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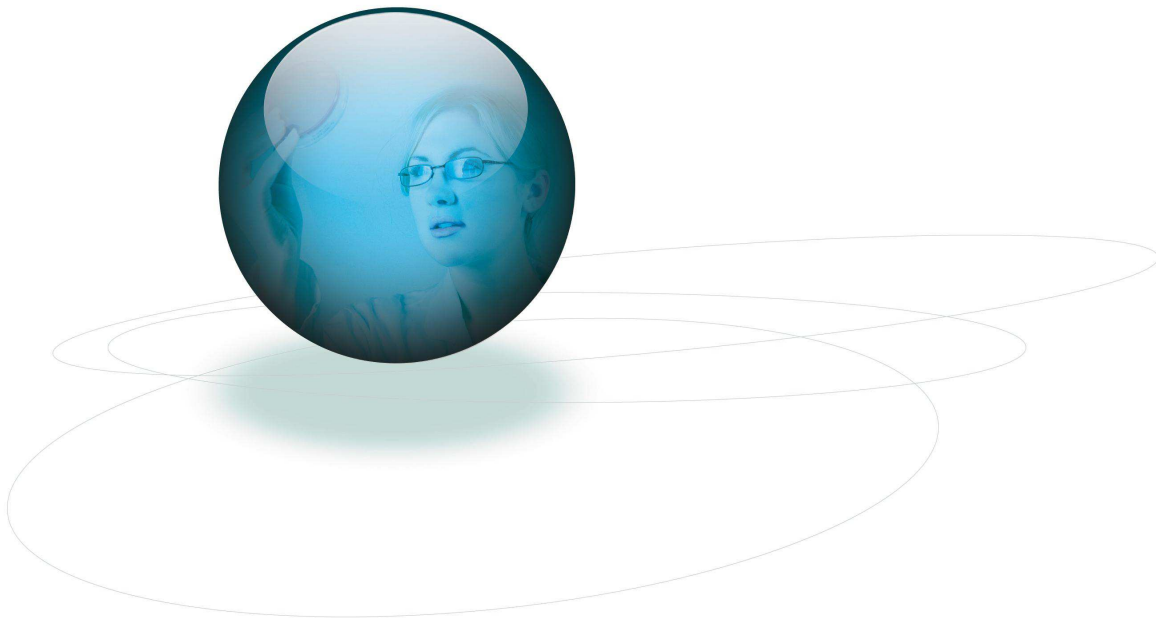


# PT-WFD

## Organotins in Surface Water

Issue Number: 2

Issued: 17 February 2011



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## Scheme Information

### Aims of Scheme

To check the chemical analysis of priority and other substances in the context of chemical monitoring for the European Water Framework Directive, especially for compliance of surface waters with Environmental Quality Standards (EQS)

Further information on the PT organisation and the statistical analysis of data is available in the Organotin data sheet, the LGC PT General Protocol and the PT-WFD 'Technical Agreement'.

### Cooperation partners

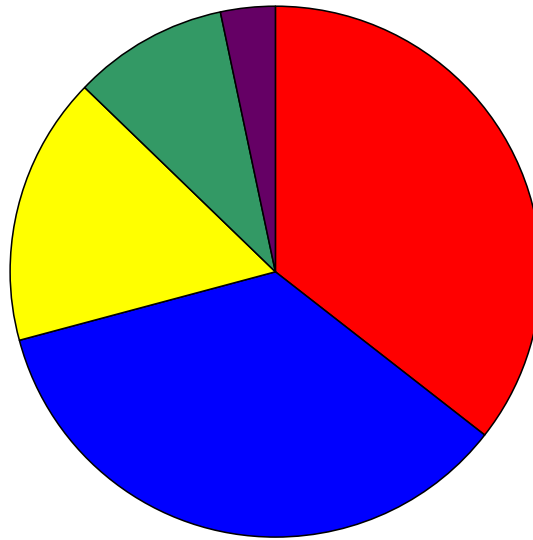
This PT is accomplished in cooperation with the following organisations of the "PT-WFD"-network:

- BIPEA, 6-14 avenue Louis Roche, F-92230 Gennevilliers, FRANCE, Tel.: +33 1 47 33 54 60, Fax : +33 1 40 86 92 59, [contact@bipea.org](mailto:contact@bipea.org)
- BSG Institute for Hygiene and Environment Hamburg, Marckmannstr. 129 b, D-20539 Hamburg, GERMANY, Tel: +49 40 42845-3645; Fax: +49 40 42845-3847; e-mail: [karla.ludwig-baxter@hu.hamburg.de](mailto:karla.ludwig-baxter@hu.hamburg.de)
- Kemijski inštitut Ljubljana 1001 Ljubljana, Hajdrihova 19, p.p.660, SLOVENIA, Tel.: +386 1 476 02 00, Fax: +386 1 476 03 00, mail: [info@ki.si](mailto:info@ki.si)
- QualityConsult, Via G. Bettolo 4, (00195) Rome, ITALY, Tel.: +39 320-6905464, Fax: +39 0697840718, [qualityconsult@aqc.it](mailto:qualityconsult@aqc.it)
- SYKE, Finnish Environment Institute, Hakuninmaantie, 00251 Helsinki, FINLAND, Tel.: +358 20 610 123, Fax: +358 9 448 320, [proftest@environment.fi](mailto:proftest@environment.fi)
- VITUKI Nonprofit Ltd., Quality Assurance and Control, 1095 Budapest, Kvassay J. 1., HUNGARY, Tel: +36 1 215-6140/ext. 2199, Fax: +36 1 215-6046, [mecs@vituki.hu](mailto:mecs@vituki.hu)

### Geographical Distribution of Participants

Company/territory	Number of participants
LGC Standards/UK	11
BSG/Germany	11
Bipea/France	5
SYKE/Finland	3
National Institute of Chemistry/Slovenija	1

Geographical Distribution of Participants



■ LGC Standards/UK ■ BSG/Germany ■ Bipea/France ■ SYKE/Finland ■ National Institute of Chemistry/Slovenija

### Performance Assessment

Once a PT round has closed, the results will be analysed and the assigned value determined, according to the criteria given in the Scheme Description.

For quantitative data, the participant's result,  $x$ , is converted into a  $z$  score using the following formula;

$$z = \frac{(x - X)}{SDPA}$$

$X$  = Assigned value

SDPA = Standard deviation for proficiency assessment

The statistical evaluation of the PT is carried out using the Algorithm A mean of all data as assigned value  $X$  according to ISO 13528 (Annex C), a robust statistical method. The standard deviation for proficiency assessment (SDPA) is calculated in compliance with the requirements of the "PT-WFD"- network:  $SDPA = 0.25 * X$ .

For the purposes of performance assessment for a single round,  $z$  scores are interpreted as follows:

<b>z score</b>	<b>Interpretation</b>	<b>Colour coding</b>
$ z  \leq 2.00$	Satisfactory result	Green
$2.00 <  z $ and $< 3.00$	Questionable result	Amber
$ z  \geq 3.00$	Unsatisfactory result	Red
No score given	See below	No colour coding

Results reported as below (<) limit of quantification will be assessed as "unsatisfactory".

Performance scores will not be given for the following:

- For quantitative results where the analyte under test is not present in the test material and thus participants should report their result as a less than value based on the detection limit of the test method used. Such results cannot be allocated a performance score; however, participants should easily be able to assess their own performance based on the assigned result and also compare their result to those reported by other participants.
- For quantitative results where non-numerical results are reported e.g. <1, >300. In these cases, it is not possible to allocate a performance score and participants should assess their performance based on the assigned value and satisfactory range given.
- Results of zero; such a result is not normally appropriate and should not be reported i.e. the result should be reported as less than the detection limit rather than zero.  
Note: for a very small number of analytes it may be appropriate to report a result of zero, depending on the type of measurement scale being used.

In some cases, performance scores may not be provided or may be provided but with colour coding suspended (indicating that scores need to be interpreted with caution). For example:

- For small data sets where less than a defined number of results have been submitted and the assigned value is derived using a consensus value from the participants' results. In these circumstances, there may be increased uncertainty of the assigned value, given the low number of participants, and performance scores will be given for information only.
- In cases where the distribution of the results gives cause for concern e.g. bi-modal data sets. These circumstances will be dependent on the statistical design that is in place.
- If the assigned value falls below a concentration threshold (only applies to some schemes).

In these or similar circumstances, further explanation as to the reasons for suspension of performance scoring or colour coding, and on the interpretation of results, will be given in the report.

Note: Data displayed in the report will have been rounded to the required number of decimal places. However statistical calculations will have been performed on unrounded data. For this reason, there may appear to be differences between displayed data and calculated data, but this does not affect results in any way.

### **Confidentiality**

A unique laboratory reference code is used to report results in order to ensure confidentiality.

### **Contact details**

The Technical Scheme Coordinator is Helen Finch

Please contact [customerservices@lqcpt.com](mailto:customerservices@lqcpt.com) if you have any questions or comments regarding the scheme.

### **Issue Information:**

Issue 2: Replaces the previously issued version 1 (17/02/2011). Changes have been made to the list of co-operation partners on Page 2, to include, BSG Institute for Hygiene and Environment Hamburg.

Scheme: PT-WFD for Organotins in Surface Water

**Authorisation**

This report was authorised by Matthew Whetton,

A handwritten signature in black ink, appearing to read 'M Whetton', is positioned below the author's name.

Head of Chemistry, LGC Proficiency Testing on 14/03/2011

## Sample details

Samples were despatched on 9 November 2010  
The reporting deadline was 10 December 2010

The following samples were distributed in this PT:

Three different surface water test samples, not containing suspended particulate matter (SPM), at three levels of analyte concentrations in 2000mL, screw capped, glass bottles.

The three different test samples were spiked with organotin reference materials at the following concentrations (ng/L):

Analyte	Sample 1	Sample 2	Sample 3
Dibutyltin	9.57	0.35	0.79
Tributyltin	10.01	1.00	0.20
Diphenyltin	11.17	9.05	1.07
Triphenyltin	2.00	1.63	8.11

Reference standards for all analytes were obtained from Sigma-Aldrich Company Ltd., The Old Brickyard, New Road, Gillingham, Dorset, SP8 4XT.

## Participant Performance Summary details

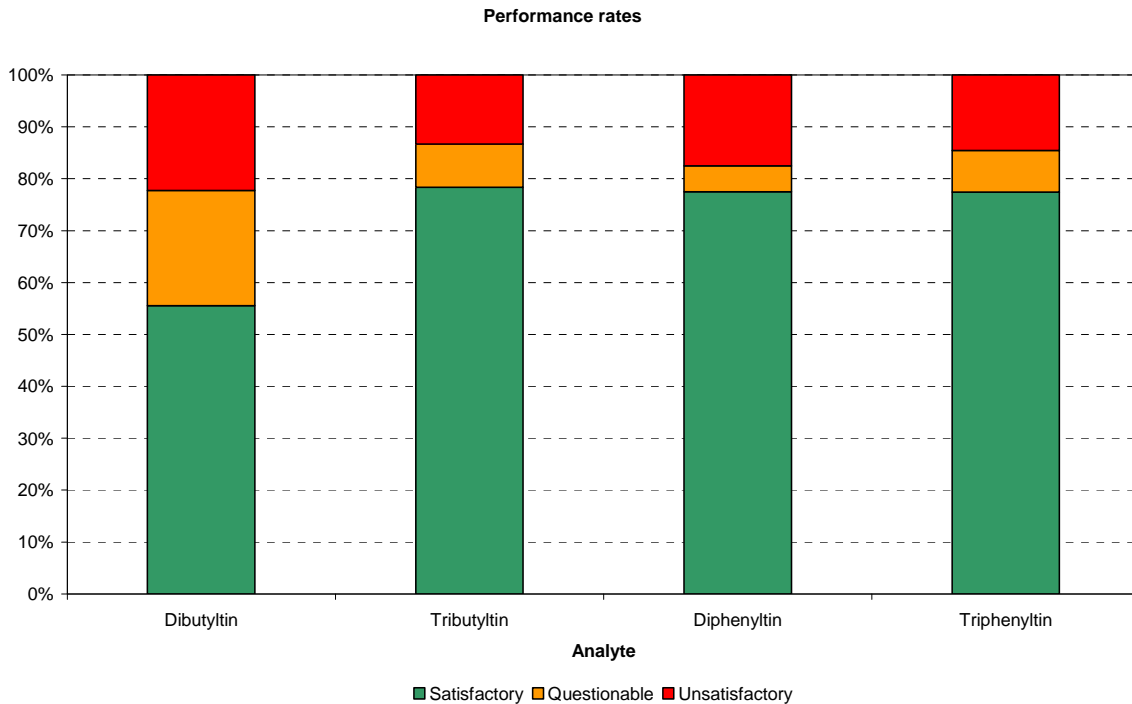
### Performance Rates Summary

Analyte	Number of Satisfactory Results	Number of Questionable Results	Number of Unsatisfactory Results
Dibutyltin	30	12	12
Tributyltin	47	5	8
Diphenyltin	31	2	7
Triphenyltin	48	5	9

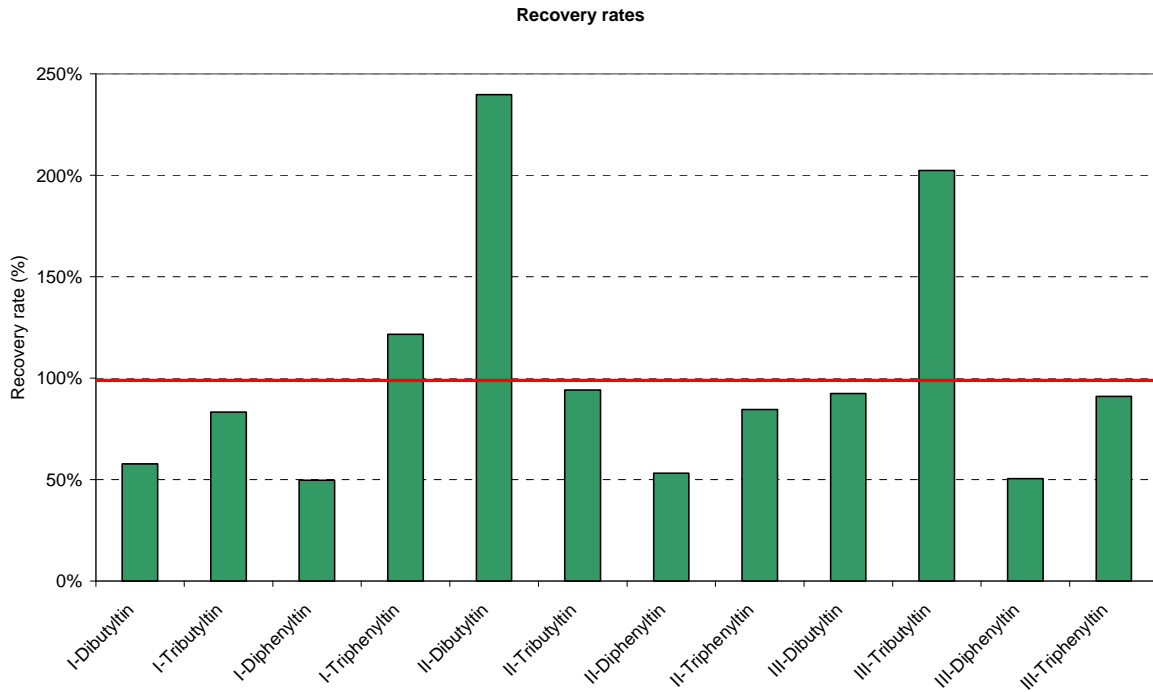
Currently, tributyltin is the only analyte of the four included in this exercise which is listed in the water framework directive list of priority substances. Tributyltin has an Annual Average (AA) EQS level of 0.2ng/L.

Across the three organotin samples, the results returned for dibutyltin received the highest number of questionable and unsatisfactory results, although a large proportion of these came in sample II where a low concentration of dibutyltin was used.

Consistently fewer participants reported results for the diphenyltin analyte than for the three other components, suggesting that this analyte is less regularly sought by laboratories or requested by customers. Participant performance for this analyte is however, comparable to the tributyltin and triphenyltin analytes.



## Recovery Rates



The recovery rates of the spikes added to the test samples were consistent for the tri-substituted compounds, with the exception of the tributyltin in sample III. Average recovery for the tri-substituted compound in all samples, excluding tributyltin in sample III, was 94.9%.

Recovery rates for the di-substituted tin compounds were lower by comparison as the average recovery was between 50-60%.

Where low spiking rates, less than 0.5ng/L, were used in the production of the test materials, dibutyltin in sample II and tributyltin in sample III, recovery rates significantly greater than 100% were observed.

It is not clear from the details provided, whether all participants applied correction for recovery to the results returned, or indeed how any corrections were applied. It is possible that variations in recovery correction would contribute significantly to the errors observed.

**Analytical Method performance**

There are no clear differences in performance between methods used, although it is difficult to assess definitively as a number of the method categories have very few results reported within them. For example, Method 2 (02- NaB(Et)<sub>4</sub> derivatisation, GC/MS-MS) has only two participants reporting results and on a number of occasions the results are below the reporting limits of the laboratories concerned. The number of laboratories submitting results for each method is tabulated in the results for the individual analytes.

For the purposes of comparison the median result for each method is used.

**Dibutyltin (ng/L)**

Method	Sample		
	I	II	III
01- NaB(Et) <sub>4</sub> derivatisation, GC/MS	4.11	0.7	0.61
02- NaB(Et) <sub>4</sub> derivatisation, GC/MS-MS	7.3	-	-
02- NaB(Et) <sub>4</sub> derivatisation, GC/PFPD	4.77	0.41	0.55
04-Other	5.56	0.61	0.6
<b>All</b>	<b>5.56</b>	<b>0.61</b>	<b>0.59</b>

**Tributyltin (ng/L)**

Method	Sample		
	I	II	III
01- NaB(Et) <sub>4</sub> derivatisation, GC/MS	8.56	0.96	0.55
02- NaB(Et) <sub>4</sub> derivatisation, GC/MS-MS	10	-	-
02- NaB(Et) <sub>4</sub> derivatisation, GC/PFPD	5.85	0.69	0.27
04-Other	8.92	0.91	0.24
<b>All</b>	<b>8.56</b>	<b>0.94</b>	<b>0.33</b>

**Diphenyltin (ng/L)**

Method	Sample		
	I	II	III
01- NaB(Et) <sub>4</sub> derivatisation, GC/MS	5.45	4.77	0.54
02- NaB(Et) <sub>4</sub> derivatisation, GC/MS-MS	7.8	8.8	-
02- NaB(Et) <sub>4</sub> derivatisation, GC/PFPD	3.03	2.24	0.34
04-Other	4.83	3.98	0.5
<b>All</b>	<b>5.3</b>	<b>4.3</b>	<b>0.51</b>

**Triphenyltin (ng/L)**

Method	Sample		
	I	II	III
01- NaB(Et) <sub>4</sub> derivatisation, GC/MS	2.17	1.5	7.37
02- NaB(Et) <sub>4</sub> derivatisation, GC/MS-MS	-	-	5.8
02- NaB(Et) <sub>4</sub> derivatisation, GC/PFPD	2.01	1.06	7.48
04-Other	2.96	1.14	7.67
<b>All</b>	<b>2.2</b>	<b>1.34</b>	<b>7.4</b>

Examination of the comments supplied by the participants reporting results in the 'Other' method category shows that these methods are predominantly NaB(Et)<sub>4</sub> derivatisation prior to instrumental analysis using GC/ICP-MS.

**Sample: I****Analyte: Dibutyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	5.5	0.249	0.00
3	01- NaB(Et)4 derivatisation, GC/MS	1.22		-3.12
10	04-Other	5.6		0.05
11	01- NaB(Et)4 derivatisation, GC/MS	3.03	1.000	-1.81
12	01- NaB(Et)4 derivatisation, GC/MS	3.94	1.143	-1.15
13	02- NaB(Et)4 derivatisation, GC/PFPD	2.24	1.120	-2.38
14	02- NaB(Et)4 derivatisation, GC/PFPD	<20		
15	01- NaB(Et)4 derivatisation, GC/MS	9.25	4.623	2.69
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	5.07	0.510	-0.33
18	01- NaB(Et)4 derivatisation, GC/MS	6.5		0.70
19	01- NaB(Et)4 derivatisation, GC/MS	4.105	1.642	-1.03
20	04-Other	7.29	2.550	1.28
23	02- NaB(Et)4 derivatisation, GC/MS-MS	7.3		1.28
24	01- NaB(Et)4 derivatisation, GC/MS	9.821	4.000	3.11
25	02- NaB(Et)4 derivatisation, GC/PFPD	7.3	0.100	1.28
26	01- NaB(Et)4 derivatisation, GC/MS	7.88	3.152	1.70
27	01- NaB(Et)4 derivatisation, GC/MS	0.68	0.140	-3.51
28	04-Other	6.0		0.34
29	04-Other	5.50	1.000	-0.02
30	01- NaB(Et)4 derivatisation, GC/MS	3.60	0.720	-1.39
31	01- NaB(Et)4 derivatisation, GC/MS	8	1.000	1.79

**Data Statistics**

	Value
Number of results	20
Number of excluded results	2
Mean	5.49 ng/L
Median	5.56 ng/L
Standard Deviation	2.53 ng/L
Robust Standard Deviation	2.58 ng/L
Result range	0.68 to 9.82 ng/L

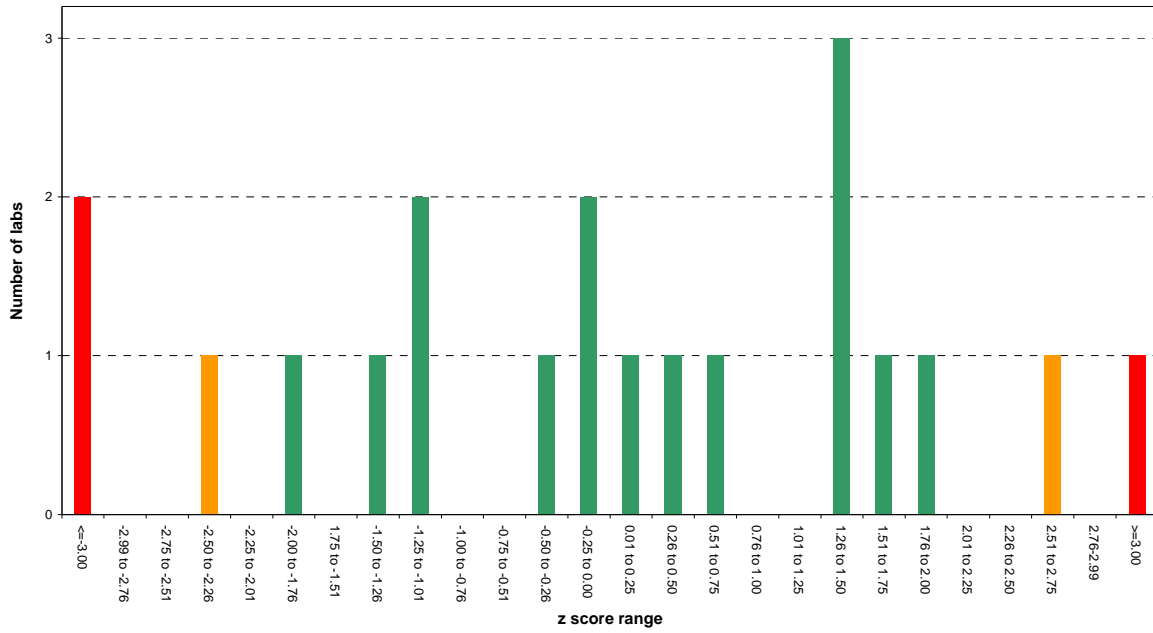
**Performance Statistics**

	Value
Assigned Value	5.53 ng/L
Uncertainty of Assigned Value	0.82 ng/L
SDPA	1.38 ng/L
Satisfactory Range	2.76 to 8.29 ng/L
Satisfactory Performance Scores	75.0 %
Questionable Performance Scores	10.0 %
Unsatisfactory Performance Scores	15.0 %

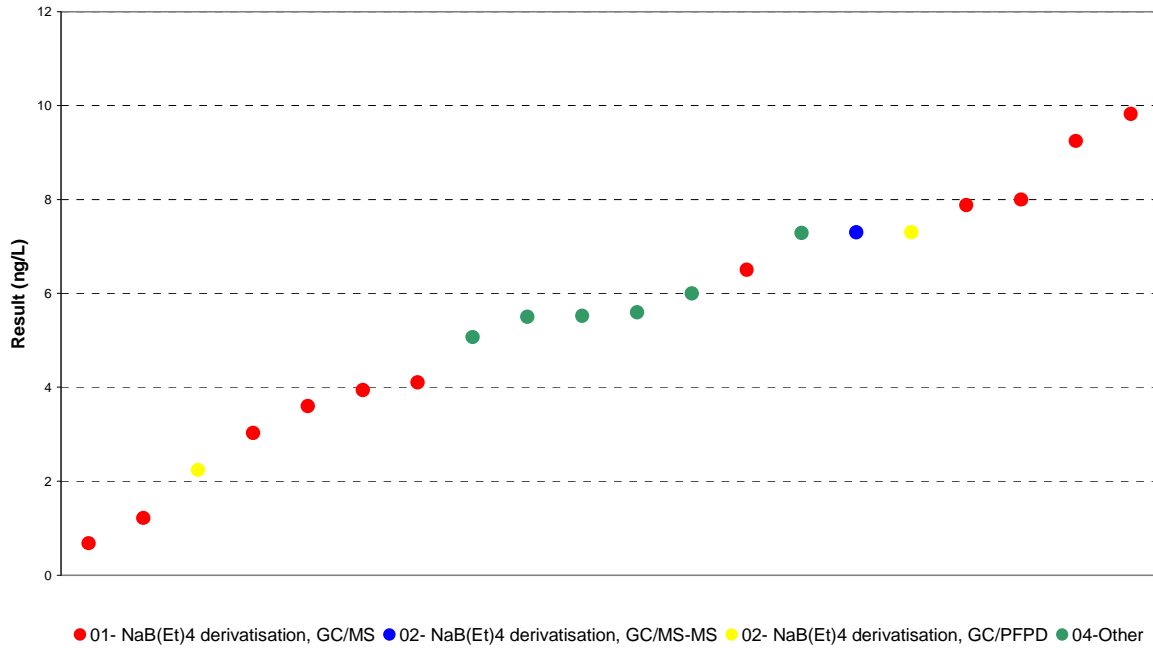
Sample: I

Analyte: Dibutyltin

z score Histogram



Distribution graph



**Sample: I**

**Analyte: Dibutyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	11	0	50.0	4.11	4.28	0.68 to 9.82	63.6
02- NaB(Et)4 derivatisation, GC/MS-MS	2	1	9.1	7.30	0.00	7.30 to 7.30	100.0
02- NaB(Et)4 derivatisation, GC/PFPD	3	1	13.6	4.77	3.75	2.24 to 7.30	50.0
04-Other	6	0	27.3	5.56	0.37	5.07 to 7.29	100.0
All	22	2	100.0	5.56	2.58	0.68 to 9.82	75.0

**Sample: I****Analyte: Tributyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	10.7	0.380	1.16
3	01- NaB(Et)4 derivatisation, GC/MS	7.25		-0.52
5	04-Other	8.92		0.28
8	01- NaB(Et)4 derivatisation, GC/MS	12.03		1.78
10	04-Other	18		4.65
11	01- NaB(Et)4 derivatisation, GC/MS	4.356	1.000	-1.91
12	01- NaB(Et)4 derivatisation, GC/MS	4.58	1.328	-1.80
13	02- NaB(Et)4 derivatisation, GC/PFPD	4.3	1.290	-1.93
14	02- NaB(Et)4 derivatisation, GC/PFPD	<20		
15	01- NaB(Et)4 derivatisation, GC/MS	9.53	4.765	0.58
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	6.99	0.350	-0.64
18	01- NaB(Et)4 derivatisation, GC/MS	9.2		0.42
19	01- NaB(Et)4 derivatisation, GC/MS	8.935	3.574	0.29
20	04-Other	9.53	3.340	0.58
23	02- NaB(Et)4 derivatisation, GC/MS-MS	10		0.80
24	01- NaB(Et)4 derivatisation, GC/MS	16.034	6.000	3.70
25	02- NaB(Et)4 derivatisation, GC/PFPD	7.4	0.100	-0.45
26	01- NaB(Et)4 derivatisation, GC/MS	7.73	2.577	-0.29
27	01- NaB(Et)4 derivatisation, GC/MS	8.19	1.600	-0.07
28	04-Other	6.9		-0.69
29	04-Other	6.00	1.000	-1.12
30	01- NaB(Et)4 derivatisation, GC/MS	6.90	1.380	-0.69
31	01- NaB(Et)4 derivatisation, GC/MS	8.95	0.600	0.30

**Data Statistics**

	Value
Number of results	22
Number of excluded results	2
Mean	8.75 ng/L
Median	8.56 ng/L
Standard Deviation	3.35 ng/L
Robust Standard Deviation	2.23 ng/L
Result range	4.30 to 18.00 ng/L

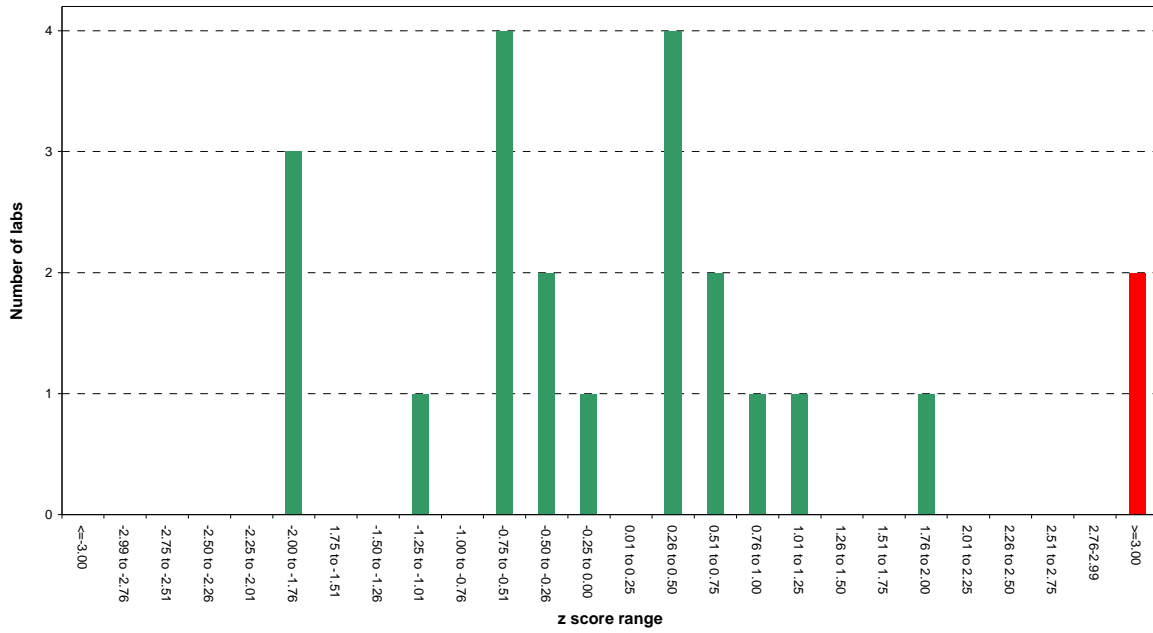
**Performance Statistics**

	Value
Assigned Value	8.33 ng/L
Uncertainty of Assigned Value	0.76 ng/L
SDPA	2.08 ng/L
Satisfactory Range	4.16 to 12.49 ng/L
Satisfactory Performance Scores	90.9 %
Questionable Performance Scores	0.0 %
Unsatisfactory Performance Scores	9.1 %

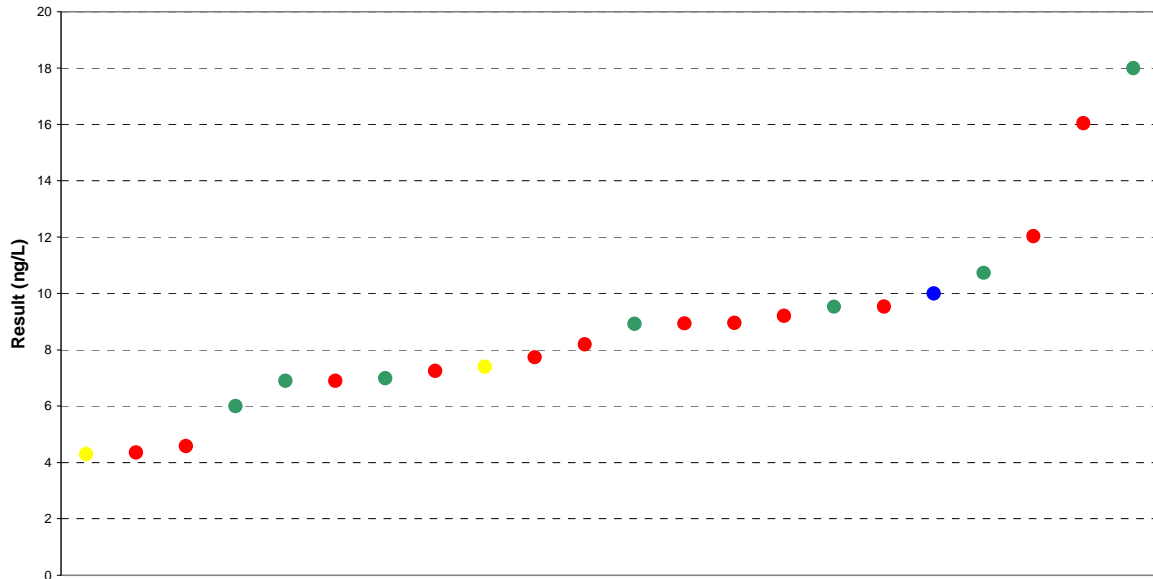
Sample: I

Analyte: Tributyltin

z score Histogram



Distribution graph



● 01- NaB(Et)4 derivatisation, GC/MS ● 02- NaB(Et)4 derivatisation, GC/MS-MS ● 02- NaB(Et)4 derivatisation, GC/PFPD ● 04-Other

**Sample: I**

**Analyte: Tributyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et) <sub>3</sub> derivatisation, GC/MS	12	0	50.0	8.56	1.69	4.36 to 16.03	91.7
02- NaB(Et) <sub>3</sub> derivatisation, GC/MS-MS	2	1	8.3	10.00	0.00	10.00 to 10.00	100.0
02- NaB(Et) <sub>3</sub> derivatisation, GC/PFPD	3	1	12.5	5.85	2.30	4.30 to 7.40	100.0
04-Other	7	0	29.2	8.92	2.86	6.00 to 18.00	85.7
All	24	2	100.0	8.56	2.23	4.30 to 18.00	90.9

**Sample: I****Analyte: Diphenyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	6.9	0.396	0.99
3	01- NaB(Et)4 derivatisation, GC/MS	3.08		-1.78
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.75	0.260	-3.46
15	01- NaB(Et)4 derivatisation, GC/MS	6.99	3.493	1.04
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	4.79	1.440	-0.55
18	01- NaB(Et)4 derivatisation, GC/MS	5.6		0.04
19	01- NaB(Et)4 derivatisation, GC/MS	7.185	2.874	1.18
20	04-Other	4.83	1.690	-0.52
23	02- NaB(Et)4 derivatisation, GC/MS-MS	7.8		1.62
25	02- NaB(Et)4 derivatisation, GC/PFPD	5.3	0.100	-0.18
27	01- NaB(Et)4 derivatisation, GC/MS	5.29	1.100	-0.19
28	04-Other	3.6		-1.40
29	04-Other	28.7	6.000	16.69
30	01- NaB(Et)4 derivatisation, GC/MS	5.20	1.040	-0.25

**Data Statistics**

	Value
Number of results	14
Number of excluded results	1
Mean	6.86 ng/L
Median	5.30 ng/L
Standard Deviation	6.55 ng/L
Robust Standard Deviation	2.45 ng/L
Result range	0.75 to 28.70 ng/L

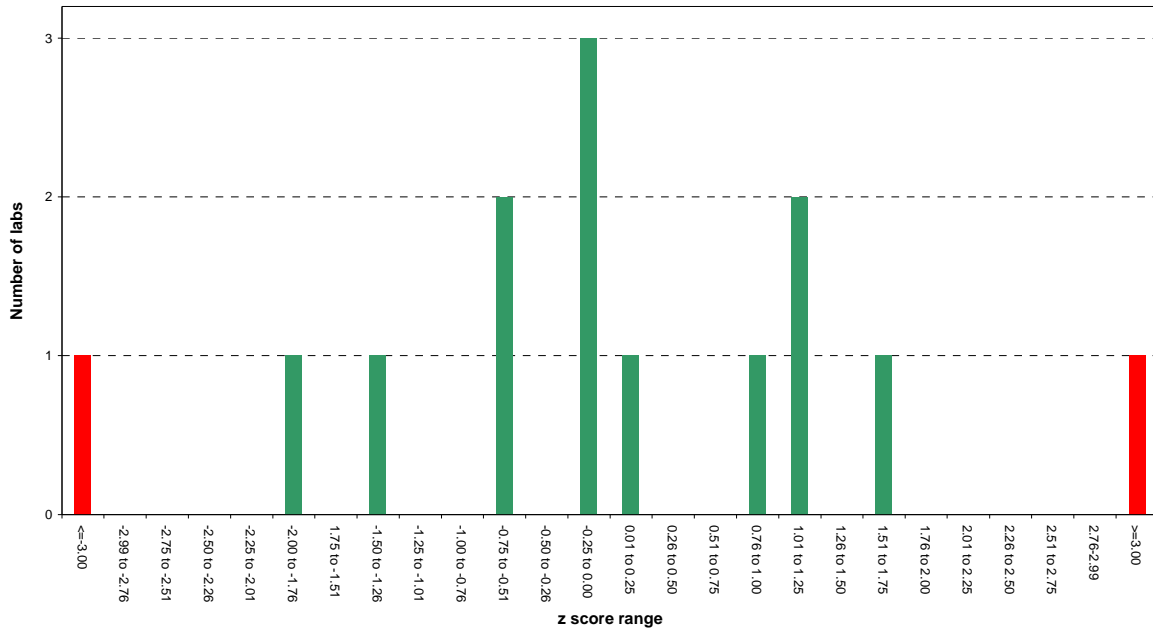
**Performance Statistics**

	Value
Assigned Value	5.55 ng/L
Uncertainty of Assigned Value	0.70 ng/L
SDPA	1.39 ng/L
Satisfactory Range	2.77 to 8.32 ng/L
Satisfactory Performance Scores	85.7 %
Questionable Performance Scores	0.0 %
Unsatisfactory Performance Scores	14.3 %

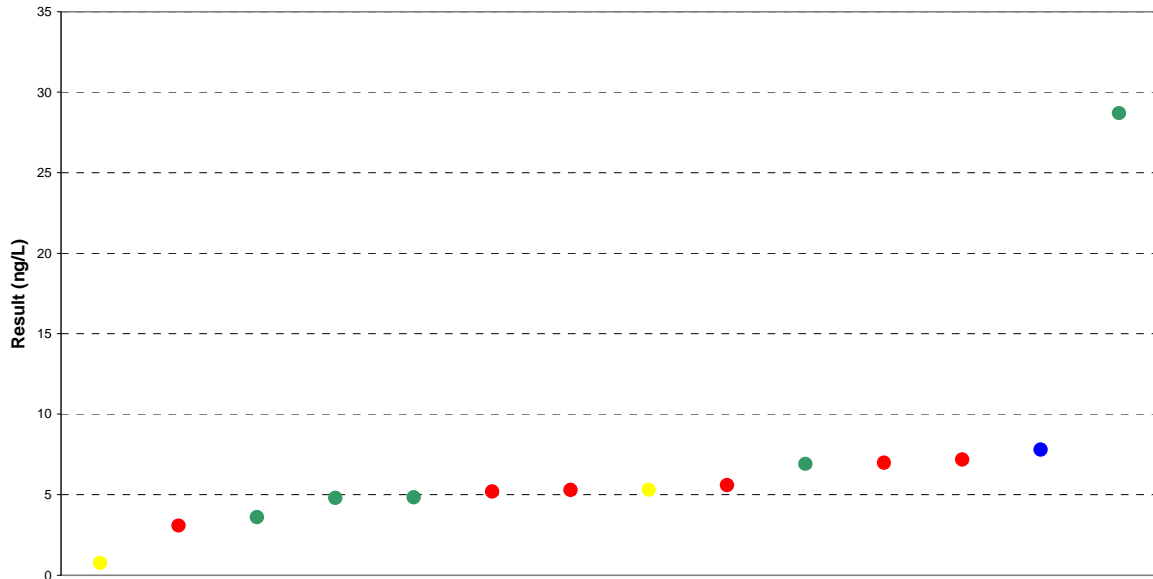
Sample: I

Analyte: Diphenyltin

z score Histogram



Distribution graph



● 01- NaB(Et)4 derivatisation, GC/MS ● 02- NaB(Et)4 derivatisation, GC/MS-MS ● 02- NaB(Et)4 derivatisation, GC/PFPD ● 04-Other

**Sample: I**

**Analyte: Diphenyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	6	0	40.0	5.45	1.32	3.08 to 7.19	100.0
02- NaB(Et)4 derivatisation, GC/MS-MS	2	1	13.3	7.80	0.00	7.80 to 7.80	100.0
02- NaB(Et)4 derivatisation, GC/PFPD	2	0	13.3	3.03	3.37	0.75 to 5.30	50.0
04-Other	5	0	33.3	4.83	1.82	3.60 to 28.70	80.0
All	15	1	100.0	5.30	2.45	0.75 to 28.70	85.7

**Sample: I****Analyte: Triphenyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	3.0	0.410	0.86
3	01- NaB(Et)4 derivatisation, GC/MS	2.3		-0.22
7	04-Other	11.6		15.06
8	01- NaB(Et)4 derivatisation, GC/MS	1.72		-1.17
10	04-Other	3.1		1.09
11	01- NaB(Et)4 derivatisation, GC/MS	1.036	0.350	-2.30
12	01- NaB(Et)4 derivatisation, GC/MS	1.30	0.377	-1.86
13	02- NaB(Et)4 derivatisation, GC/PFPD	1.81	1.450	-1.03
15	01- NaB(Et)4 derivatisation, GC/MS	2.93	1.465	0.82
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	2.26	0.680	-0.29
18	01- NaB(Et)4 derivatisation, GC/MS	2.2		-0.38
19	01- NaB(Et)4 derivatisation, GC/MS	2.140	0.856	-0.48
20	04-Other	1.65	0.580	-1.29
23	02- NaB(Et)4 derivatisation, GC/MS-MS	<4		
24	01- NaB(Et)4 derivatisation, GC/MS	3.668	1.500	2.03
25	02- NaB(Et)4 derivatisation, GC/PFPD	2.2	0.100	-0.38
26	01- NaB(Et)4 derivatisation, GC/MS	2.43	1.215	-0.01
27	01- NaB(Et)4 derivatisation, GC/MS	5.44	1.100	4.94
28	04-Other	2.1		-0.55
29	04-Other	7.80	2.000	8.82
30	01- NaB(Et)4 derivatisation, GC/MS	2.10	0.420	-0.55
31	01- NaB(Et)4 derivatisation, GC/MS	1.51	0.250	-1.52

**Data Statistics**

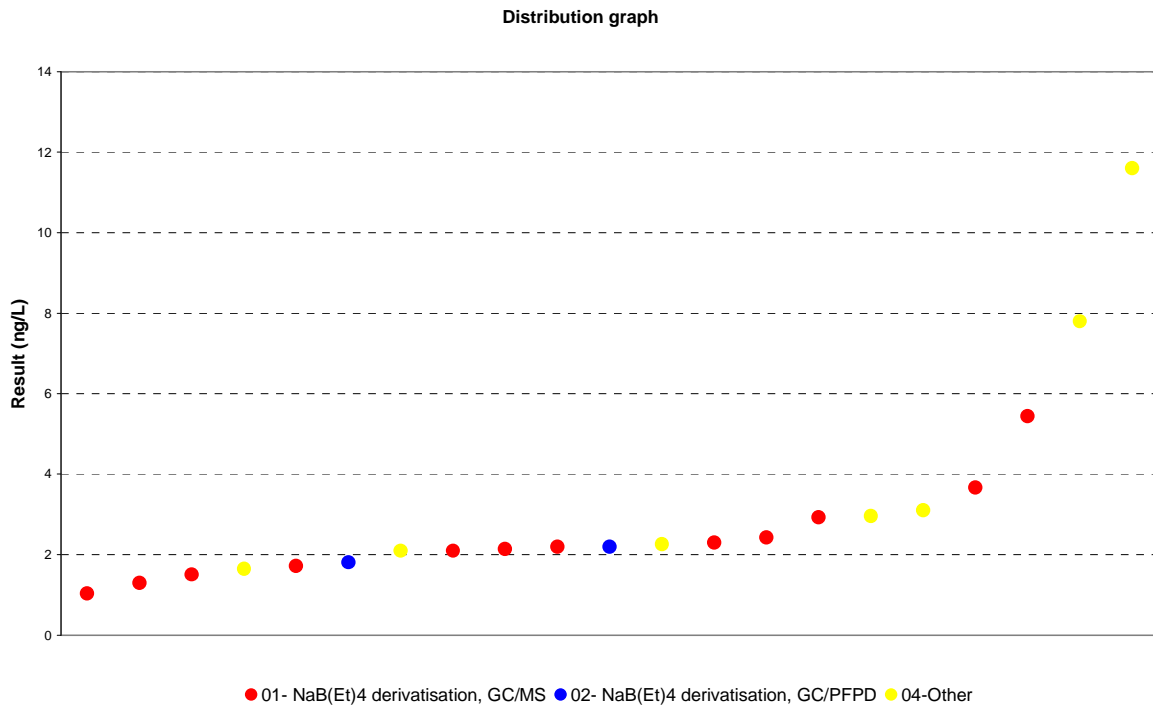
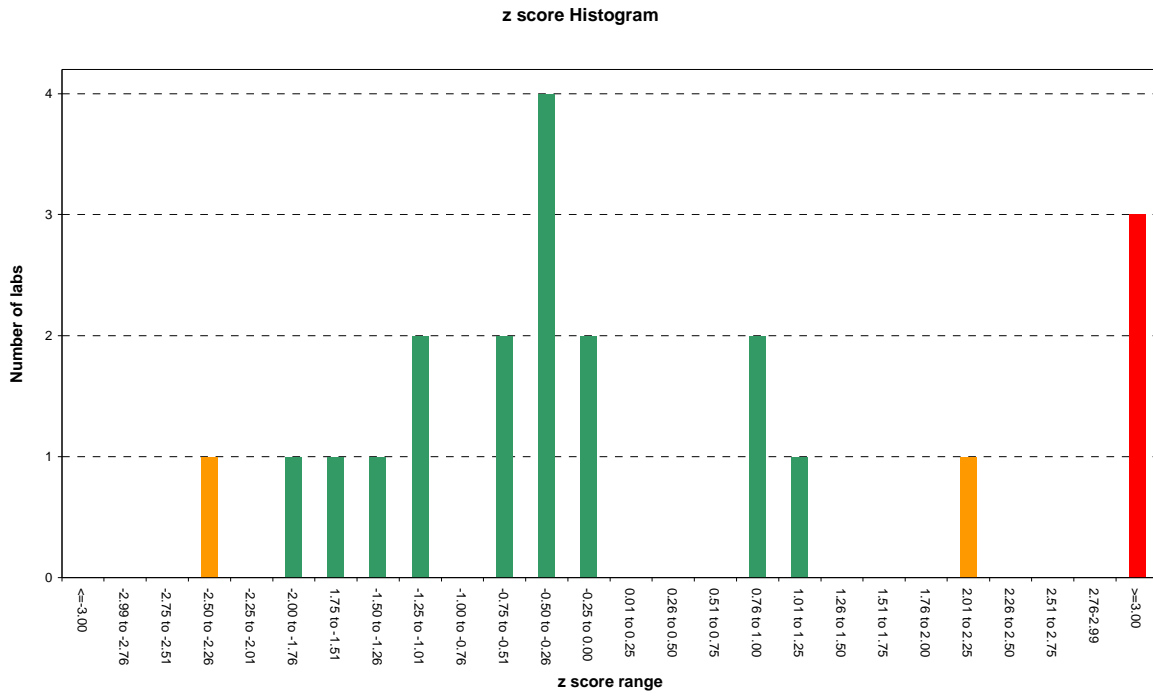
	Value
Number of results	21
Number of excluded results	2
Mean	3.06 ng/L
Median	2.20 ng/L
Standard Deviation	2.47 ng/L
Robust Standard Deviation	0.82 ng/L
Result range	1.04 to 11.60 ng/L

**Performance Statistics**

	Value
Assigned Value	2.43 ng/L
Uncertainty of Assigned Value	0.28 ng/L
SDPA	0.61 ng/L
Satisfactory Range	1.22 to 3.65 ng/L
Satisfactory Performance Scores	76.2 %
Questionable Performance Scores	9.5 %
Unsatisfactory Performance Scores	14.3 %

Sample: I

Analyte: Triphenyltin



**Sample: I**

**Analyte: Triphenyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	12	0	52.2	2.17	0.82	1.04 to 5.44	75.0
02- NaB(Et)4 derivatisation, GC/MS-MS	2	2	8.7	N/A	N/A		N/A
02- NaB(Et)4 derivatisation, GC/PFPD	2	0	8.7	2.01	0.29	1.81 to 2.20	100.0
04-Other	7	0	30.4	2.96	1.27	1.65 to 11.60	71.4
All	23	2	100.0	2.20	0.82	1.04 to 11.60	76.2

**Sample: II****Analyte: Dibutyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	0.22	0.022	-2.97
3	01- NaB(Et)4 derivatisation, GC/MS	<0.5		
10	04-Other	1.2		1.72
11	01- NaB(Et)4 derivatisation, GC/MS	0.394	2.500	-2.12
12	01- NaB(Et)4 derivatisation, GC/MS	0.28	0.081	-2.66
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.37	0.190	-2.24
14	02- NaB(Et)4 derivatisation, GC/PFPD	<20		
15	01- NaB(Et)4 derivatisation, GC/MS	0.40	0.201	-2.08
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	<1		
18	01- NaB(Et)4 derivatisation, GC/MS	0.27		-2.71
19	01- NaB(Et)4 derivatisation, GC/MS	1.675	0.670	3.99
20	04-Other	1.32	0.460	2.29
23	02- NaB(Et)4 derivatisation, GC/MS-MS	<4		
24	01- NaB(Et)4 derivatisation, GC/MS	2.205	1.000	6.51
25	02- NaB(Et)4 derivatisation, GC/PFPD	0.44	0.100	-1.90
26	01- NaB(Et)4 derivatisation, GC/MS	1.62	0.810	3.72
27	01- NaB(Et)4 derivatisation, GC/MS	0.68	0.140	-0.76
28	04-Other	0.33		-2.43
29	04-Other	0.61	0.120	-1.09
30	01- NaB(Et)4 derivatisation, GC/MS	0.71	0.142	-0.61
31	01- NaB(Et)4 derivatisation, GC/MS	12.3	0.950	54.65

**Data Statistics**

	Value
Number of results	17
Number of excluded results	5
Mean	1.47 ng/L
Median	0.61 ng/L
Standard Deviation	2.85 ng/L
Robust Standard Deviation	0.49 ng/L
Result range	0.22 to 12.30 ng/L

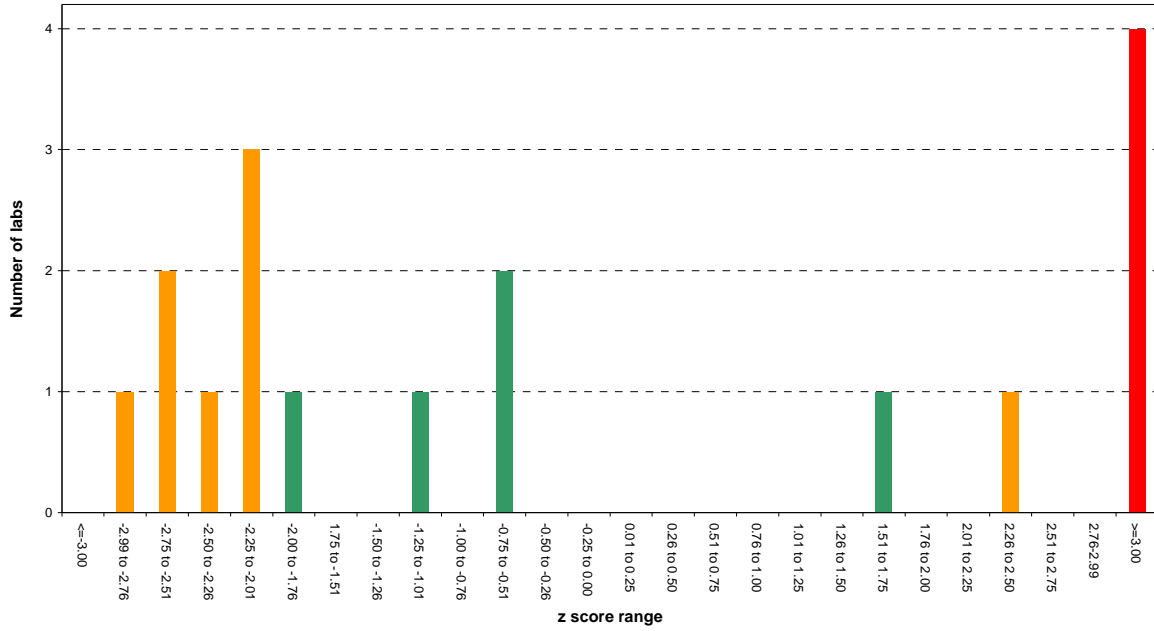
**Performance Statistics**

	Value
Assigned Value	0.84 ng/L
Uncertainty of Assigned Value	0.25 ng/L
SDPA	0.21 ng/L
Satisfactory Range	0.42 to 1.26 ng/L
Satisfactory Performance Scores	29.4 %
Questionable Performance Scores	47.1 %
Unsatisfactory Performance Scores	23.5 %

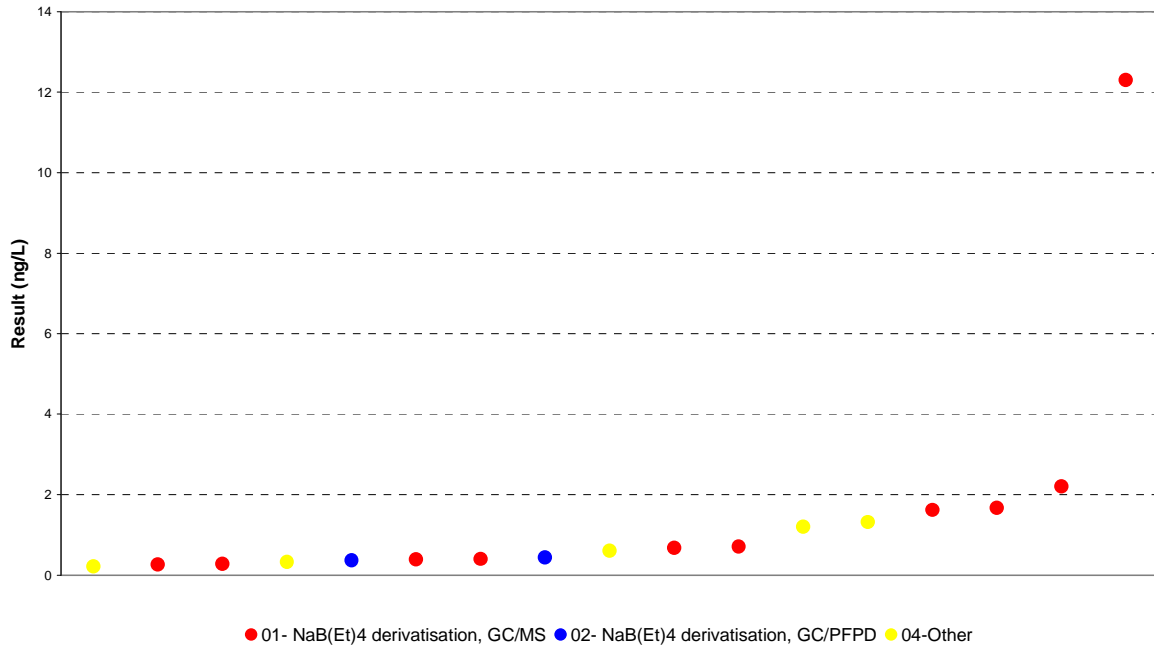
Sample: II

Analyte: Dibutyltin

z score Histogram



Distribution graph



**Sample: II****Analyte: Dibutyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	11	1	50.0	0.70	0.62	0.27 to 12.30	20.0
02- NaB(Et)4 derivatisation, GC/MS-MS	2	2	9.1	N/A	N/A		N/A
02- NaB(Et)4 derivatisation, GC/PFPD	3	1	13.6	0.41	0.05	0.37 to 0.44	50.0
04-Other	6	1	27.3	0.61	0.58	0.22 to 1.32	40.0
All	22	5	100.0	0.61	0.49	0.22 to 12.30	29.4

**Comments**

The results for dibutyltin in sample II were extremely varied and resulted in a large number of questionable and unsatisfactory results. Overall, the dataset showed a robust standard deviation of 0.49ng/L, which is over 50% of the assigned value and significantly larger than the SDPA of 0.21ng/L (25% of the assigned value) applied in PT-WFD exercises. In comparison to the spike value for this sample, the recovery of dibutyltin was significantly higher than expected.

When interpreting the assessment of their results participants should consider the dataset as a whole and the potential effects that this may have on the summary statistics. Where a relatively small number of datapoints are used to calculate the assigned value and a wide range of results are returned, participants should be aware that the uncertainty of the assigned value is significant and z scores become less reliable measures of acceptable analytical performance.

A number of the participants reported results less than the reporting limit of the method and it is clear that for this analyte, the relatively low spike concentration 0.35ng/L made this a particularly challenging analysis. As the SDPA is a fixed percentage of the assigned value, in samples low analyte concentrations are used the allowable errors used to define acceptable performance are small.

At higher analyte concentration levels, in samples I and III, the percentage of participants receiving acceptable performance scores was significantly higher and comparable to that of the other analytes in the PT scheme. Future PT schemes for organotin analysis should attempt to test the participants for this analyte at a similar concentration level to that used for this sample.

**Sample: II****Analyte: Tributyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	1.06	0.029	0.50
3	01- NaB(Et)4 derivatisation, GC/MS	0.83		-0.47
5	04-Other	0.91		-0.13
8	01- NaB(Et)4 derivatisation, GC/MS	1.52		2.46
10	04-Other	2.2		5.35
11	01- NaB(Et)4 derivatisation, GC/MS	0.43	2.000	-2.17
12	01- NaB(Et)4 derivatisation, GC/MS	0.66	0.191	-1.19
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.51	0.150	-1.83
14	02- NaB(Et)4 derivatisation, GC/PFPD	<20		
15	01- NaB(Et)4 derivatisation, GC/MS	1.04	0.518	0.40
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	0.52	0.070	-1.79
18	01- NaB(Et)4 derivatisation, GC/MS	0.95		0.04
19	01- NaB(Et)4 derivatisation, GC/MS	0.635	0.254	-1.30
20	04-Other	1.02	0.360	0.34
23	02- NaB(Et)4 derivatisation, GC/MS-MS	<4		
24	01- NaB(Et)4 derivatisation, GC/MS	1.843	0.700	3.83
25	02- NaB(Et)4 derivatisation, GC/PFPD	0.87	0.100	-0.30
26	01- NaB(Et)4 derivatisation, GC/MS	1.01	0.505	0.29
27	01- NaB(Et)4 derivatisation, GC/MS	5.41	1.100	18.99
28	04-Other	0.67		-1.15
29	04-Other	0.78	0.200	-0.68
30	01- NaB(Et)4 derivatisation, GC/MS	0.94	0.188	0.00
31	01- NaB(Et)4 derivatisation, GC/MS	0.97	0.070	0.12

**Data Statistics**

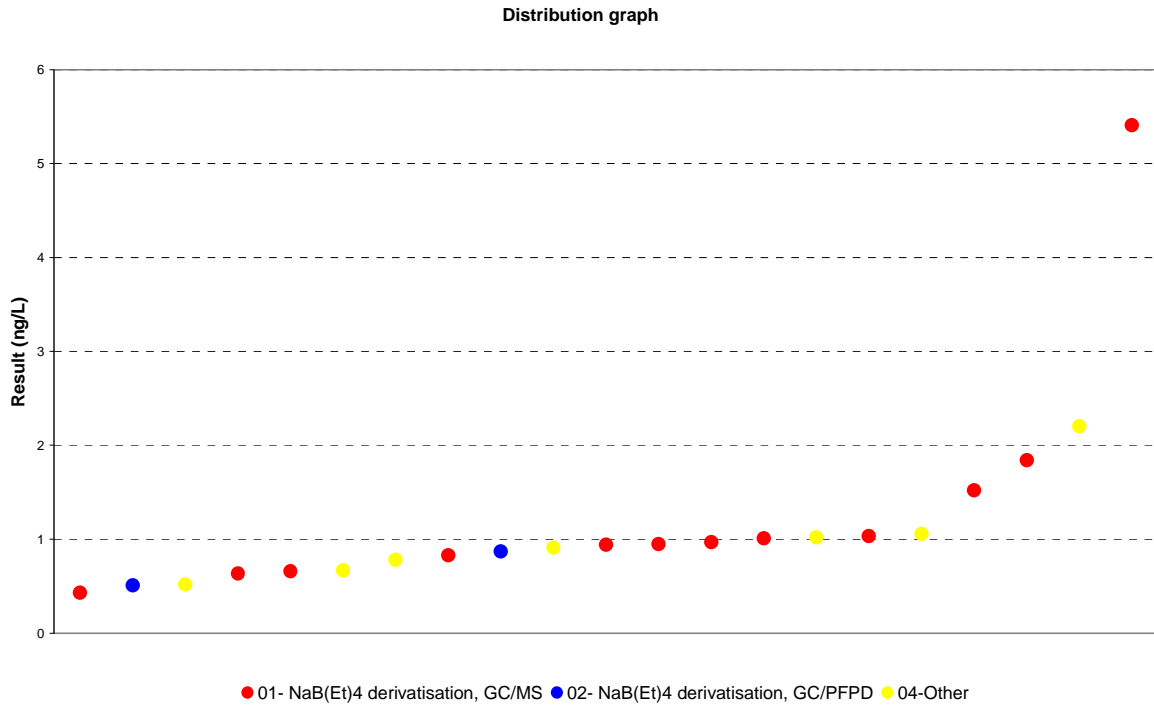
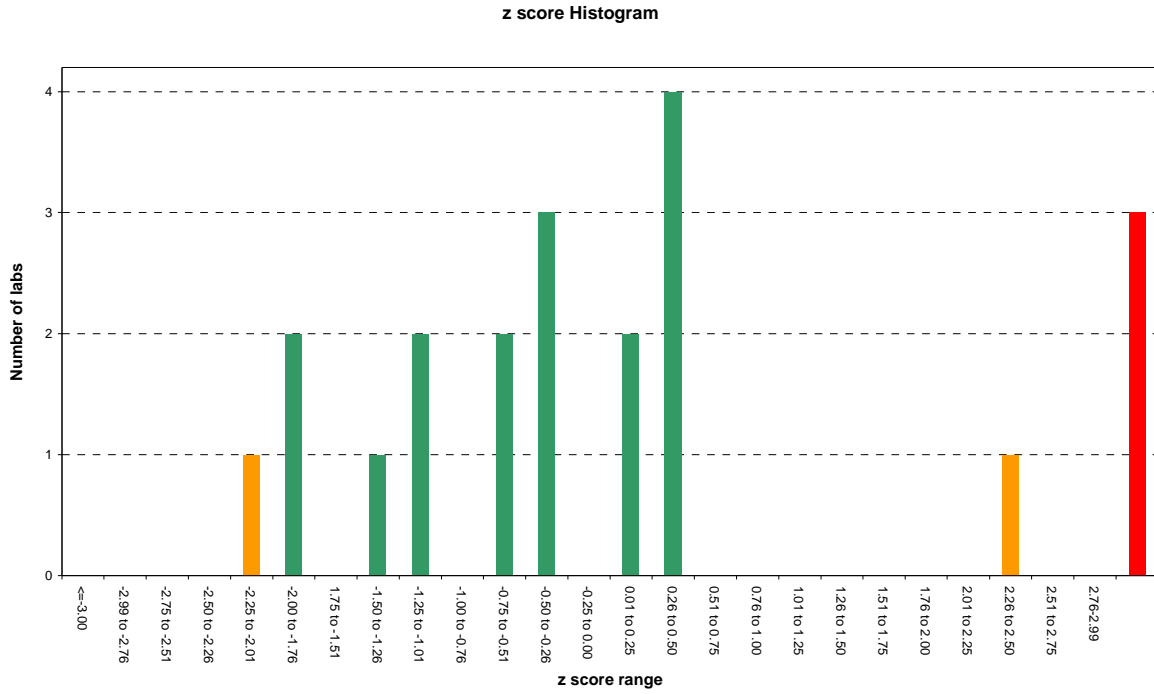
	Value
Number of results	21
Number of excluded results	3
Mean	1.18 ng/L
Median	0.94 ng/L
Standard Deviation	1.06 ng/L
Robust Standard Deviation	0.24 ng/L
Result range	0.43 to 5.41 ng/L

**Performance Statistics**

	Value
Assigned Value	0.94 ng/L
Uncertainty of Assigned Value	0.11 ng/L
SDPA	0.24 ng/L
Satisfactory Range	0.47 to 1.41 ng/L
Satisfactory Performance Scores	76.2 %
Questionable Performance Scores	9.5 %
Unsatisfactory Performance Scores	14.3 %

Sample: II

Analyte: Tributyltin



**Sample: II**

**Analyte: Tributyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	12	0	50.0	0.96	0.32	0.43 to 5.41	66.7
02- NaB(Et)4 derivatisation, GC/MS-MS	2	2	8.3	N/A	N/A		N/A
02- NaB(Et)4 derivatisation, GC/PFPD	3	1	12.5	0.69	0.27	0.51 to 0.87	100.0
04-Other	7	0	29.2	0.91	0.22	0.52 to 2.20	85.7
All	24	3	100.0	0.94	0.24	0.43 to 5.41	76.2

**Sample: II****Analyte: Diphenyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	5.0	0.173	0.14
3	01- NaB(Et)4 derivatisation, GC/MS	3.91		-0.74
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.87	0.300	-3.28
15	01- NaB(Et)4 derivatisation, GC/MS	5.24	2.622	0.37
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	3.57	1.070	-1.03
18	01- NaB(Et)4 derivatisation, GC/MS	4.3		-0.42
19	01- NaB(Et)4 derivatisation, GC/MS	5.365	2.146	0.47
20	04-Other	3.98	1.390	-0.69
23	02- NaB(Et)4 derivatisation, GC/MS-MS	8.8		3.33
25	02- NaB(Et)4 derivatisation, GC/PFPD	3.6	0.100	-1.00
27	01- NaB(Et)4 derivatisation, GC/MS	7.46	1.500	2.21
28	04-Other	2.9		-1.59
29	04-Other	23.4	5.000	15.48
30	01- NaB(Et)4 derivatisation, GC/MS	4.30	0.860	-0.42

**Data Statistics**

	Value
Number of results	14
Number of excluded results	1
Mean	5.91 ng/L
Median	4.30 ng/L
Standard Deviation	5.38 ng/L
Robust Standard Deviation	1.24 ng/L
Result range	0.87 to 23.40 ng/L

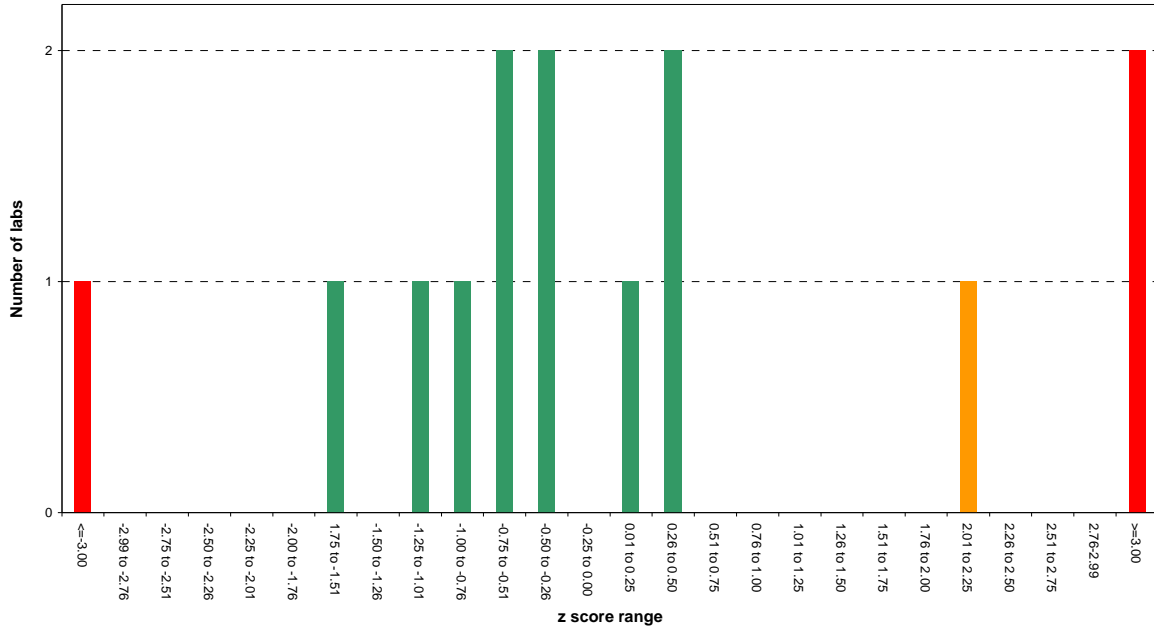
**Performance Statistics**

	Value
Assigned Value	4.80 ng/L
Uncertainty of Assigned Value	0.75 ng/L
SDPA	1.20 ng/L
Satisfactory Range	2.40 to 7.21 ng/L
Satisfactory Performance Scores	71.4 %
Questionable Performance Scores	7.1 %
Unsatisfactory Performance Scores	21.4 %

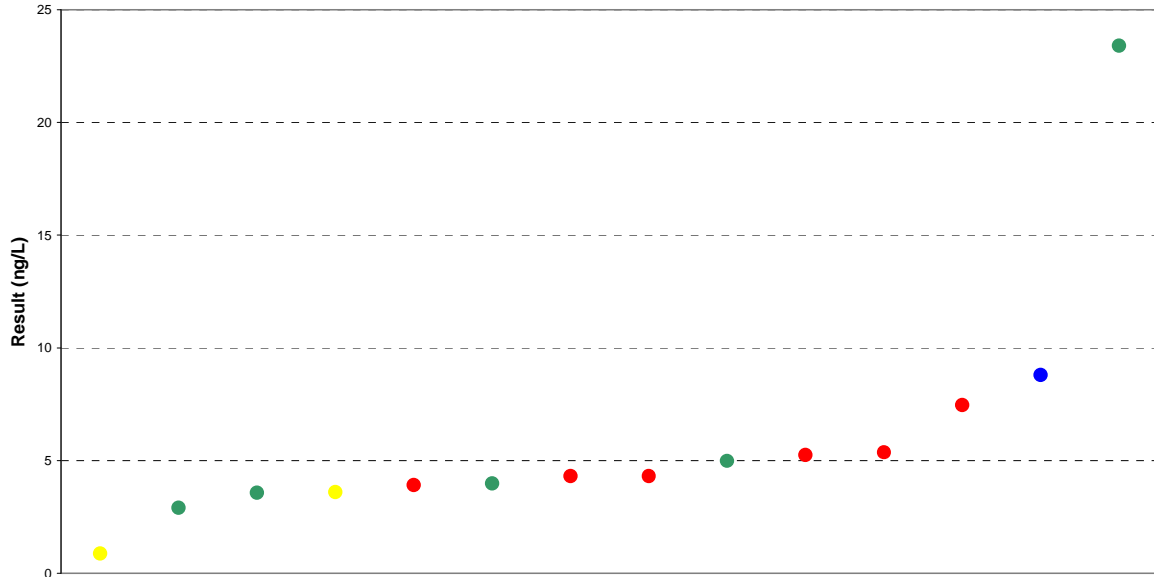
Sample: II

Analyte: Diphenyltin

z score Histogram



Distribution graph



● 01- NaB(Et)4 derivatisation, GC/MS ● 02- NaB(Et)4 derivatisation, GC/MS-MS ● 02- NaB(Et)4 derivatisation, GC/PFPD ● 04-Other

**Sample: II**

**Analyte: Diphenyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	6	0	40.0	4.77	0.79	3.91 to 7.46	83.3
02- NaB(Et)4 derivatisation, GC/MS-MS	2	1	13.3	8.80	0.00	8.80 to 8.80	0.0
02- NaB(Et)4 derivatisation, GC/PFPD	2	0	13.3	2.24	2.02	0.87 to 3.60	50.0
04-Other	5	0	33.3	3.98	1.48	2.90 to 23.40	80.0
All	15	1	100.0	4.30	1.24	0.87 to 23.40	71.4

**Sample: II****Analyte: Triphenyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	1.7	0.143	0.83
3	01- NaB(Et)4 derivatisation, GC/MS	<1.50		
7	04-Other	0.932		-1.30
8	01- NaB(Et)4 derivatisation, GC/MS	1.12		-0.75
10	04-Other	1.6		0.64
11	01- NaB(Et)4 derivatisation, GC/MS	0.568	5.000	-2.35
12	01- NaB(Et)4 derivatisation, GC/MS	0.83	0.241	-1.59
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.92	0.740	-1.33
15	01- NaB(Et)4 derivatisation, GC/MS	1.64	0.820	0.76
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	1.14	0.340	-0.69
18	01- NaB(Et)4 derivatisation, GC/MS	1.5		0.35
19	01- NaB(Et)4 derivatisation, GC/MS	1.060	0.424	-0.92
20	04-Other	1.10	0.390	-0.81
23	02- NaB(Et)4 derivatisation, GC/MS-MS	<4		
24	01- NaB(Et)4 derivatisation, GC/MS	1.606	0.600	0.66
25	02- NaB(Et)4 derivatisation, GC/PFPD	1.2	0.100	-0.52
26	01- NaB(Et)4 derivatisation, GC/MS	1.67	0.835	0.85
27	01- NaB(Et)4 derivatisation, GC/MS	5.22	1.000	11.15
28	04-Other	1.1		-0.81
29	04-Other	5.50	1.000	11.96
30	01- NaB(Et)4 derivatisation, GC/MS	12.00	2.400	30.83
31	01- NaB(Et)4 derivatisation, GC/MS	1.48	0.250	0.30

**Data Statistics**

	Value
Number of results	20
Number of excluded results	2
Mean	2.19 ng/L
Median	1.34 ng/L
Standard Deviation	2.65 ng/L
Robust Standard Deviation	0.43 ng/L
Result range	0.57 to 12.00 ng/L

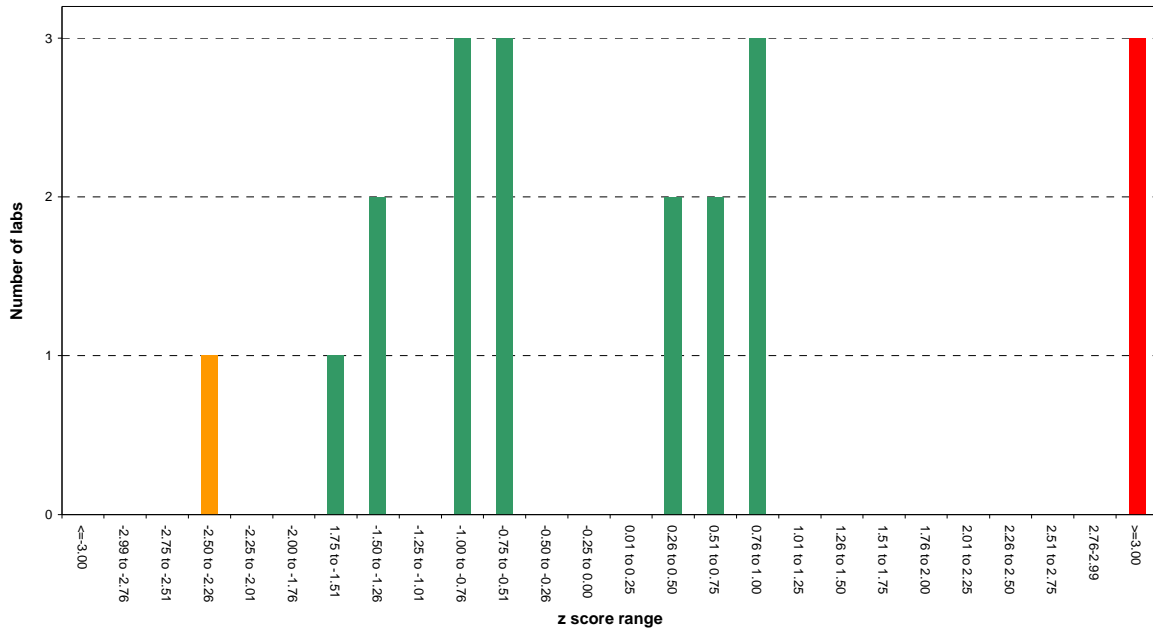
**Performance Statistics**

	Value
Assigned Value	1.38 ng/L
Uncertainty of Assigned Value	0.15 ng/L
SDPA	0.34 ng/L
Satisfactory Range	0.69 to 2.07 ng/L
Satisfactory Performance Scores	80.0 %
Questionable Performance Scores	5.0 %
Unsatisfactory Performance Scores	15.0 %

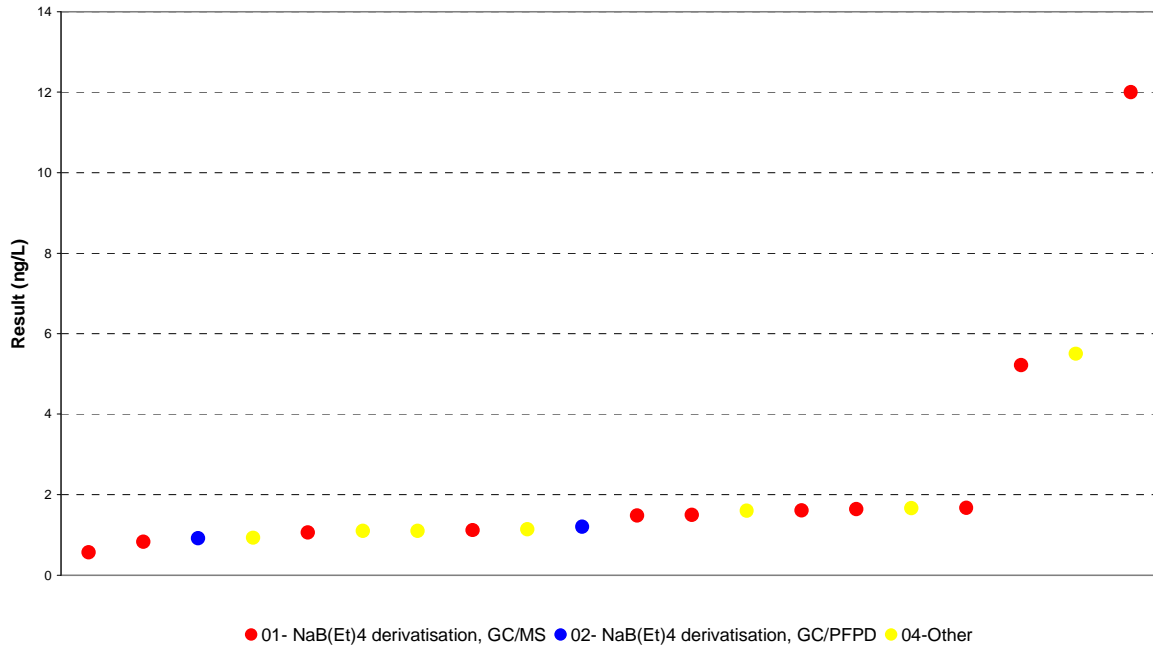
Sample: II

Analyte: Triphenyltin

z score Histogram



Distribution graph



**Sample: II**

**Analyte: Triphenyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	12	1	52.2	1.50	0.56	0.57 to 12.00	72.7
02- NaB(Et)4 derivatisation, GC/MS-MS	2	2	8.7	N/A	N/A		N/A
02- NaB(Et)4 derivatisation, GC/PFPD	2	0	8.7	1.06	0.21	0.92 to 1.20	100.0
04-Other	7	0	30.4	1.14	0.31	0.93 to 5.50	85.7
All	23	3	100.0	1.34	0.43	0.57 to 12.00	80.0

**Sample: III****Analyte: Dibutyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	0.33	0.039	-2.19
3	01- NaB(Et)4 derivatisation, GC/MS	<0.5		
10	04-Other	0.6		-0.71
11	01- NaB(Et)4 derivatisation, GC/MS	0.501	2.500	-1.25
12	01- NaB(Et)4 derivatisation, GC/MS	0.03	0.009	-3.84
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.59	0.300	-0.77
14	02- NaB(Et)4 derivatisation, GC/PFPD	<20	3.000	
15	01- NaB(Et)4 derivatisation, GC/MS	0.56	0.282	-0.91
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	<1		
18	01- NaB(Et)4 derivatisation, GC/MS	1.5		4.22
19	01- NaB(Et)4 derivatisation, GC/MS	1.345	0.538	3.37
20	04-Other	0.68	0.340	-0.27
23	02- NaB(Et)4 derivatisation, GC/MS-MS	<4		
24	01- NaB(Et)4 derivatisation, GC/MS	2.019	1.000	7.06
25	02- NaB(Et)4 derivatisation, GC/PFPD	0.5	0.100	-1.26
26	01- NaB(Et)4 derivatisation, GC/MS	1.78	0.890	5.75
27	01- NaB(Et)4 derivatisation, GC/MS	0.41	0.080	-1.75
28	04-Other	0.36		-2.03
29	04-Other	0.95	0.200	1.21
30	01- NaB(Et)4 derivatisation, GC/MS	0.65	0.130	-0.44
31	01- NaB(Et)4 derivatisation, GC/MS	0.38	0.050	-1.92

**Data Statistics**

	Value
Number of results	17
Number of excluded results	5
Mean	0.78 ng/L
Median	0.59 ng/L
Standard Deviation	0.56 ng/L
Robust Standard Deviation	0.31 ng/L
Result range	0.03 to 2.02 ng/L

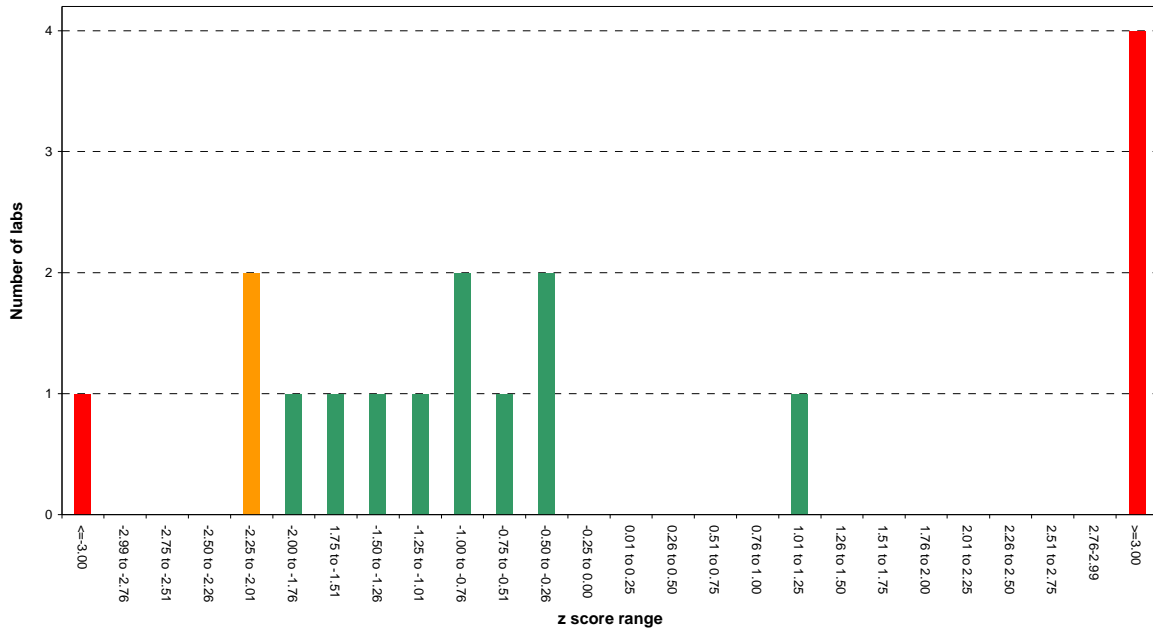
**Performance Statistics**

	Value
Assigned Value	0.73 ng/L
Uncertainty of Assigned Value	0.19 ng/L
SDPA	0.18 ng/L
Satisfactory Range	0.36 to 1.09 ng/L
Satisfactory Performance Scores	58.8 %
Questionable Performance Scores	11.8 %
Unsatisfactory Performance Scores	29.4 %

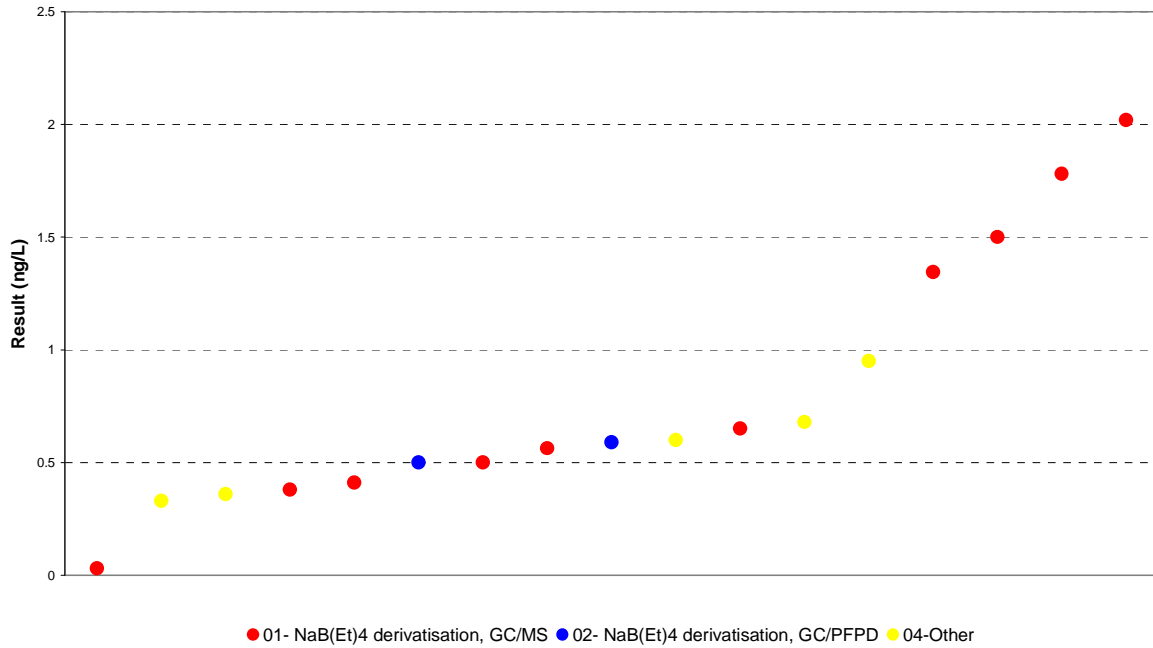
Sample: III

Analyte: Dibutyltin

z score Histogram



Distribution graph



**Sample: III**

**Analyte: Dibutyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	11	1	50.0	0.61	0.60	0.03 to 2.02	50.0
02- NaB(Et)4 derivatisation, GC/MS-MS	2	2	9.1	N/A	N/A		N/A
02- NaB(Et)4 derivatisation, GC/PFPD	3	1	13.6	0.55	0.07	0.50 to 0.59	100.0
04-Other	6	1	27.3	0.60	0.36	0.33 to 0.95	60.0
All	22	5	100.0	0.59	0.31	0.03 to 2.02	58.8

**Sample: III****Analyte: Tributyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	0.34	0.038	-0.64
3	01- NaB(Et)4 derivatisation, GC/MS	<0.5		
5	04-Other	0.24		-1.63
8	01- NaB(Et)4 derivatisation, GC/MS	0.6		1.93
10	04-Other	<0.2		
12	01- NaB(Et)4 derivatisation, GC/MS	0.24	0.070	-1.63
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.31	0.090	-0.94
14	02- NaB(Et)4 derivatisation, GC/PFPD	<20		
15	01- NaB(Et)4 derivatisation, GC/MS	0.13	0.063	-2.75
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	<0,4		
18	01- NaB(Et)4 derivatisation, GC/MS	3.7		32.55
19	01- NaB(Et)4 derivatisation, GC/MS	0.435	0.174	0.30
20	04-Other	0.33	0.170	-0.74
23	02- NaB(Et)4 derivatisation, GC/MS-MS	<4		
24	01- NaB(Et)4 derivatisation, GC/MS	1.013	0.400	6.01
25	02- NaB(Et)4 derivatisation, GC/PFPD	0.23	0.100	-1.73
26	01- NaB(Et)4 derivatisation, GC/MS	0.537	0.269	1.31
27	01- NaB(Et)4 derivatisation, GC/MS	4.35	0.870	38.98
28	04-Other	0.20		-2.02
29	04-Other	0.13	0.030	-2.72
30	01- NaB(Et)4 derivatisation, GC/MS	0.56	0.112	1.53
31	01- NaB(Et)4 derivatisation, GC/MS	0.28	0.070	-1.23

**Data Statistics**

	Value
Number of results	17
Number of excluded results	6
Mean	0.80 ng/L
Median	0.33 ng/L
Standard Deviation	1.24 ng/L
Robust Standard Deviation	0.19 ng/L
Result range	0.13 to 4.35 ng/L

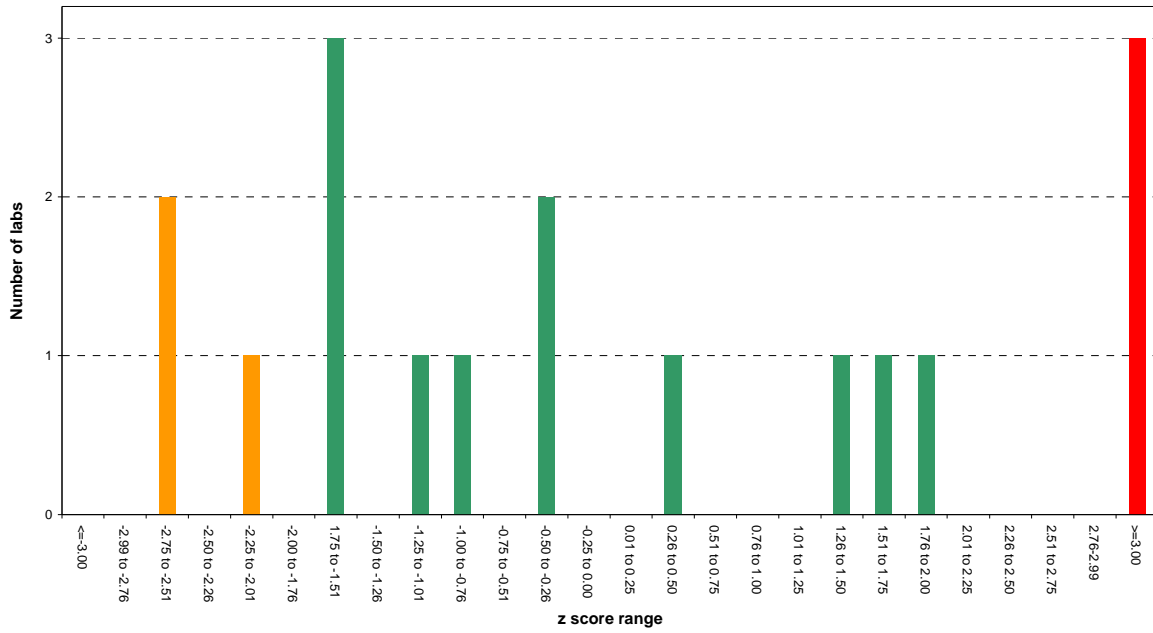
**Performance Statistics**

	Value
Assigned Value	0.40 ng/L
Uncertainty of Assigned Value	0.10 ng/L
SDPA	0.10 ng/L
Satisfactory Range	0.20 to 0.61 ng/L
Satisfactory Performance Scores	64.7 %
Questionable Performance Scores	17.6 %
Unsatisfactory Performance Scores	17.6 %

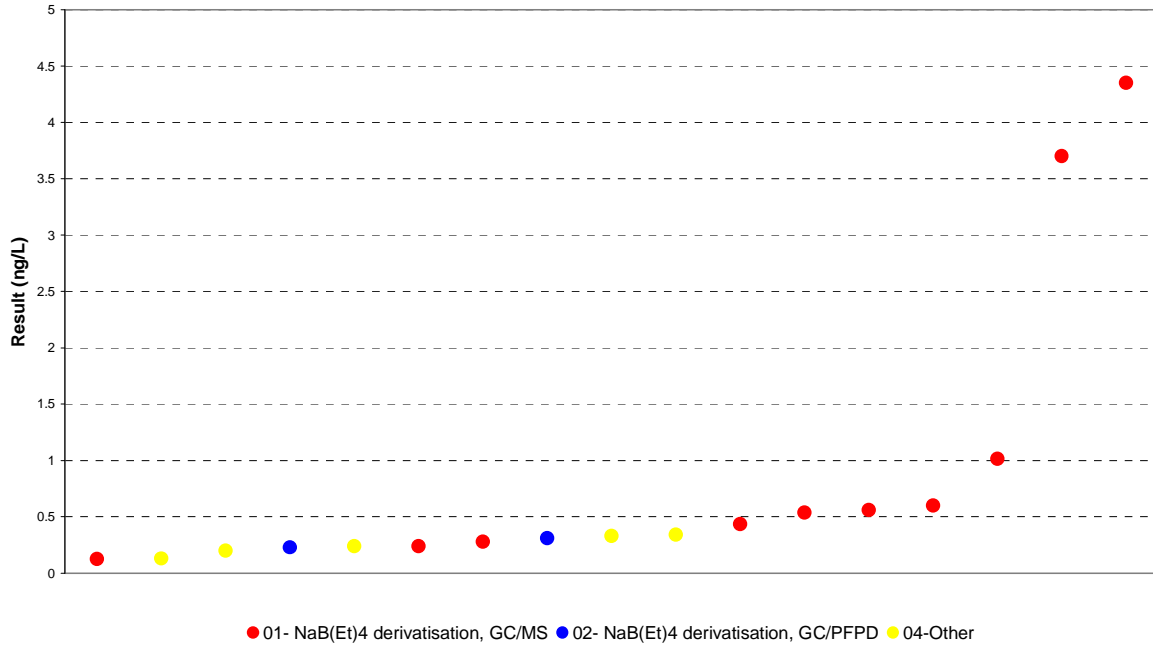
Sample: III

Analyte: Tributyltin

z score Histogram



Distribution graph



**Sample: III**

**Analyte: Tributyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et) <sub>3</sub> derivatisation, GC/MS	11	1	47.8	0.55	0.43	0.13 to 4.35	60.0
02- NaB(Et) <sub>3</sub> derivatisation, GC/MS-MS	2	2	8.7	N/A	N/A		N/A
02- NaB(Et) <sub>3</sub> derivatisation, GC/PFPD	3	1	13.0	0.27	0.06	0.23 to 0.31	100.0
04-Other	7	2	30.4	0.24	0.13	0.13 to 0.34	60.0
All	23	6	100.0	0.33	0.19	0.13 to 4.35	64.7

**Comments**

Tributyltin was spiked into this sample at the AA EQS level of 0.2ng/L. The performance of the participants was generally good, although several results, significantly higher than both the robust mean and the spike value, were returned.

Six of the participants reported results as below their reporting limit for this analyte. In a number of cases the reporting limit was significantly higher than the published concentration levels for PT-WFD exercises.

**Sample: III****Analyte: Diphenyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	0.5	0.102	-0.26
3	01- NaB(Et)4 derivatisation, GC/MS	<1.0		
13	02- NaB(Et)4 derivatisation, GC/PFPD	0.37	0.130	-1.26
15	01- NaB(Et)4 derivatisation, GC/MS	0.78	0.389	1.76
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	0.67	0.200	0.96
18	01- NaB(Et)4 derivatisation, GC/MS	0.38		-1.19
19	01- NaB(Et)4 derivatisation, GC/MS	0.525	0.210	-0.11
20	04-Other	0.30	0.150	-1.78
23	02- NaB(Et)4 derivatisation, GC/MS-MS	<4		
25	02- NaB(Et)4 derivatisation, GC/PFPD	0.3	0.100	-1.78
27	01- NaB(Et)4 derivatisation, GC/MS	3.79	0.760	24.07
28	04-Other	0.21		-2.44
29	04-Other	1.20	0.300	4.89
30	01- NaB(Et)4 derivatisation, GC/MS	0.54	0.108	0.00

**Data Statistics**

	Value
Number of results	12
Number of excluded results	3
Mean	0.80 ng/L
Median	0.51 ng/L
Standard Deviation	0.98 ng/L
Robust Standard Deviation	0.27 ng/L
Result range	0.21 to 3.79 ng/L

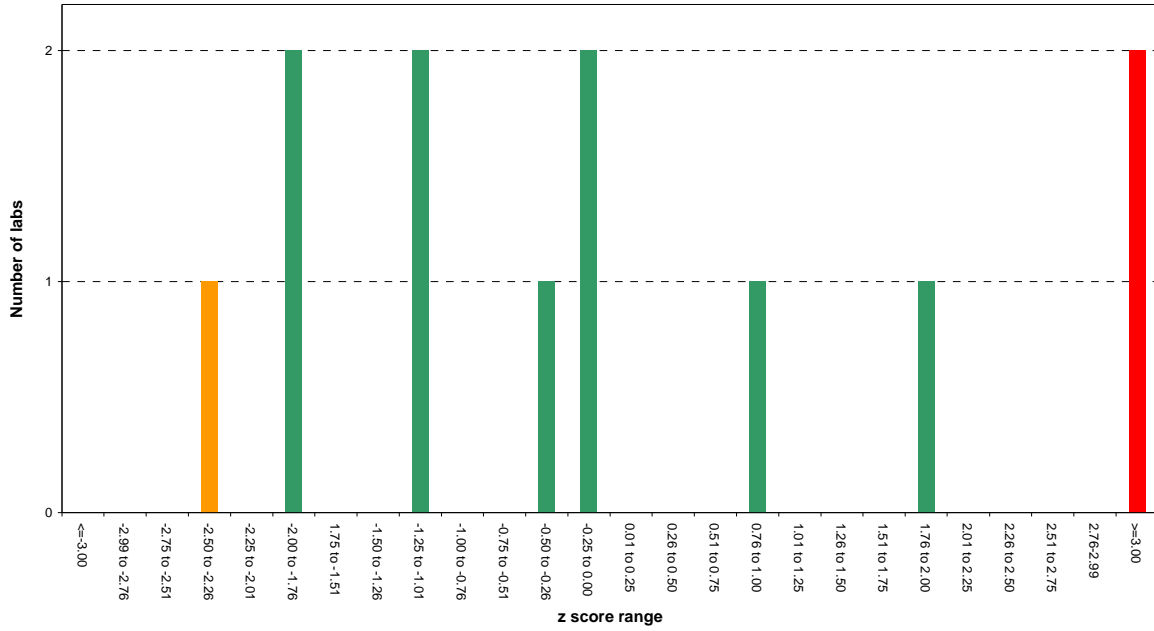
**Performance Statistics**

	Value
Assigned Value	0.54 ng/L
Uncertainty of Assigned Value	0.12 ng/L
SDPA	0.14 ng/L
Satisfactory Range	0.27 to 0.81 ng/L
Satisfactory Performance Scores	75.0 %
Questionable Performance Scores	8.3 %
Unsatisfactory Performance Scores	16.7 %

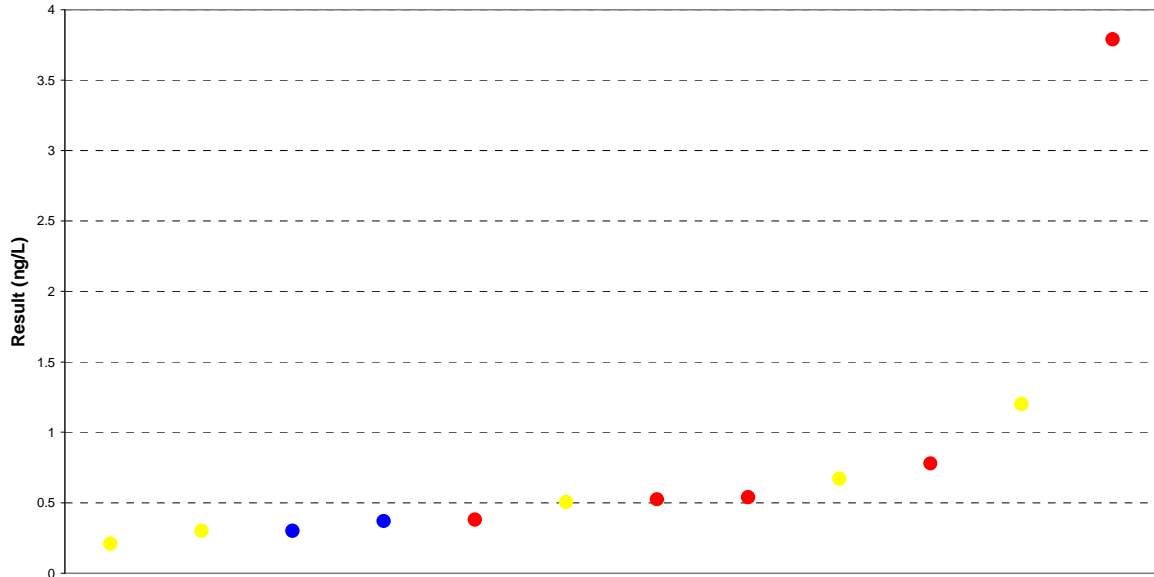
Sample: III

Analyte: Diphenyltin

z score Histogram



Distribution graph



● 01- NaB(Et)4 derivatisation, GC/MS ● 02- NaB(Et)4 derivatisation, GC/PFPD ● 04-Other

**Sample: III**

**Analyte: Diphenyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	6	1	40.0	0.54	0.24	0.38 to 3.79	80.0
02- NaB(Et)4 derivatisation, GC/MS-MS	2	2	13.3	N/A	N/A		N/A
02- NaB(Et)4 derivatisation, GC/PFPD	2	0	13.3	0.34	0.05	0.30 to 0.37	100.0
04-Other	5	0	33.3	0.50	0.30	0.21 to 1.20	60.0
All	15	3	100.0	0.51	0.27	0.21 to 3.79	75.0

**Sample: III****Analyte: Triphenyltin**

Lab ID	Method	Result (ng/l)	Uncertainty (ng/L)	z score
1	04-Other	11.1	0.628	2.00
3	01- NaB(Et)4 derivatisation, GC/MS	7.27		-0.06
7	04-Other	0.277		-3.85
8	01- NaB(Et)4 derivatisation, GC/MS	6.2		-0.64
10	04-Other	<1		
11	01- NaB(Et)4 derivatisation, GC/MS	3.166	0.350	-2.28
12	01- NaB(Et)4 derivatisation, GC/MS	4.24	1.230	-1.70
13	02- NaB(Et)4 derivatisation, GC/PFPD	7.56	6.000	0.10
15	01- NaB(Et)4 derivatisation, GC/MS	6.54	3.270	-0.45
16	02- NaB(Et)4 derivatisation, GC/MS-MS	<20	3.000	
17	04-Other	9.53	2.380	1.17
18	01- NaB(Et)4 derivatisation, GC/MS	7.6		0.12
19	01- NaB(Et)4 derivatisation, GC/MS	7.470	2.988	0.05
20	04-Other	4.93	1.730	-1.33
23	02- NaB(Et)4 derivatisation, GC/MS-MS	5.8		-0.86
24	01- NaB(Et)4 derivatisation, GC/MS	10.473	4.200	1.68
25	02- NaB(Et)4 derivatisation, GC/PFPD	7.4	0.100	0.01
26	01- NaB(Et)4 derivatisation, GC/MS	8.80	2.933	0.77
27	01- NaB(Et)4 derivatisation, GC/MS	5.92	1.200	-0.79
28	04-Other	5.8		-0.86
29	04-Other	18.0	4.000	5.76
30	01- NaB(Et)4 derivatisation, GC/MS	35.00	7.000	14.98
31	01- NaB(Et)4 derivatisation, GC/MS	8.69	0.700	0.71

**Data Statistics**

	Value
Number of results	21
Number of excluded results	2
Mean	8.65 ng/L
Median	7.40 ng/L
Standard Deviation	6.95 ng/L
Robust Standard Deviation	2.37 ng/L
Result range	0.28 to 35.00 ng/L

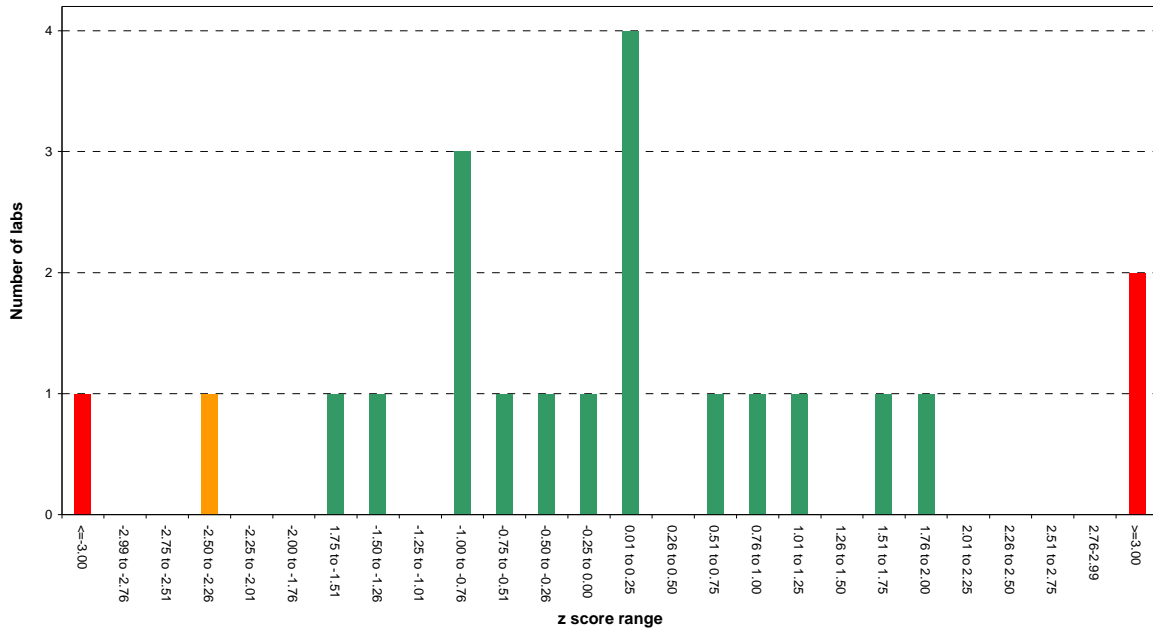
**Performance Statistics**

	Value
Assigned Value	7.38 ng/L
Uncertainty of Assigned Value	0.83 ng/L
SDPA	1.84 ng/L
Satisfactory Range	3.69 to 11.07 ng/L
Satisfactory Performance Scores	76.2 %
Questionable Performance Scores	9.5 %
Unsatisfactory Performance Scores	14.3 %

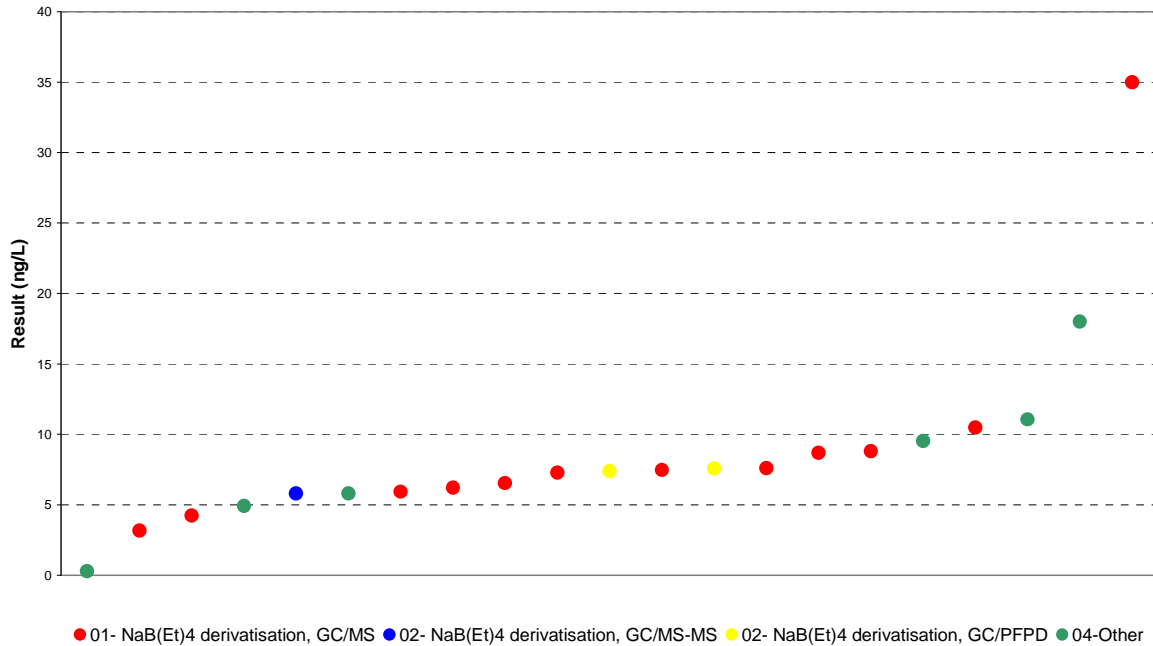
Sample: III

Analyte: Triphenyltin

z score Histogram



Distribution graph



**Sample: III**

**Analyte: Triphenyltin  
Methodology Statistics**

Method	No. of results	Excluded results	% of Total	Median	Robust SD	Range	Sat %
				ng/L			
01- NaB(Et)4 derivatisation, GC/MS	12	0	52.2	7.37	2.04	3.17 to 35.00	83.3
02- NaB(Et)4 derivatisation, GC/MS-MS	2	1	8.7	5.80	0.00	5.80 to 5.80	100.0
02- NaB(Et)4 derivatisation, GC/PFPD	2	0	8.7	7.48	0.12	7.40 to 7.56	100.0
04-Other	7	1	30.4	7.67	4.54	0.28 to 18.00	50.0
All	23	2	100.0	7.40	2.37	0.28 to 35.00	76.2