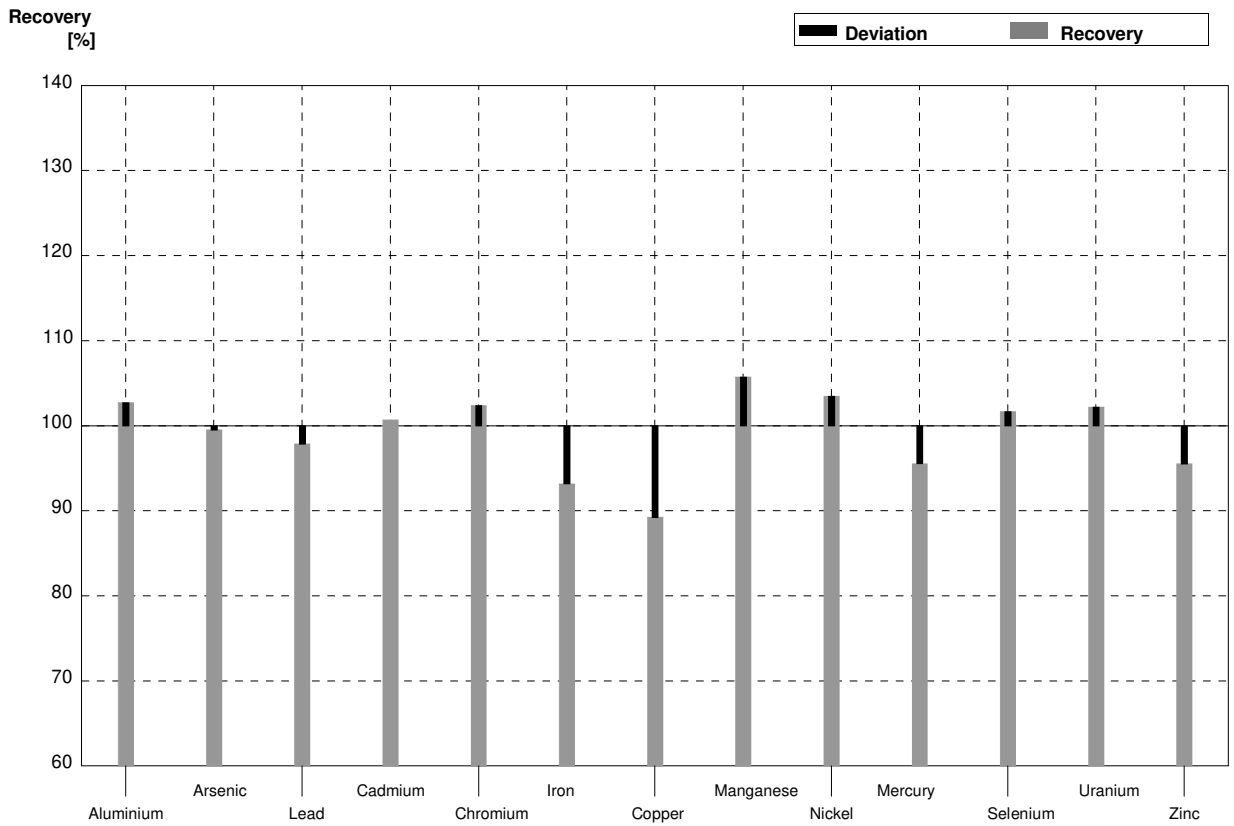
Sample M178B
Laboratory V

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	20,73	4,15	$\mu\text{g/l}$	102%
Arsenic	1,592	0,016	2,78	0,556	$\mu\text{g/l}$	175%
Lead	2,55	0,02	1,07	0,214	$\mu\text{g/l}$	42%
Cadmium	1,916	0,014	2,16	0,432	$\mu\text{g/l}$	113%
Chromium	1,233	0,013	1,59	0,318	$\mu\text{g/l}$	129%
Iron	15,16	0,15	162,5	32,5	$\mu\text{g/l}$	1072%
Copper	5,28	0,04			$\mu\text{g/l}$	
Manganese	15,10	0,11	38,1	7,62	$\mu\text{g/l}$	252%
Nickel	9,06	0,06	9,03	1,81	$\mu\text{g/l}$	100%
Mercury	1,004	0,016	0,976	0,195	$\mu\text{g/l}$	97%
Selenium	1,95	0,02	5,42	1,08	$\mu\text{g/l}$	278%
Uranium	2,391	0,018			$\mu\text{g/l}$	
Zinc	17,2	0,6	15,97	3,19	$\mu\text{g/l}$	93%



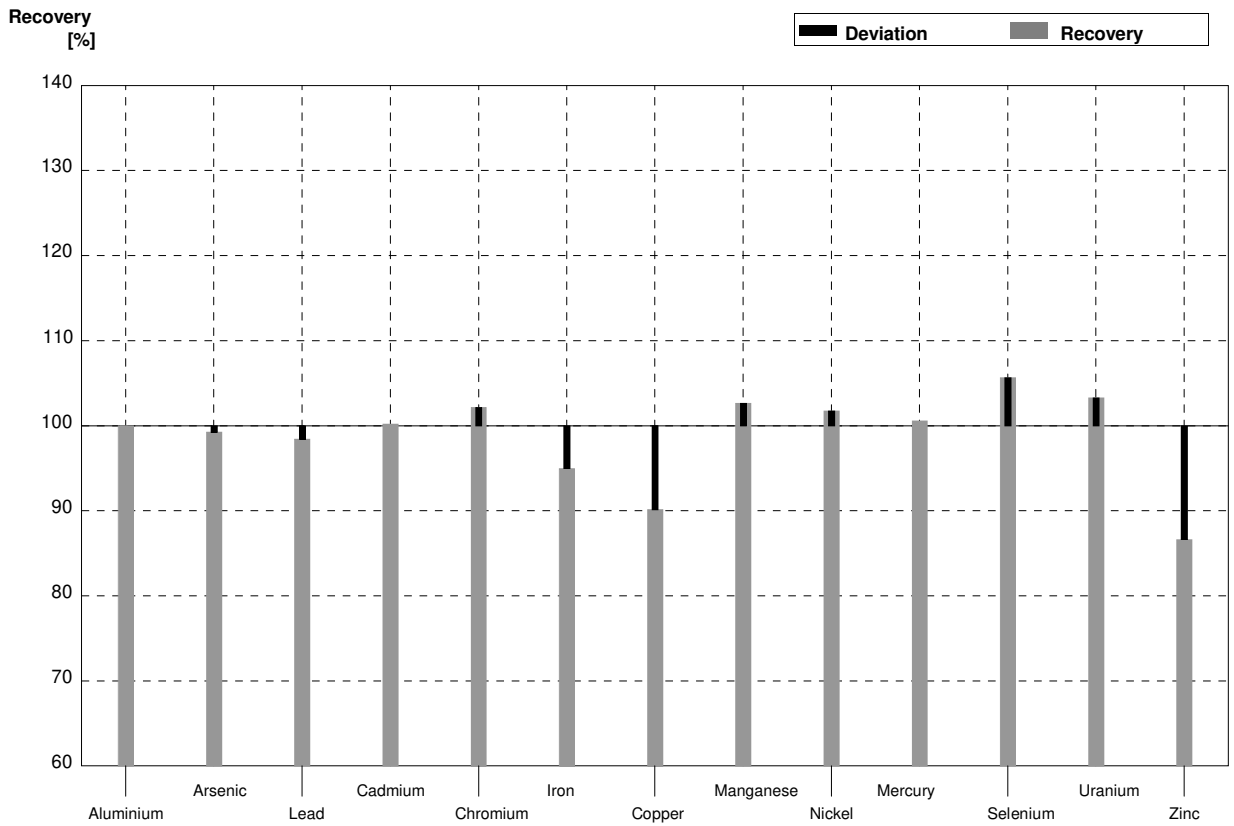
Sample M178A
Laboratory W

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	12,7	1,27	$\mu\text{g/l}$	103%
Arsenic	1,075	0,015	1,07	0,107	$\mu\text{g/l}$	100%
Lead	4,23	0,03	4,14	0,414	$\mu\text{g/l}$	98%
Cadmium	0,993	0,011	1,00	0,100	$\mu\text{g/l}$	101%
Chromium	4,58	0,03	4,69	0,469	$\mu\text{g/l}$	102%
Iron	45,5	0,2	42,4	4,24	$\mu\text{g/l}$	93%
Copper	3,44	0,03	3,07	0,307	$\mu\text{g/l}$	89%
Manganese	21,94	0,13	23,2	2,32	$\mu\text{g/l}$	106%
Nickel	3,46	0,03	3,58	0,358	$\mu\text{g/l}$	103%
Mercury	1,800	0,018	1,72	0,172	$\mu\text{g/l}$	96%
Selenium	1,20	0,02	1,22	0,122	$\mu\text{g/l}$	102%
Uranium	4,98	0,03	5,09	0,509	$\mu\text{g/l}$	102%
Zinc	56	1	53,5	5,35	$\mu\text{g/l}$	96%



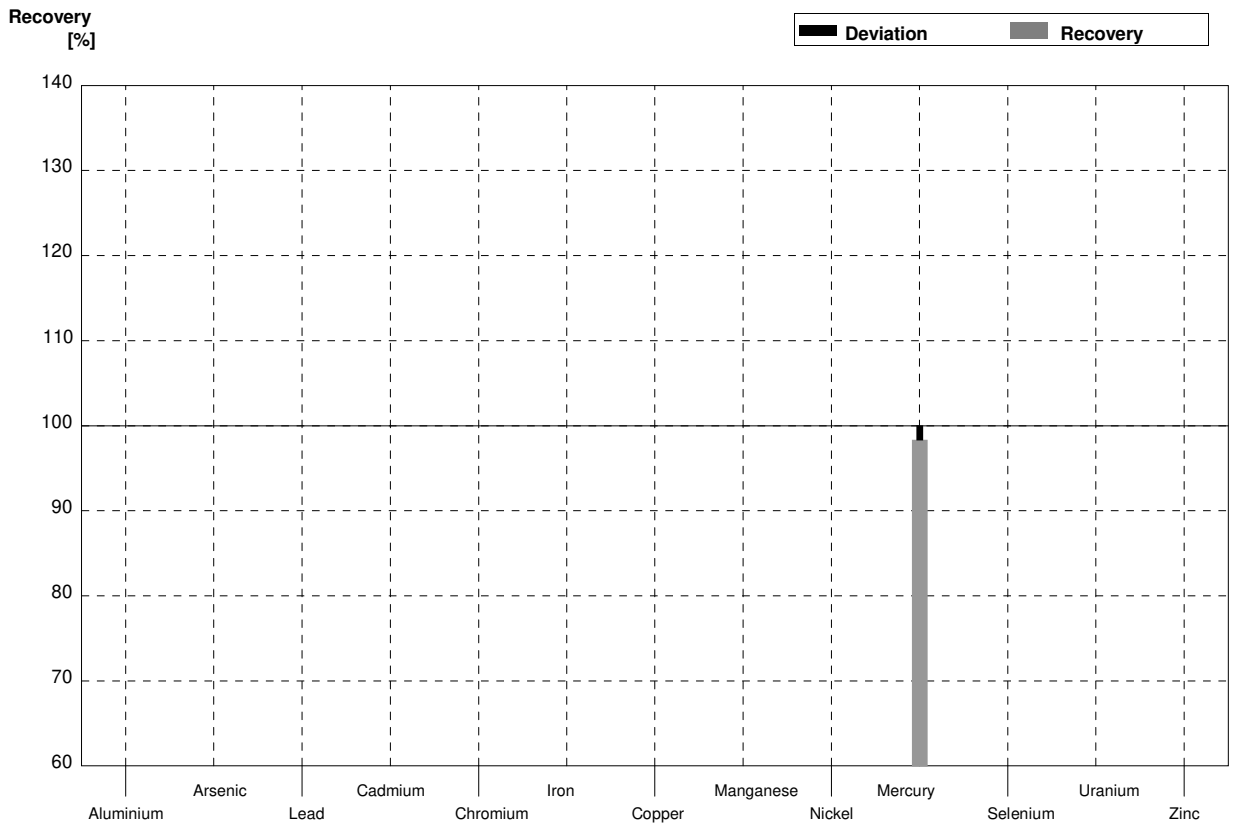
Sample M178B
Laboratory W

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	20,4	2,04	$\mu\text{g/l}$	100%
Arsenic	1,592	0,016	1,58	0,158	$\mu\text{g/l}$	99%
Lead	2,55	0,02	2,51	0,251	$\mu\text{g/l}$	98%
Cadmium	1,916	0,014	1,92	0,192	$\mu\text{g/l}$	100%
Chromium	1,233	0,013	1,26	0,126	$\mu\text{g/l}$	102%
Iron	15,16	0,15	14,4	1,44	$\mu\text{g/l}$	95%
Copper	5,28	0,04	4,76	0,476	$\mu\text{g/l}$	90%
Manganese	15,10	0,11	15,5	1,55	$\mu\text{g/l}$	103%
Nickel	9,06	0,06	9,22	0,922	$\mu\text{g/l}$	102%
Mercury	1,004	0,016	1,01	0,101	$\mu\text{g/l}$	101%
Selenium	1,95	0,02	2,06	0,206	$\mu\text{g/l}$	106%
Uranium	2,391	0,018	2,47	0,247	$\mu\text{g/l}$	103%
Zinc	17,2	0,6	14,9	1,49	$\mu\text{g/l}$	87%



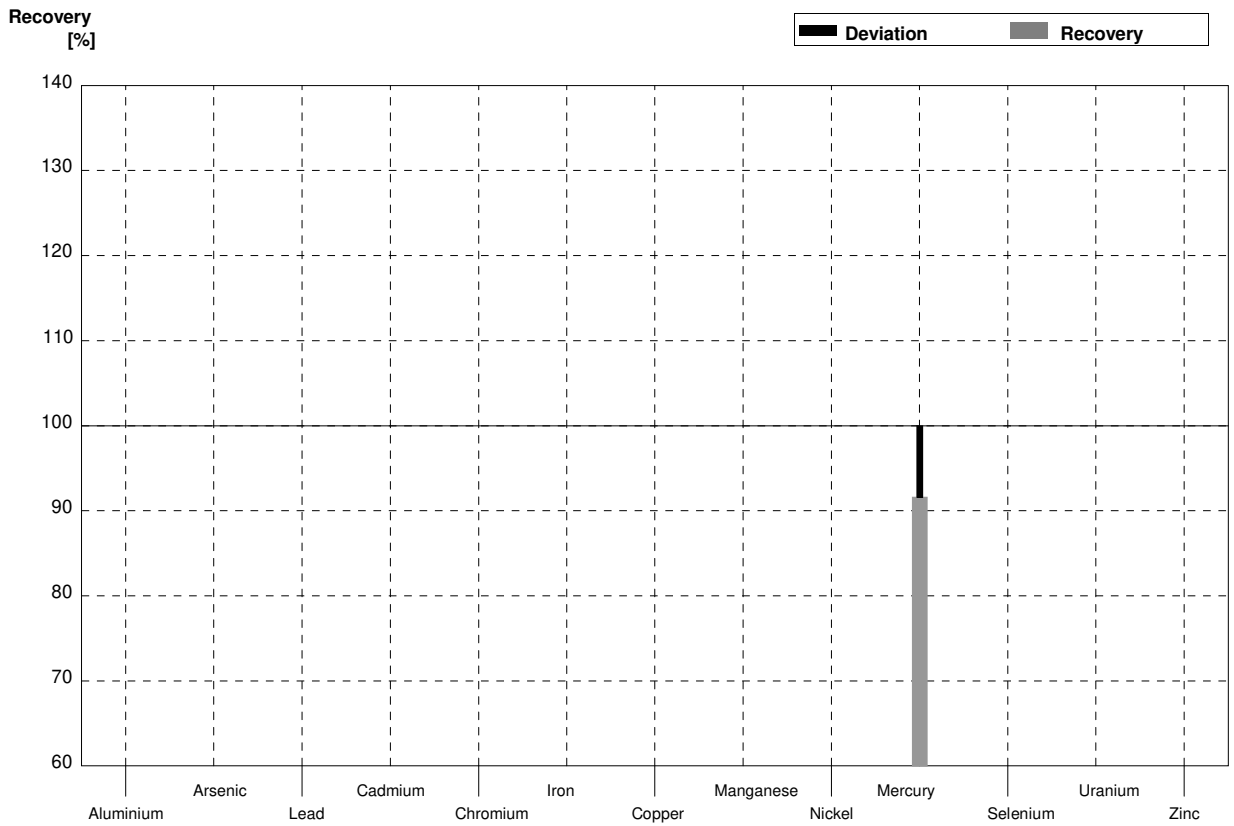
Sample M178A
Laboratory X

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18			$\mu\text{g/l}$	
Arsenic	1,075	0,015			$\mu\text{g/l}$	
Lead	4,23	0,03			$\mu\text{g/l}$	
Cadmium	0,993	0,011			$\mu\text{g/l}$	
Chromium	4,58	0,03			$\mu\text{g/l}$	
Iron	45,5	0,2			$\mu\text{g/l}$	
Copper	3,44	0,03			$\mu\text{g/l}$	
Manganese	21,94	0,13			$\mu\text{g/l}$	
Nickel	3,46	0,03			$\mu\text{g/l}$	
Mercury	1,800	0,018	1,77	0,35	$\mu\text{g/l}$	98%
Selenium	1,20	0,02			$\mu\text{g/l}$	
Uranium	4,98	0,03			$\mu\text{g/l}$	
Zinc	56	1			$\mu\text{g/l}$	



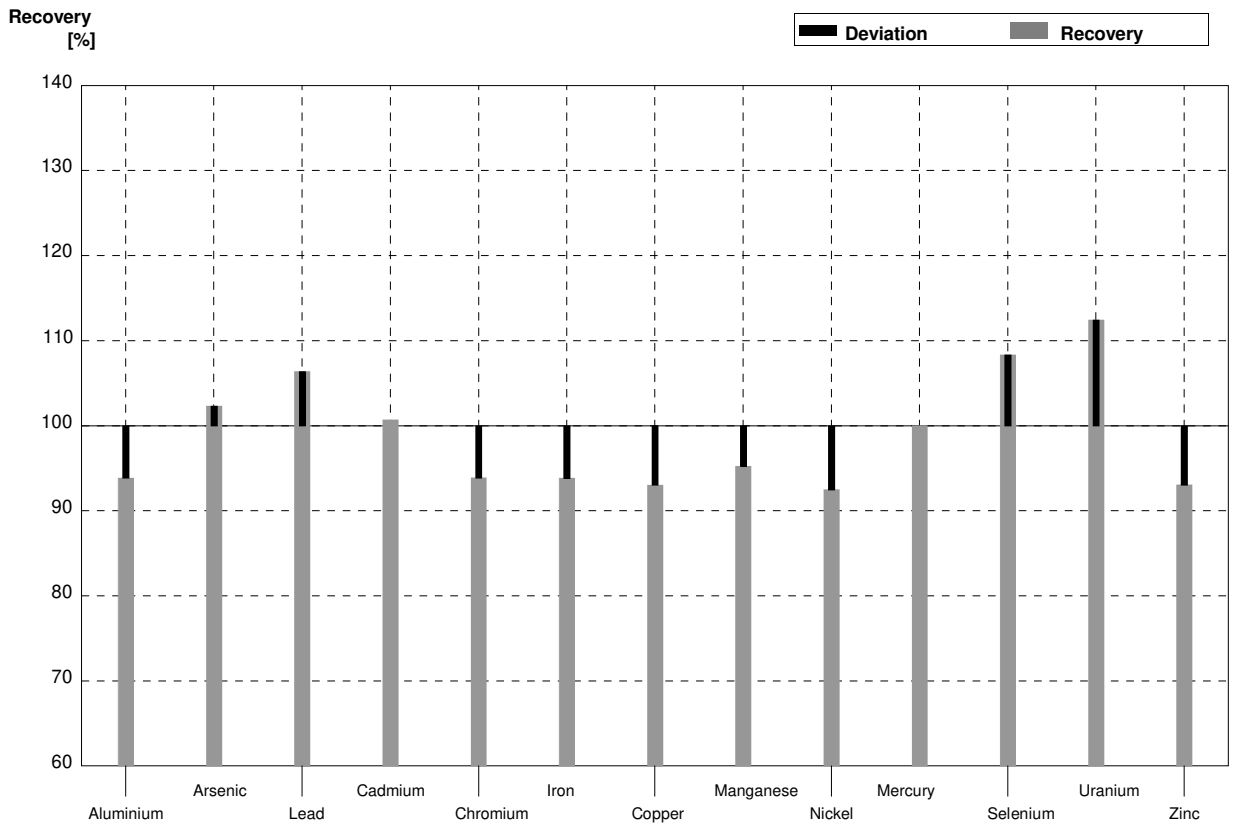
Sample M178B
Laboratory X

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2			$\mu\text{g/l}$	
Arsenic	1,592	0,016			$\mu\text{g/l}$	
Lead	2,55	0,02			$\mu\text{g/l}$	
Cadmium	1,916	0,014			$\mu\text{g/l}$	
Chromium	1,233	0,013			$\mu\text{g/l}$	
Iron	15,16	0,15			$\mu\text{g/l}$	
Copper	5,28	0,04			$\mu\text{g/l}$	
Manganese	15,10	0,11			$\mu\text{g/l}$	
Nickel	9,06	0,06			$\mu\text{g/l}$	
Mercury	1,004	0,016	0,92	0,18	$\mu\text{g/l}$	92%
Selenium	1,95	0,02			$\mu\text{g/l}$	
Uranium	2,391	0,018			$\mu\text{g/l}$	
Zinc	17,2	0,6			$\mu\text{g/l}$	



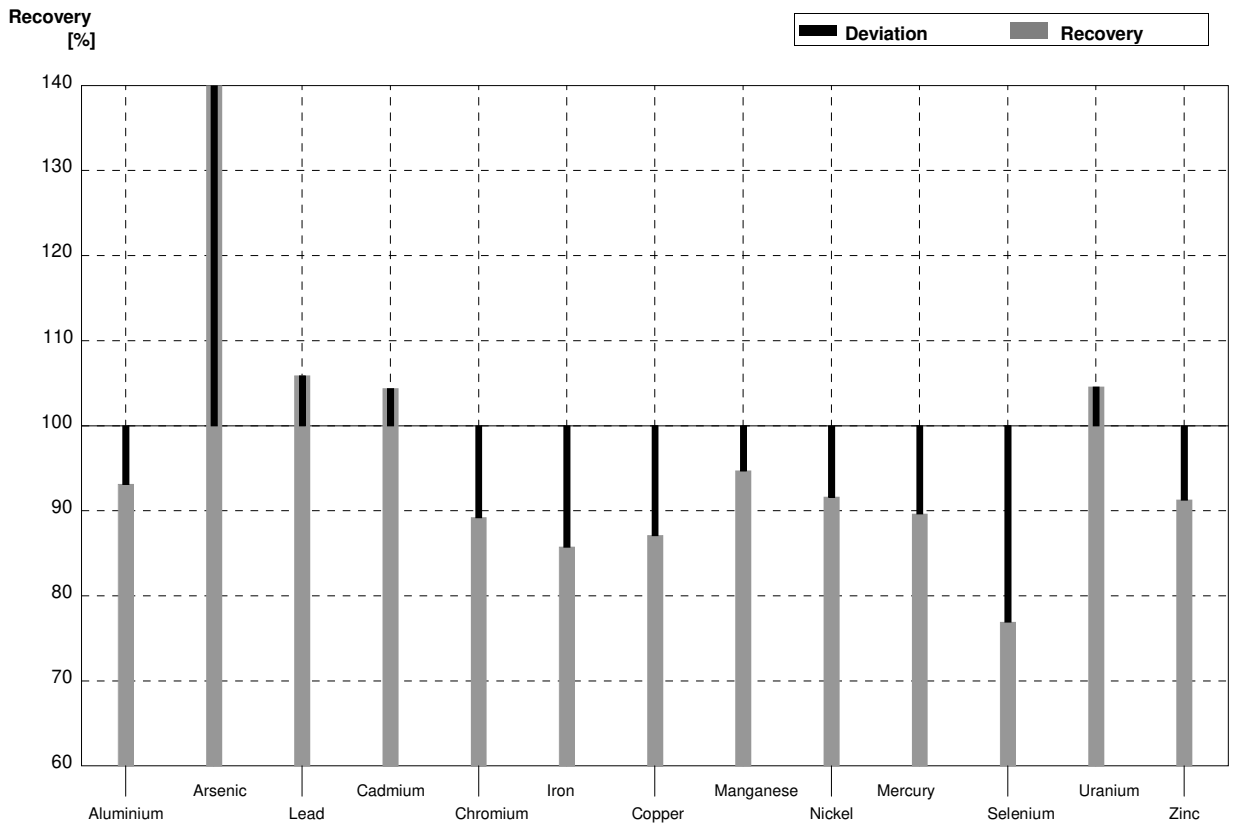
Sample M178A
Laboratory Y

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	11,6	1,32	$\mu\text{g/l}$	94%
Arsenic	1,075	0,015	1,10	0,06	$\mu\text{g/l}$	102%
Lead	4,23	0,03	4,50	0,29	$\mu\text{g/l}$	106%
Cadmium	0,993	0,011	1,00	0,05	$\mu\text{g/l}$	101%
Chromium	4,58	0,03	4,30	0,51	$\mu\text{g/l}$	94%
Iron	45,5	0,2	42,7	5,08	$\mu\text{g/l}$	94%
Copper	3,44	0,03	3,20	0,30	$\mu\text{g/l}$	93%
Manganese	21,94	0,13	20,9	1,38	$\mu\text{g/l}$	95%
Nickel	3,46	0,03	3,20	0,27	$\mu\text{g/l}$	92%
Mercury	1,800	0,018	1,80	0,37	$\mu\text{g/l}$	100%
Selenium	1,20	0,02	1,30	0,01	$\mu\text{g/l}$	108%
Uranium	4,98	0,03	5,60	0,56	$\mu\text{g/l}$	112%
Zinc	56	1	52,1	7,35	$\mu\text{g/l}$	93%



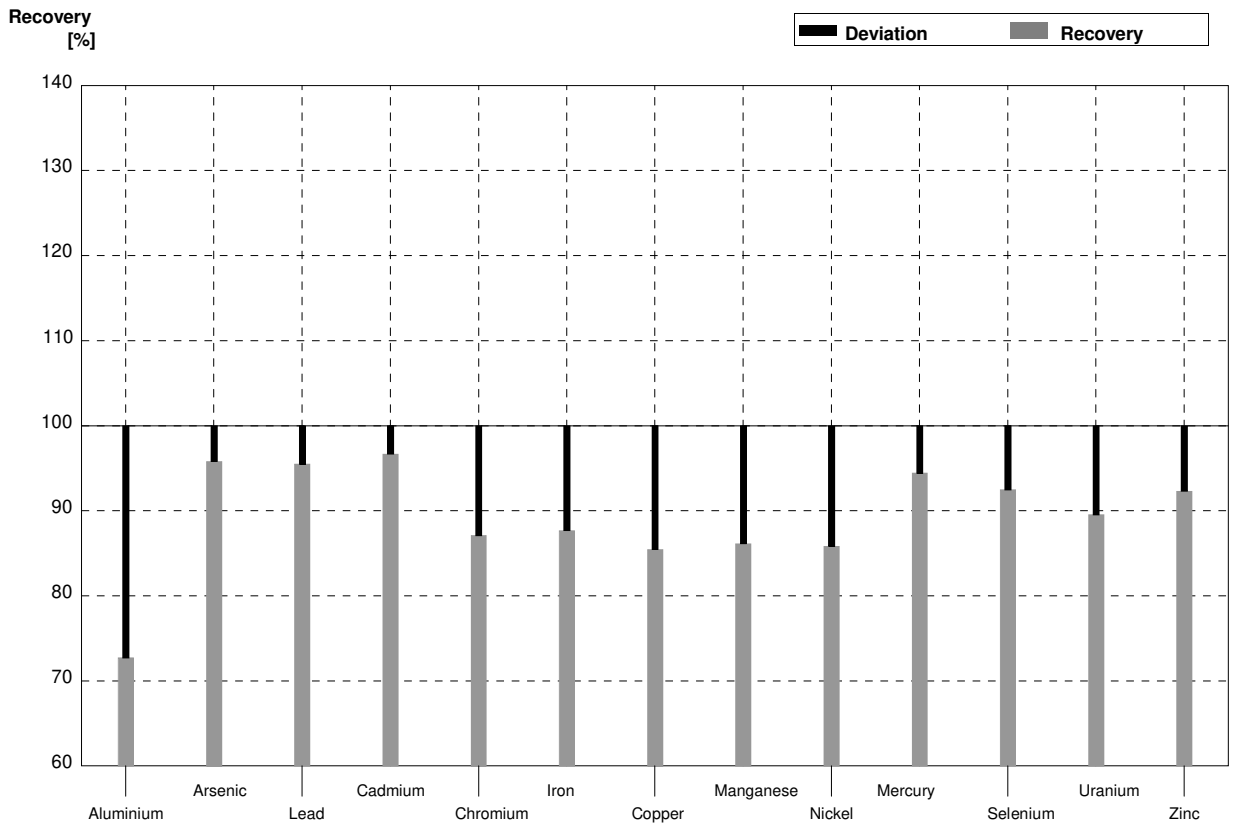
Sample M178B
Laboratory Y

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	19,0	2,17	$\mu\text{g/l}$	93%
Arsenic	1,592	0,016	3,00	0,16	$\mu\text{g/l}$	188%
Lead	2,55	0,02	2,70	0,18	$\mu\text{g/l}$	106%
Cadmium	1,916	0,014	2,00	0,10	$\mu\text{g/l}$	104%
Chromium	1,233	0,013	1,10	0,13	$\mu\text{g/l}$	89%
Iron	15,16	0,15	13,0	1,55	$\mu\text{g/l}$	86%
Copper	5,28	0,04	4,60	0,43	$\mu\text{g/l}$	87%
Manganese	15,10	0,11	14,3	0,94	$\mu\text{g/l}$	95%
Nickel	9,06	0,06	8,30	0,69	$\mu\text{g/l}$	92%
Mercury	1,004	0,016	0,90	0,19	$\mu\text{g/l}$	90%
Selenium	1,95	0,02	1,50	0,01	$\mu\text{g/l}$	77%
Uranium	2,391	0,018	2,50	0,25	$\mu\text{g/l}$	105%
Zinc	17,2	0,6	15,7	2,21	$\mu\text{g/l}$	91%



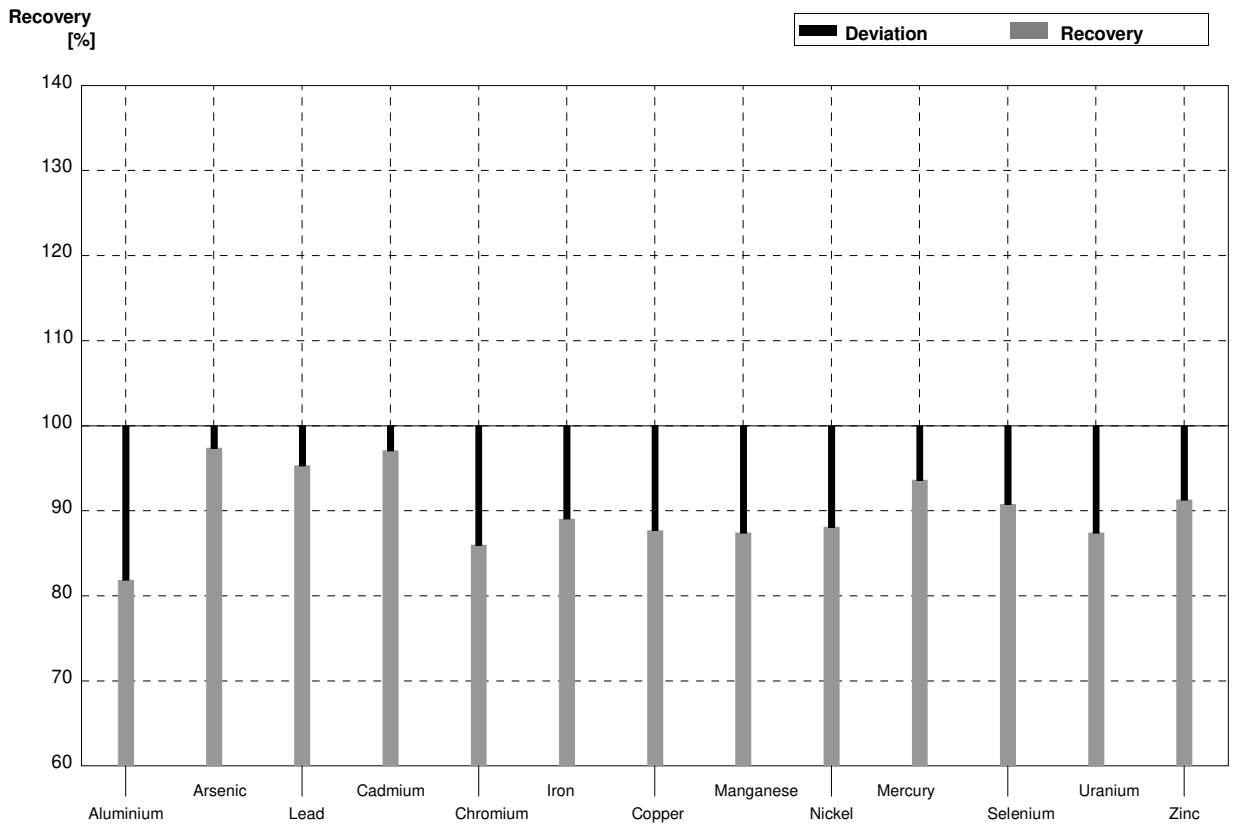
Sample M178A
Laboratory Z

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	12,36	0,18	8,99	0,899	$\mu\text{g/l}$	73%
Arsenic	1,075	0,015	1,03	0,050	$\mu\text{g/l}$	96%
Lead	4,23	0,03	4,04	0,182	$\mu\text{g/l}$	96%
Cadmium	0,993	0,011	0,96	0,015	$\mu\text{g/l}$	97%
Chromium	4,58	0,03	3,99	0,138	$\mu\text{g/l}$	87%
Iron	45,5	0,2	39,9	1,39	$\mu\text{g/l}$	88%
Copper	3,44	0,03	2,94	0,131	$\mu\text{g/l}$	85%
Manganese	21,94	0,13	18,9	0,88	$\mu\text{g/l}$	86%
Nickel	3,46	0,03	2,97	0,083	$\mu\text{g/l}$	86%
Mercury	1,800	0,018	1,70	0,104	$\mu\text{g/l}$	94%
Selenium	1,20	0,02	1,11	0,019	$\mu\text{g/l}$	93%
Uranium	4,98	0,03	4,46	0,351	$\mu\text{g/l}$	90%
Zinc	56	1	51,7	0,66	$\mu\text{g/l}$	92%



Sample M178B
Laboratory Z

Parameter	Assigned value	$\pm U (k=2)$	Result	\pm	Unit	Recovery
Aluminium	20,4	0,2	16,7	0,89	$\mu\text{g/l}$	82%
Arsenic	1,592	0,016	1,55	0,042	$\mu\text{g/l}$	97%
Lead	2,55	0,02	2,43	0,170	$\mu\text{g/l}$	95%
Cadmium	1,916	0,014	1,86	0,037	$\mu\text{g/l}$	97%
Chromium	1,233	0,013	1,06	0,047	$\mu\text{g/l}$	86%
Iron	15,16	0,15	13,5	0,43	$\mu\text{g/l}$	89%
Copper	5,28	0,04	4,63	0,108	$\mu\text{g/l}$	88%
Manganese	15,10	0,11	13,2	0,49	$\mu\text{g/l}$	87%
Nickel	9,06	0,06	7,98	0,186	$\mu\text{g/l}$	88%
Mercury	1,004	0,016	0,94	0,080	$\mu\text{g/l}$	94%
Selenium	1,95	0,02	1,77	0,018	$\mu\text{g/l}$	91%
Uranium	2,391	0,018	2,09	0,359	$\mu\text{g/l}$	87%
Zinc	17,2	0,6	15,7	1,73	$\mu\text{g/l}$	91%





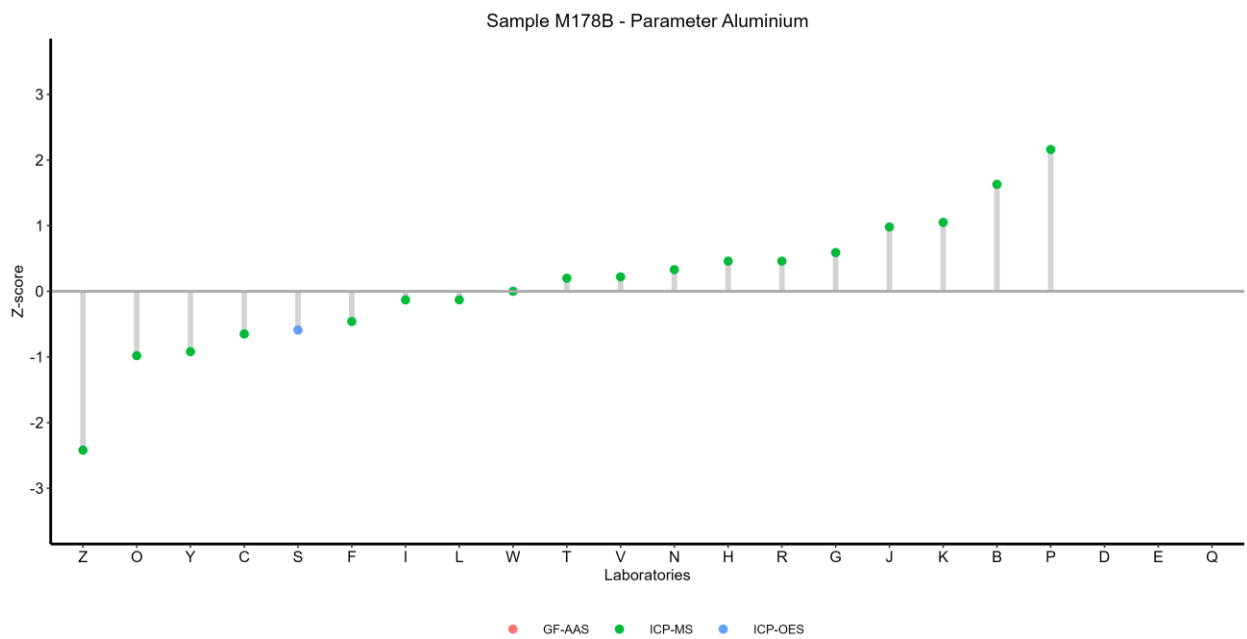
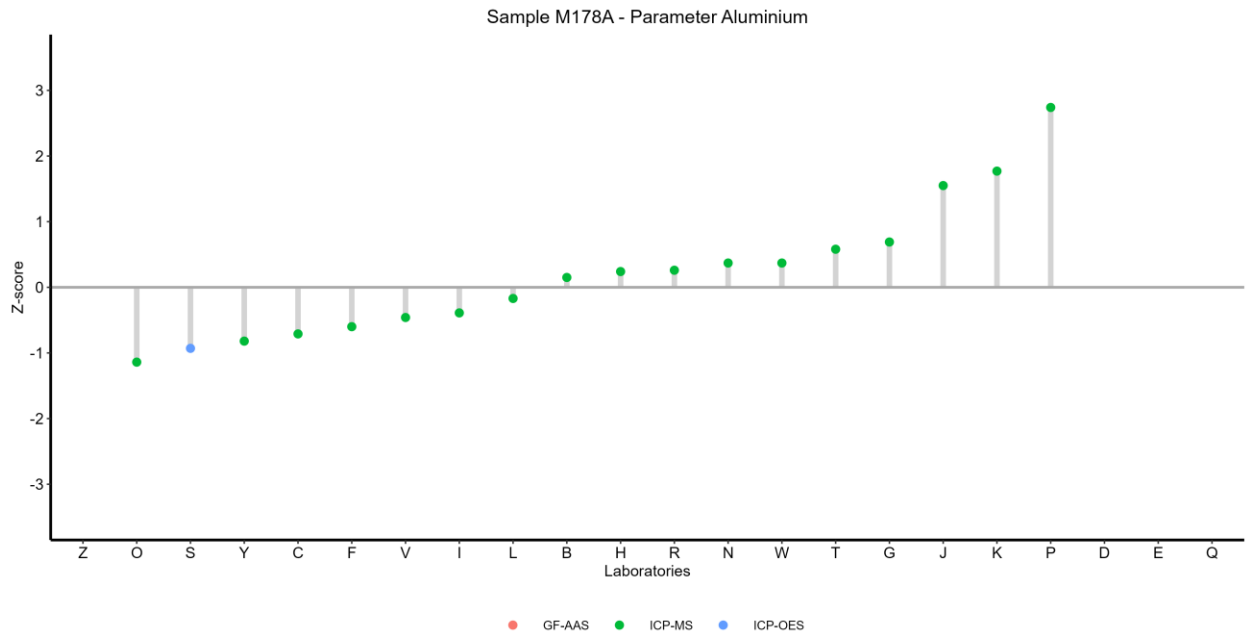
Methodenvergleich
Method comparison

Eignungsprüfungsrunde / Proficiency testing round
M178

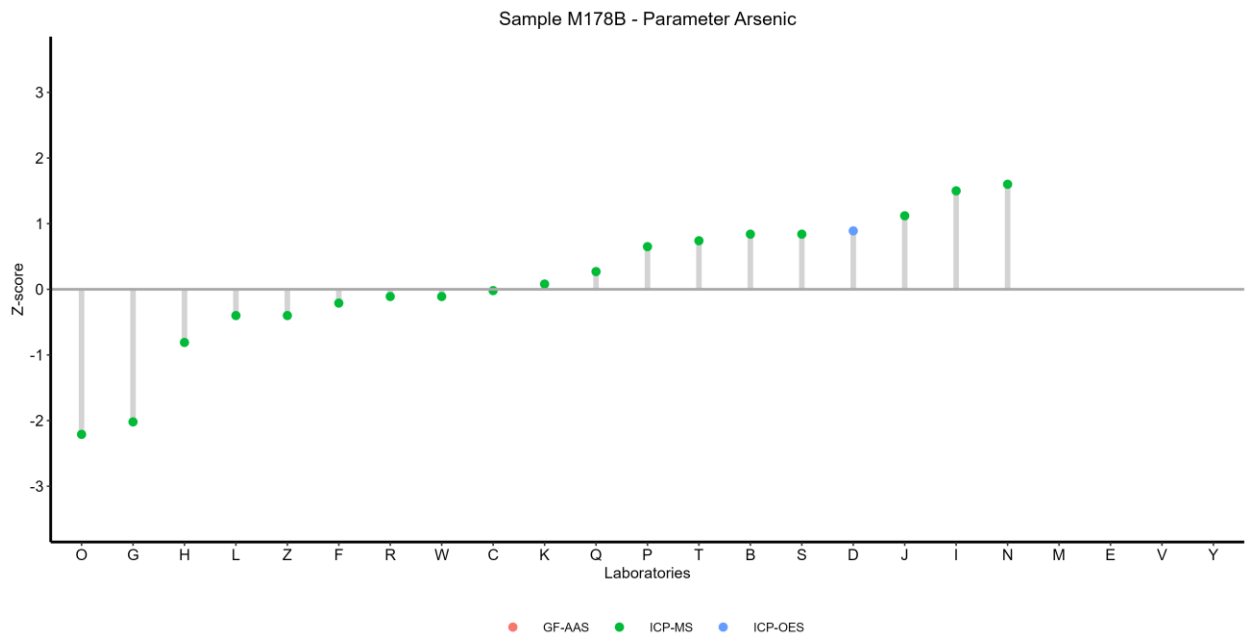
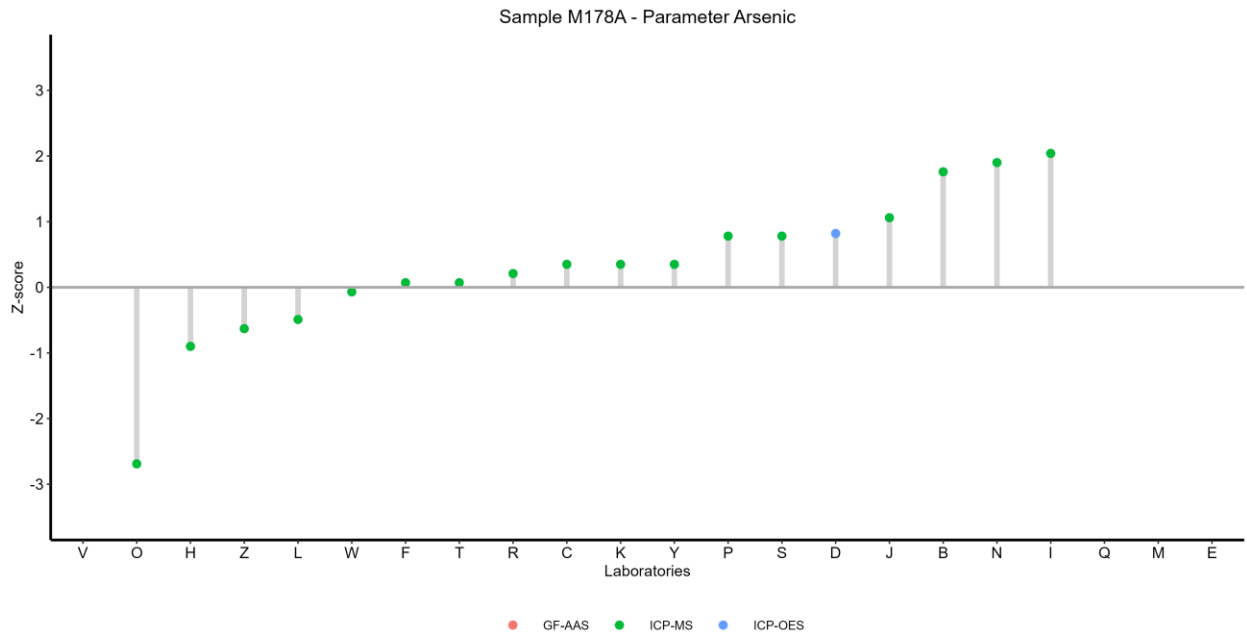
Metalle / Metals

Versand / Dispatch: 08.09.2025

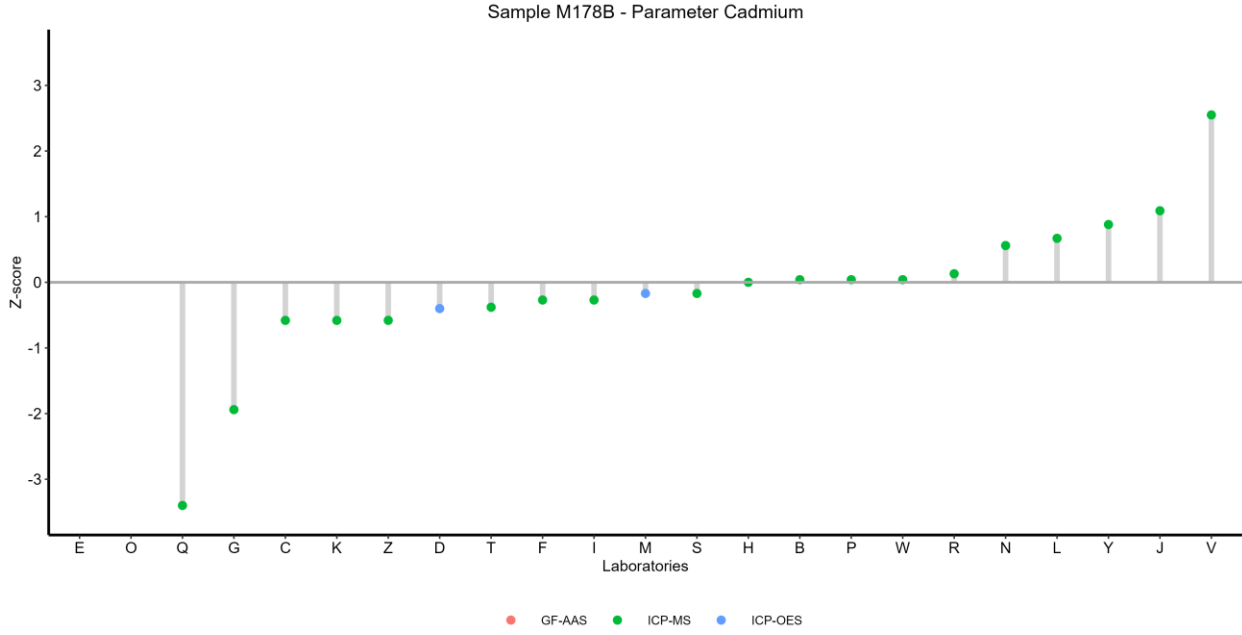
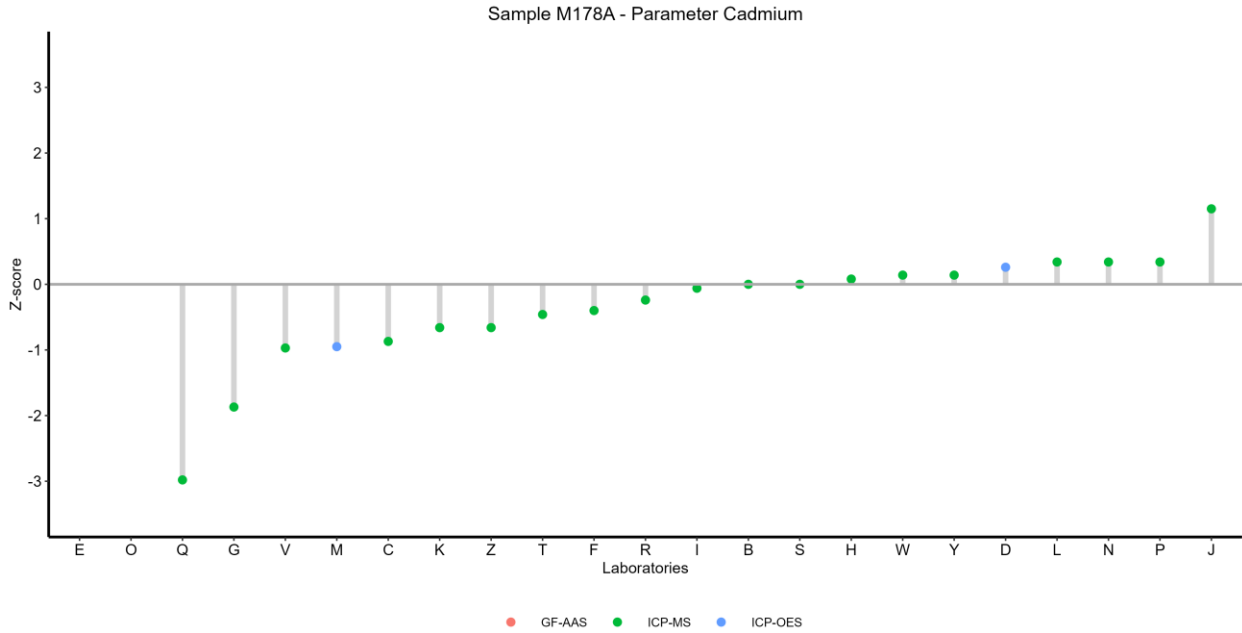
Aluminium



Arsenic

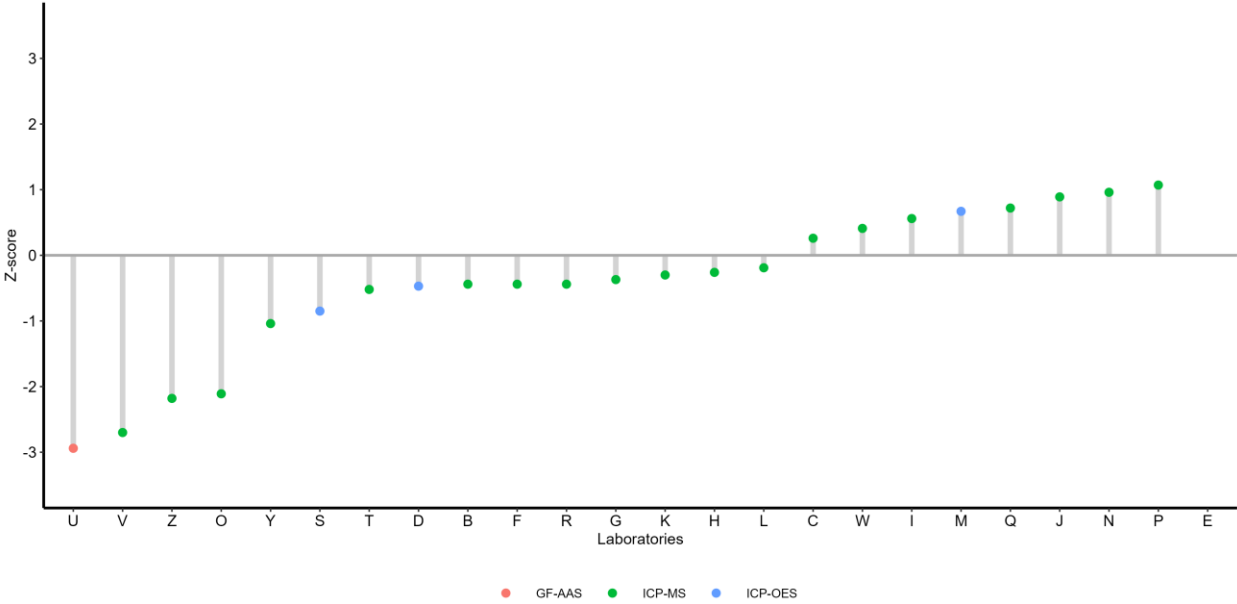


Cadmium

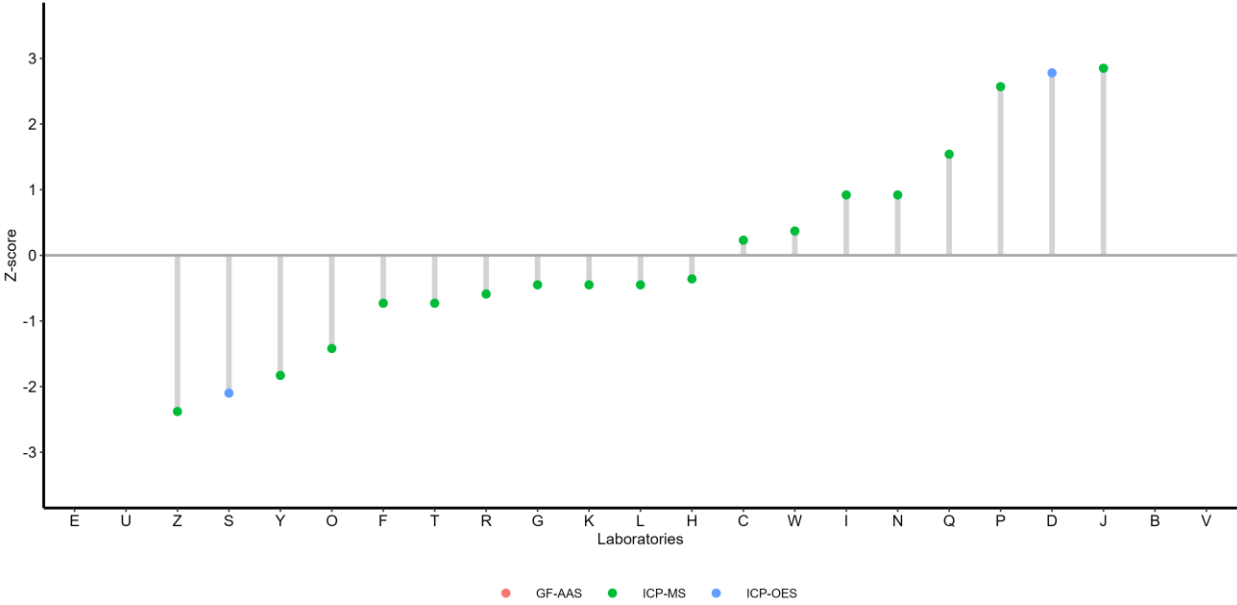


Chromium

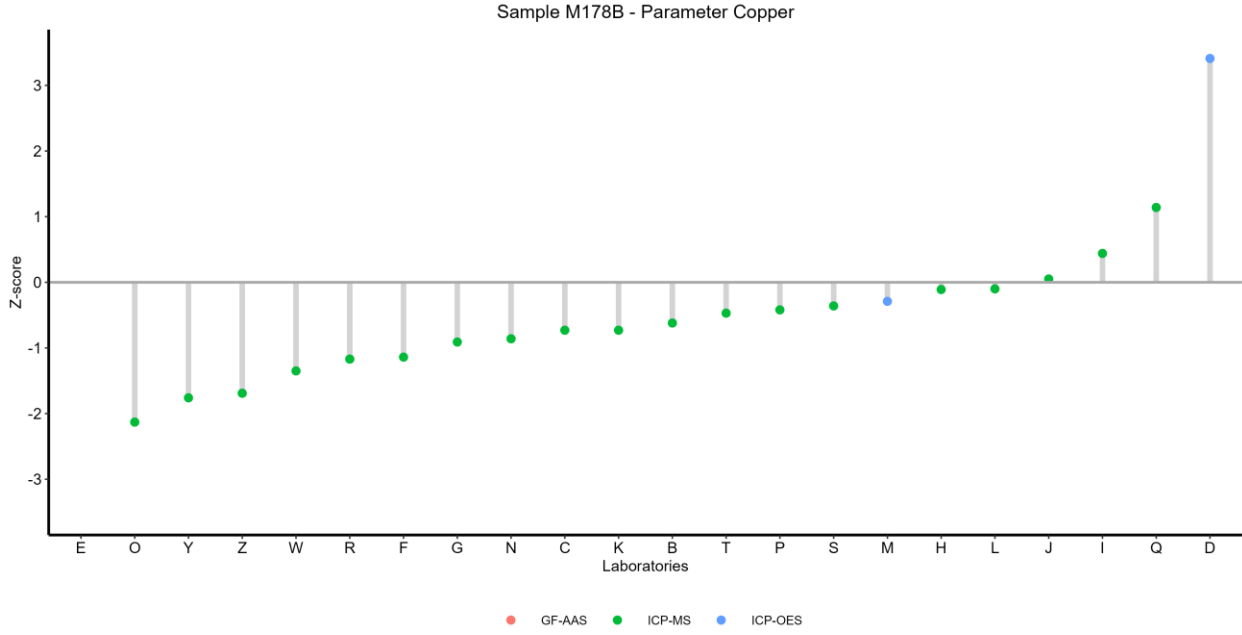
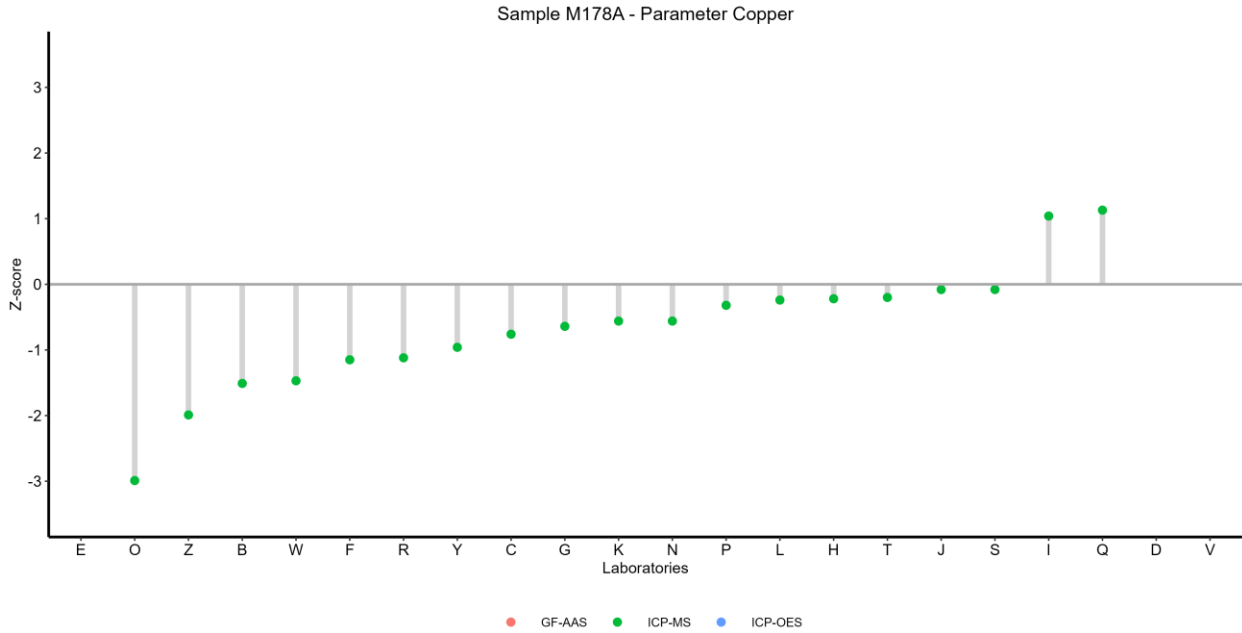
Sample M178A - Parameter Chromium



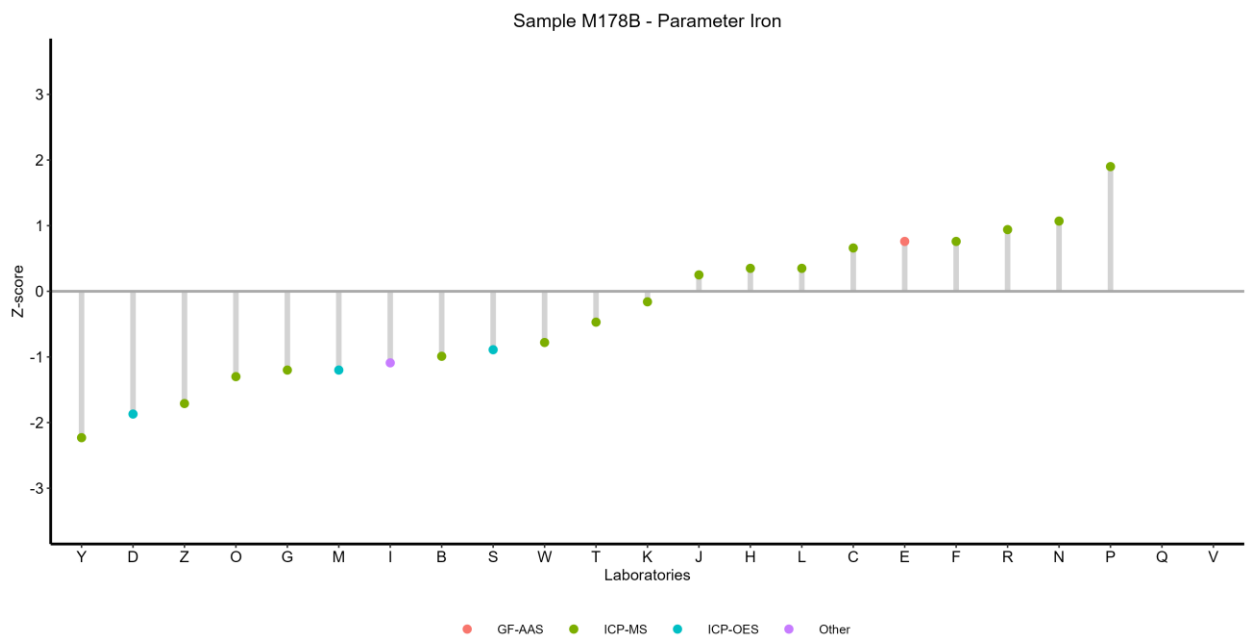
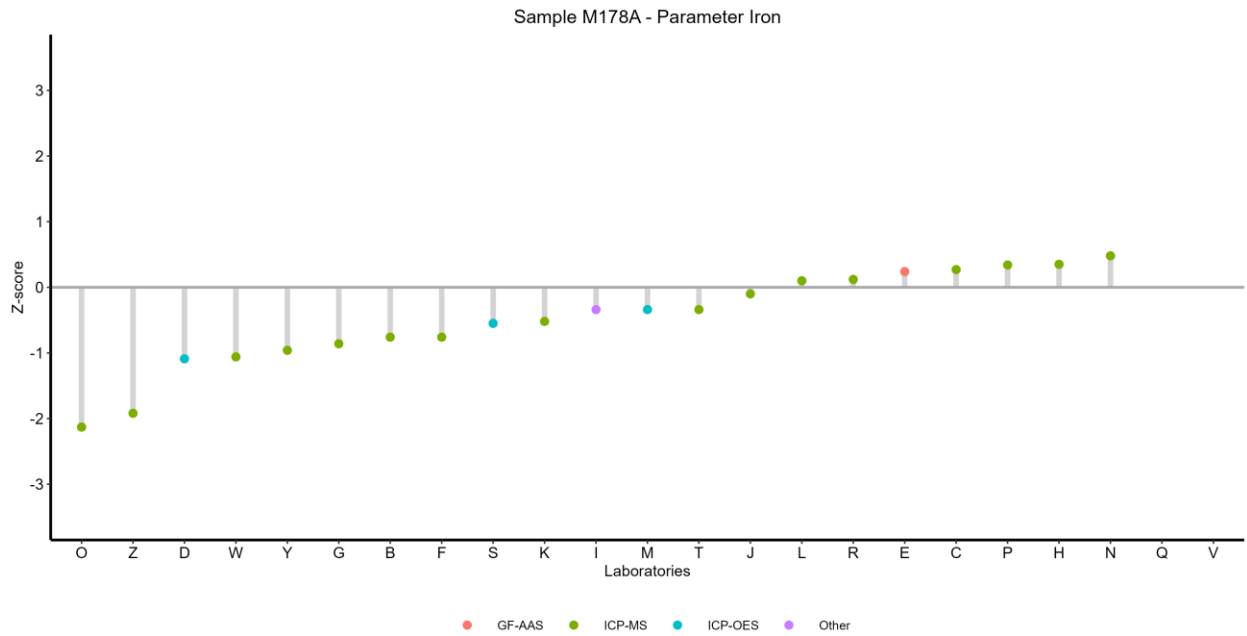
Sample M178B - Parameter Chromium



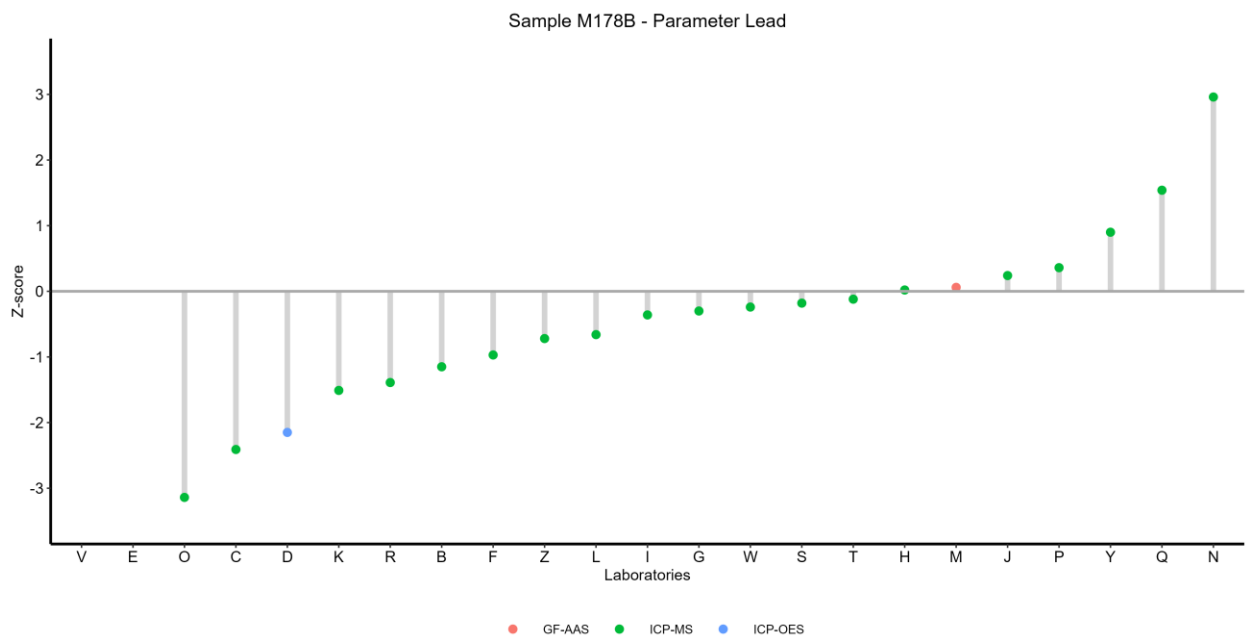
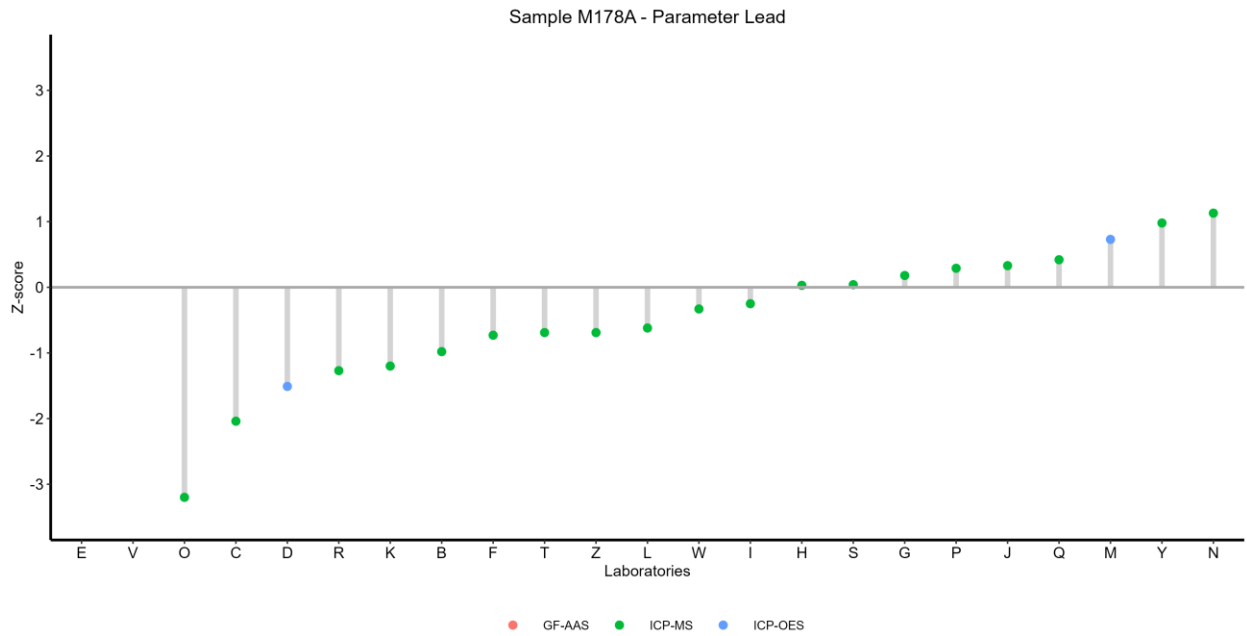
Copper



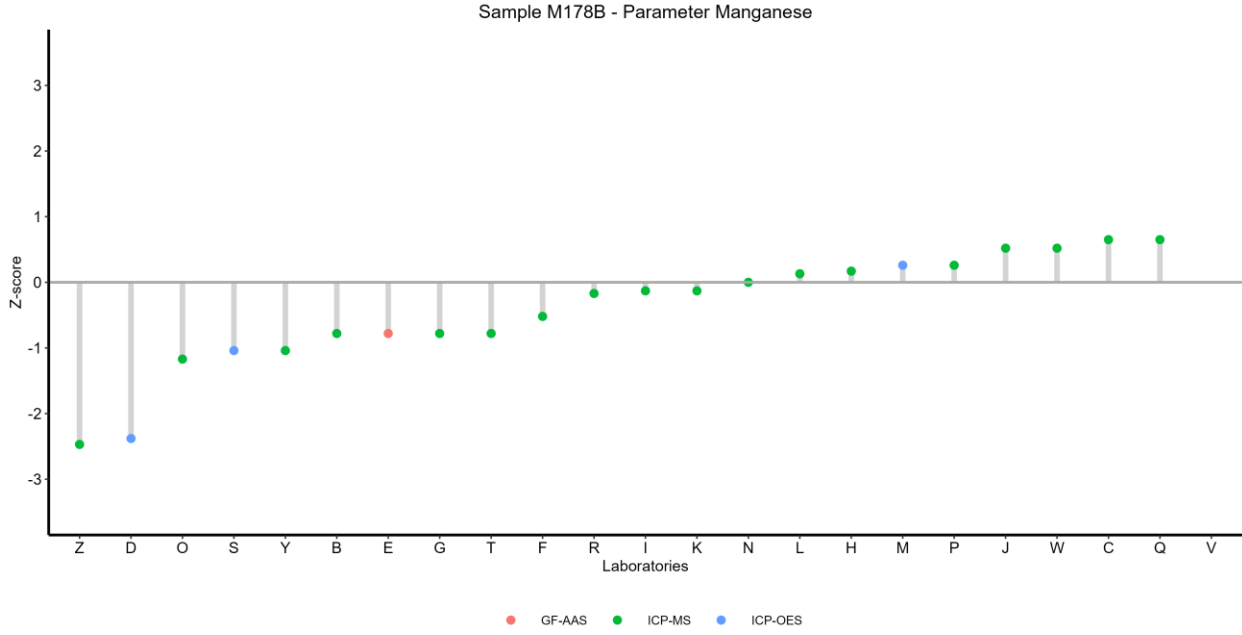
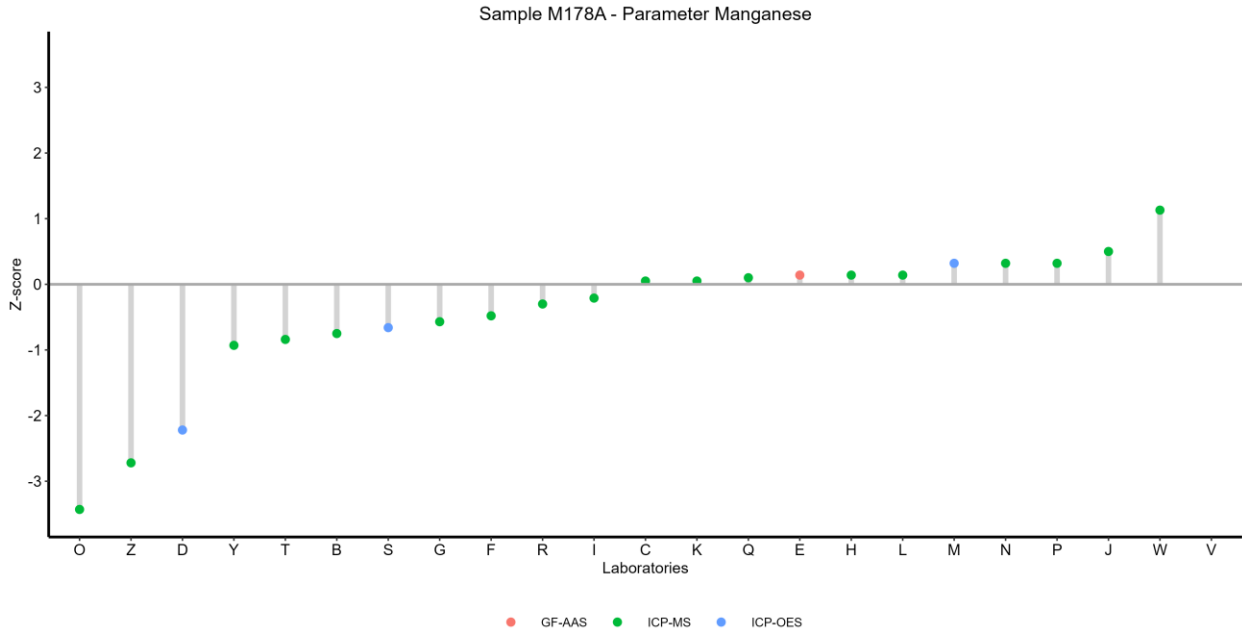
Iron



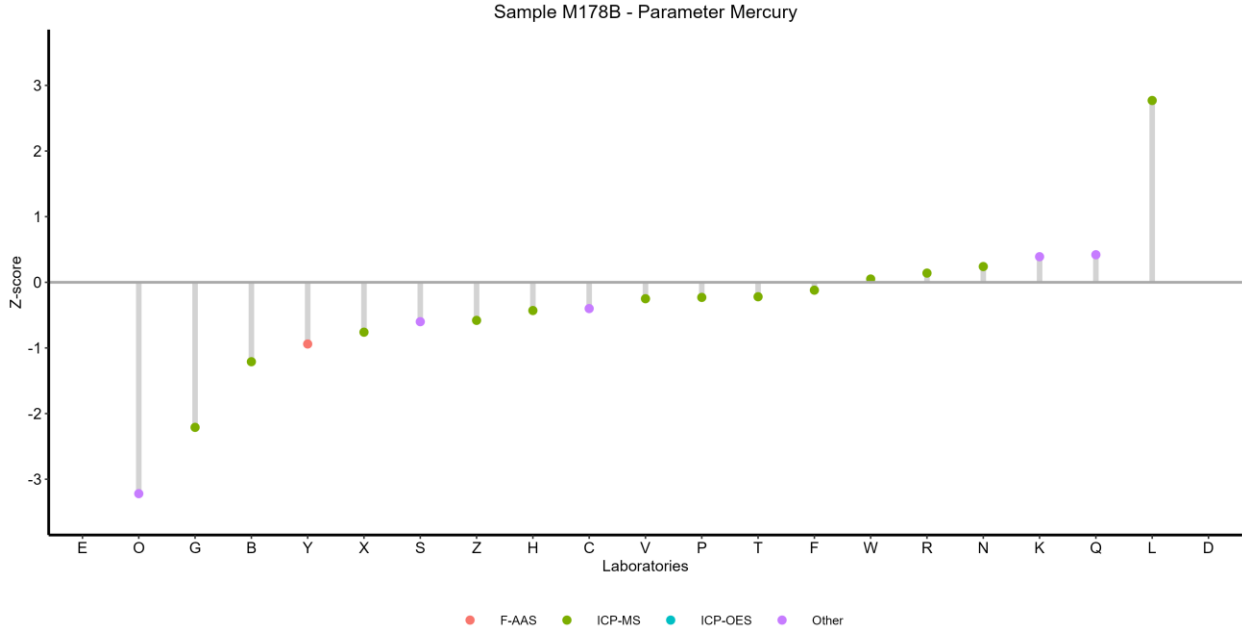
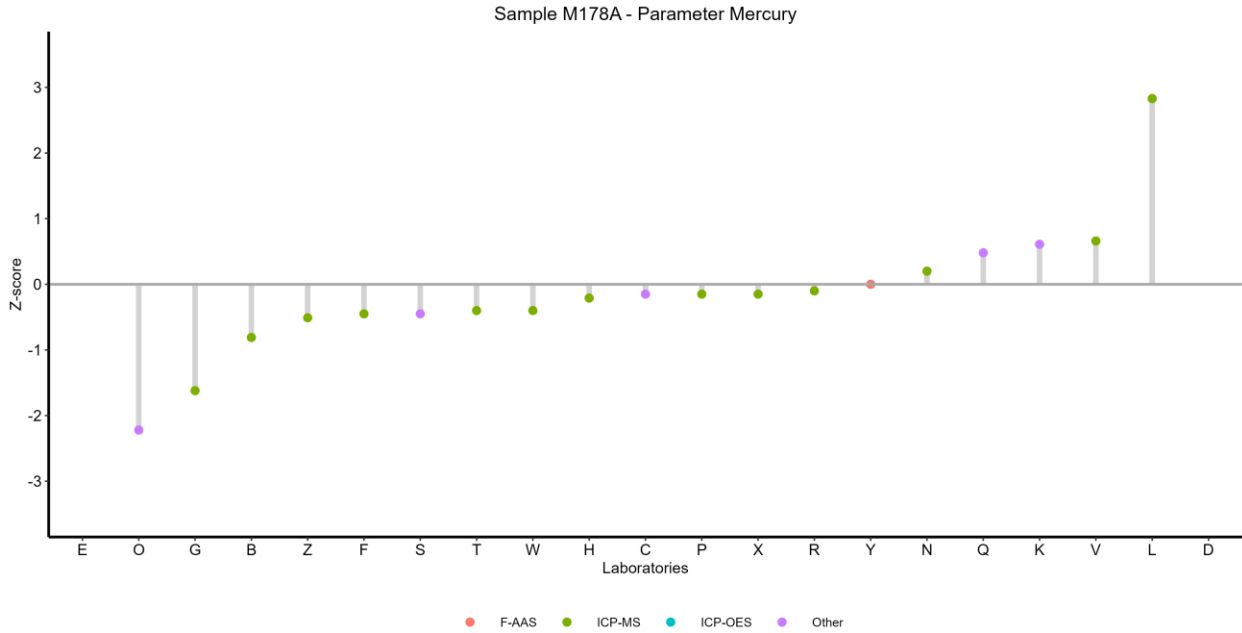
Lead



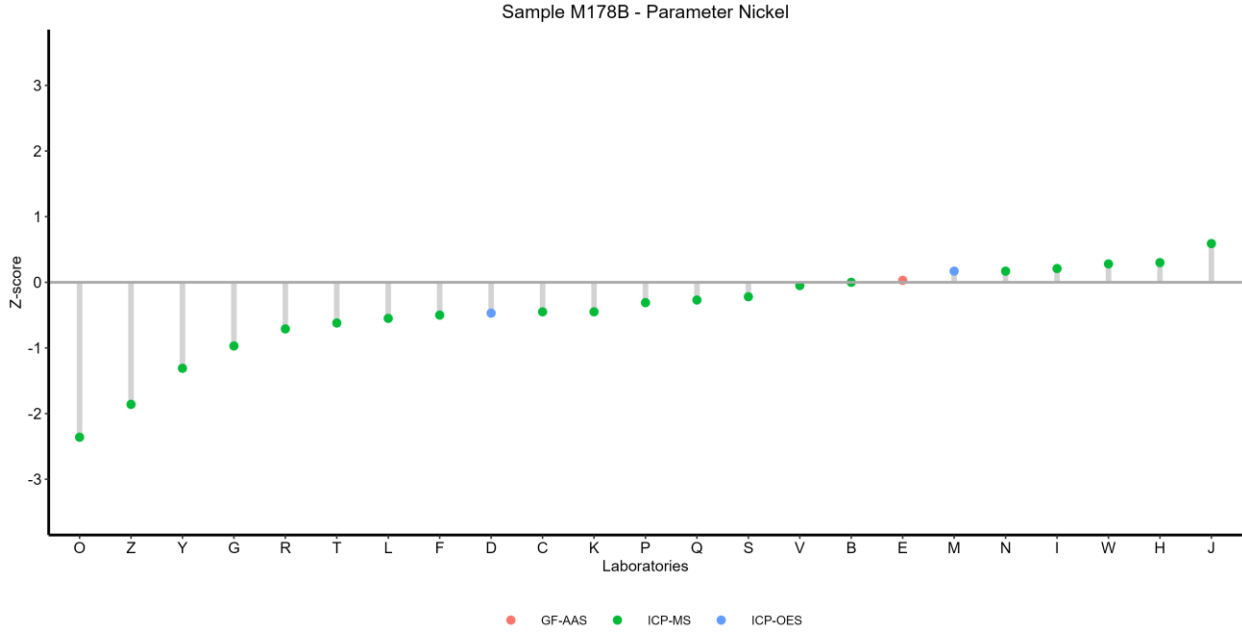
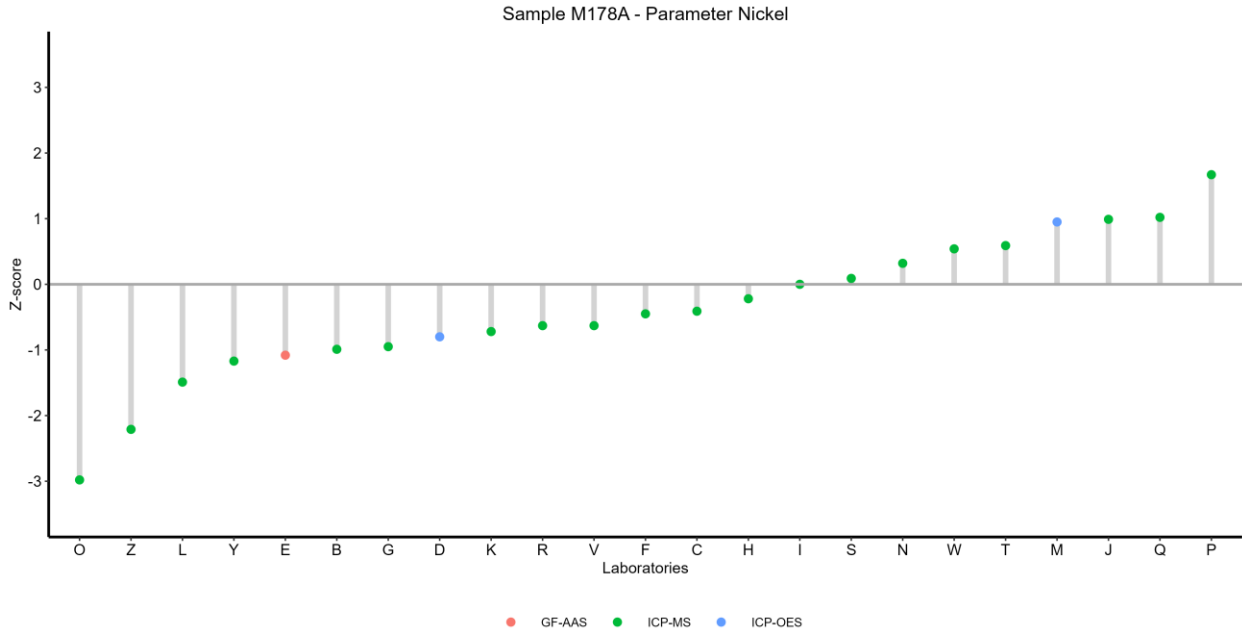
Manganese



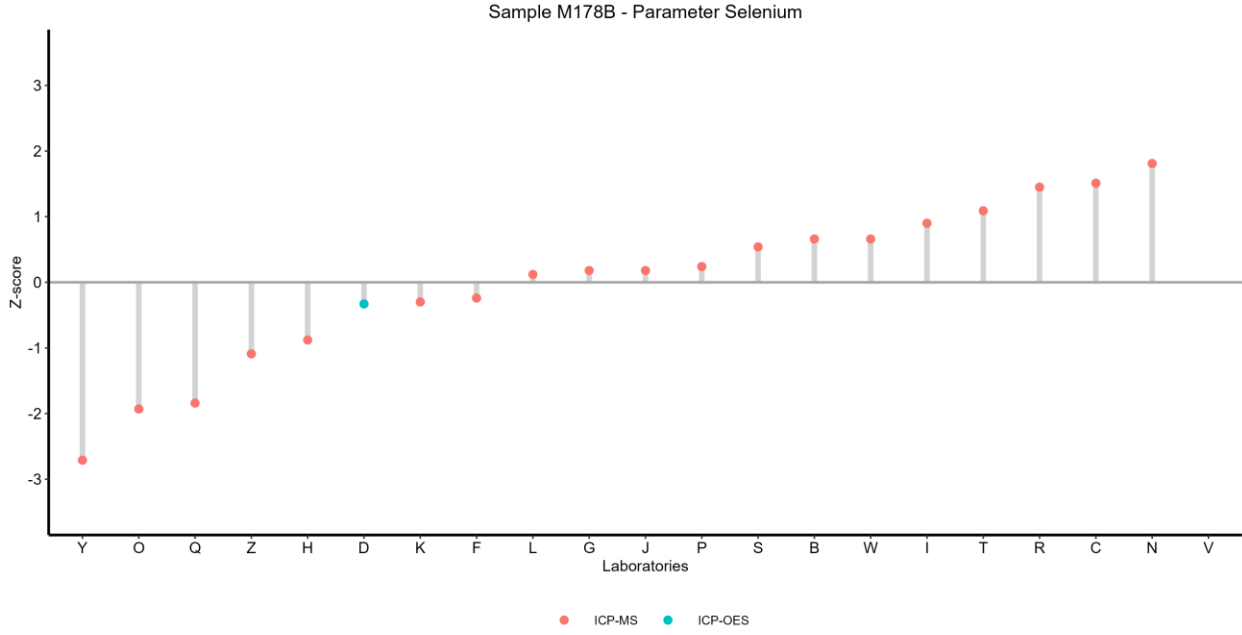
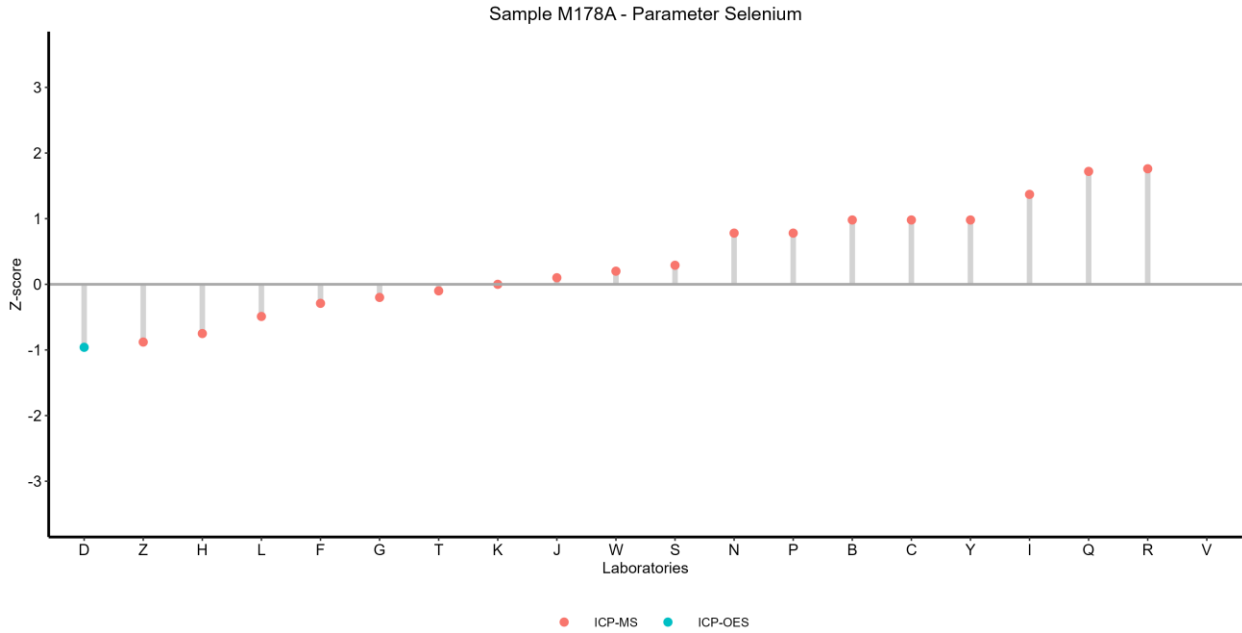
Mercury



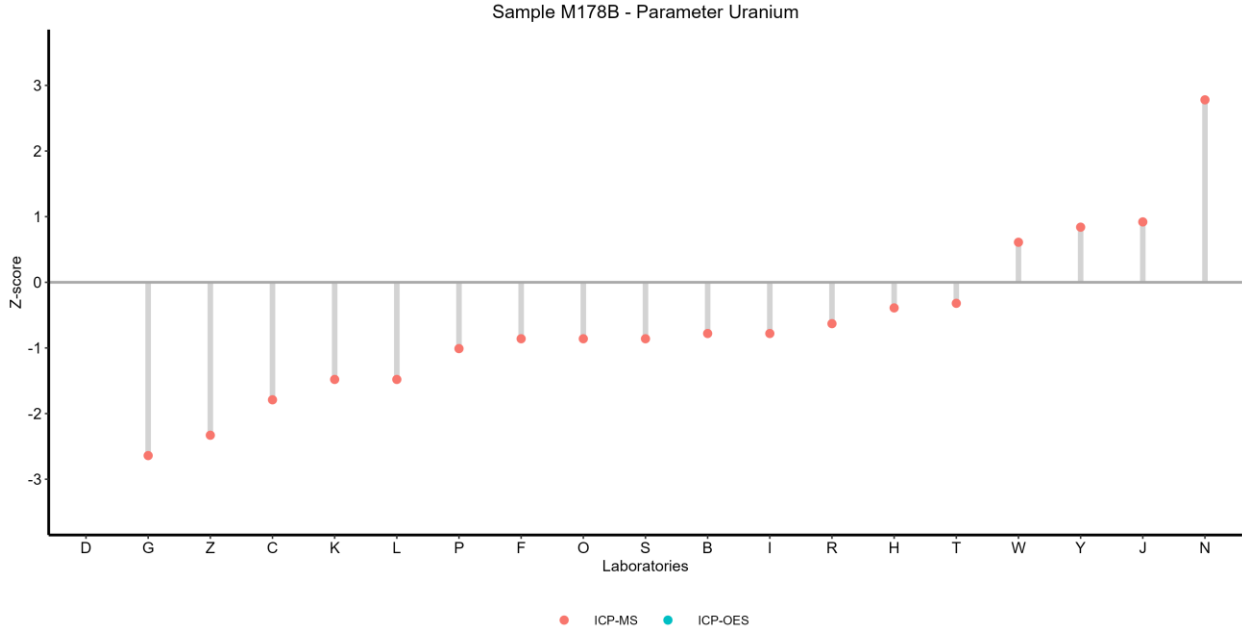
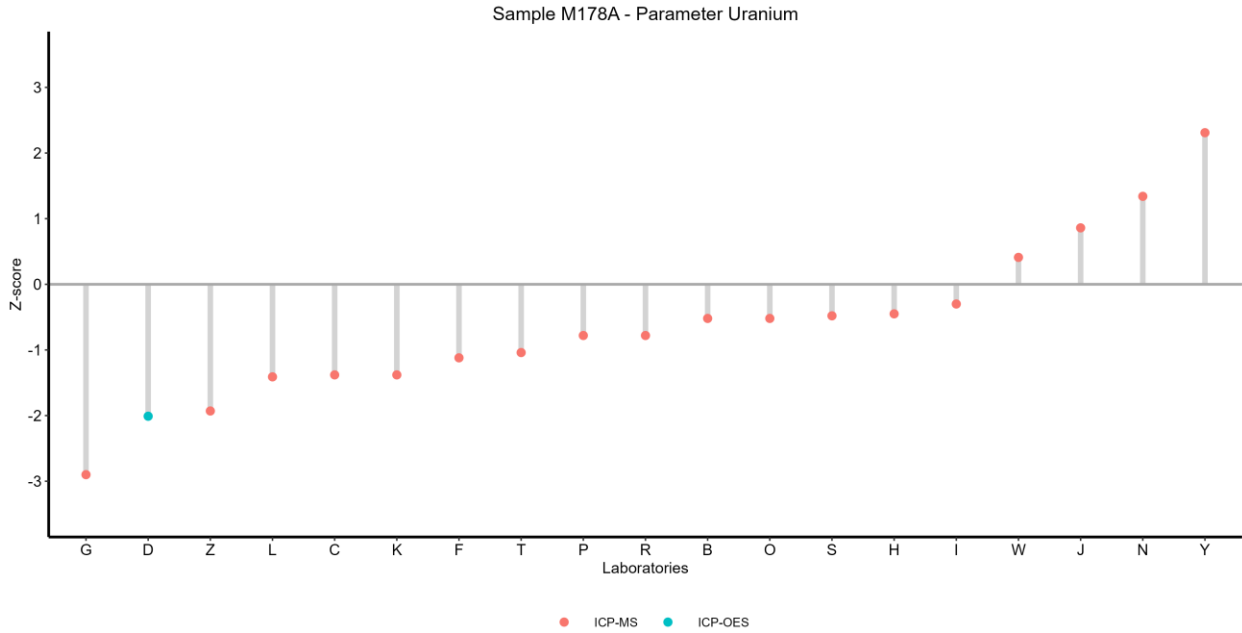
Nickel



Selenium



Uranium



Zinc

