

WESSLING International Research and Education Centre (WIREC)

QualcoDuna Proficiency Testing Scheme

Scheme description 2020

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1. General information

This document describes the 2020 proficiency testing scheme offered by the Proficiency Testing Department of WESSLING Nonprofit Ltd. (hereinafter referred to as the Provider). For further information please consult QualcoDuna Proficiency Testing Scheme – General Protocol 2020.

2. Certificates of the Provider

Proficiency testing activities of Provider confirm to the requirements of EN ISO/IEC 17043:2010. We are a proficiency testing provider accredited by NAH under No NAH-8-0003/2018.

3. Sample identification

The 2020 themes of the QualcoDuna Proficiency Testing Scheme include different matrices as well as sampling activities.

Proficiency testing items are denoted as follows:

Theme code – parameter group code – sample number
(e.g.: DW-G-1, or DW/SW-Org-1 in case of a joint sample)

Respective codes are:

Theme	Code	Parameter group	Code
drinking water testing	DW	general parameters	G
surface water testing	SW	nutrients	N
groundwater testing	GW	elements	M
bathing water testing	BW	organic parameters	Org
wastewater testing	WW	non-specific parameters	NS
wastewater sludge/surface water sediment testing	SL	hydrobiological characteristics	HB
soil testing	SO	ecotoxicological tests	TOX
waste testing	W	NO ₂	NO ₂
impinger solutions testing	IM		
emission quartz filter (digest) testing	EM		
drinking water sampling	DWS		
surface water sampling	SWS		
groundwater sampling	GWS		
bathing water sampling	BWS		
polluted soil sampling	PSOS		
waste sampling	WS		

4. Distribution of samples

Round	Scheduled distribution
2020/I.	16.03 – 18.03.2020, Week 12
2020/II.	18.05 – 20.05.2020, Week 21
2020/III.	31.08 – 02.09.2020, Week 36
2020/IV.	12.10 – 14.10.2020, Week 42

Samples are dispatched by courier service on scheduled dispatch dates. Distribution schedule is summarised in Annex I.

5. Prices and discounts

Participation prices are detailed in theme descriptions. Prices quoted are net values and do not include shipping, VAT, import duty or other payables applicable in your country of residence nor coolbox packaging if necessary. In case of orders under Eur 190, an administrative surcharge of Eur 60 is applied.

Available discounts are as follows:

- for online reporting of measurement results: 5 %;
- for orders over
 - Eur 800: 10 %;
 - Eur 1 600: 15 %;
 - Eur 2 400: 20 %.

Discounts are applicable to order net values only.

6. Proficiency testing activities by theme

6.1. DRINKING WATER testing

Samples offered in this theme:

Scheduled distribution	Sample code	Parameters	Sample quantity	Sample type	Preservation method	Price/EUR
2020/Round I.	DW-G-1,2	pH (20°C), conductivity (20°C)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	50
2020/Round III.	DW-G-3,4	Cl ⁻ , SO ₄ ²⁻ , K, Na	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	83
2020/Round I.	DW-G/M-1,2	Ca, Mg, total hardness, As, Ni, Pb, Zn	2 x 20 cm ³	simulated concentrate from deionised/high purity water	14 mmol/dm ³ HNO ₃	133
2020/Round III.	DW-M-1,2	Fe, Mn, Al, Ba, Cd, Cr, Cu	2 x 20 cm ³	simulated concentrate from deionised/high purity water	14 mmol/dm ³ HNO ₃	133
2020/Round I.	DW-N-1,2	NH ₄ ⁺ , NO ₃ ⁻ , PO ₄ ³⁻	2 x 30 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄ + heat sterilisation	66
2020/Round I.	DW-N/M-1,2	NO ₂ ⁻ , Hg	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	50
2020/Round I.	DW-Org-1,2	COD _{Mn} , TOC	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	50
2020/Round I.	DW/WW-NS-1,2	F ⁻ (free)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	34
2020/Round III.	DW/SW-M-1,2	Sb, Se, Sn	2 x 20 cm ³	simulated concentrate from deionised/high purity water	1,2 mol/dm ³ HCl	66
2020/Round III.	DW/SW-Org-1,2	phenol index	2 x 20 cm ³	simulated concentrate from deionised/high purity water	3,5 mmol/dm ³ H ₃ PO ₄ + 1,9 g/dm ³ CuSO ₄ * 5H ₂ O	34
2020/Round III.	DW/SW-Org-3,4	AOX	2 x 20 cm ³	simulated concentrate from deionised/high purity water	14 mmol/dm ³ HNO ₃	34
2020/Round III.	DW/SW-NS-1,2	CN ⁻ (total)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	0,4 mol/dm ³ NaOH	34
2020/Round III.	DW/SW/BW-NS-1,2	turbidity	2 x 30 cm ³	simulated concentrate from deionised/high purity water	none	34
2020/Round II.	DW/GW-Org-1,2	atrazine, diazinon, prometryne, simazine, terbutryne	2 x 4 cm ³	spike solution (solvent: methanol)	by cooling	100
2020/Round II.	DW/GW-Org-3,4	acetochlor, alachlor, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endosulfan (α+β), lindane, metolachlor, propachlor, propisochlor, trifluralin	2 x 4 cm ³	spike solution (solvent: methanol)	by cooling	200
2020/Round II.	DW/GW-Org-5,6	aldrin, dieldrin, endrin, isodrin	2 x 4 cm ³	spike solution (solvent: methanol)	by cooling	83

Simulated concentrates are to be diluted by and spike solutions are to be added to water free from the parameters to be quantified by Participants according to work instructions.

DW/SW denotes *drinking water/surface water* joint samples, DW/WW denotes *drinking water/wastewater* joint samples, DW/GW denotes *drinking water/ground water* joint samples, DW/SW/BW denotes *drinking water/surface water/bathing water* joint samples.

6.2. SURFACE WATER testing

Samples offered in this theme:

Scheduled distribution	Sample code	Parameters	Sample quantity	Sample type	Preservation method	Price/EUR
2020/Round II.	SW/BW-G/M-1,2	Cl ⁻ , Ca, Mg, total hardness, Ni, Pb, Zn	2 x 500 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	14 mmol/dm ³ HNO ₃	133
2020/Round III.	SW/BW-G/M-3,4	SO ₄ ²⁻ , K, Na, Fe, Mn, Al, As, Cd, Cr, Cu	2 x 500 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	14 mmol/dm ³ HNO ₃	184
2020/Round II.	SW/BW-N-1,2	NH ₄ ⁺ -N, NO ₃ ⁻ -N, PO ₄ ³⁻ -P	2 x 500 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	18 mmol/dm ³ H ₂ SO ₄ + heat sterilisation	66
2020/Round II.	SW/BW-Org-1,2	COD _{Mn} , TOC	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	50
2020/Round II.	SW/BW-Org-3,4	MBAS	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	34
2020/Round II.	SW-M-1,2	Hg	2 x 250 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	14 mmol/dm ³ HNO ₃ + 0,5 g K ₂ Cr ₂ O ₇ /dm ³	34
2020/Round III.	SW-N-1,2	total N	2 x 250 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	12 mmol/dm ³ HCl	34
2020/Round III.	SW-Org-1,2	COD _{Cr} , cBOD ₅ , TOC	2 x 1000 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	18 mmol/dm ³ H ₂ SO ₄	66
2020/Round III.	DW/SW-M-1,2	Sb, Se, Sn	2 x 20 cm ³	simulated concentrate from deionised/high purity water	1,2 mol/dm ³ HCl	66
2020/Round III.	DW/SW-Org-1,2	phenol index	2 x 20 cm ³	simulated concentrate from deionised/high purity water	3,5 mmol/dm ³ H ₃ PO ₄ + 1,9 g/dm ³ CuSO ₄ *5H ₂ O	34
2020/Round III.	DW/SW-Org-3,4	AOX	2 x 20 cm ³	simulated concentrate from deionised/high purity water	14 mmol/dm ³ HNO ₃	34
2020/Round III.	DW/SW-NS-1,2	CN ⁻ (total)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	0,4 mol/dm ³ NaOH	34
2020/Round III.	DW/SW/BW-NS-1,2	turbidity	2 x 30 cm ³	simulated concentrate from deionised/high purity water	none	34

Simulated concentrates are to be diluted by Participants according to work instructions using water free from the parameters to be quantified.

DW/SW denotes *drinking water/surface water* joint samples, DW/SW/BW denotes *drinking water/surface water/bathing water* joint samples.

6.3. GROUNDWATER testing

Samples offered in this theme:

<i>Scheduled distribution</i>	<i>Sample code</i>	<i>Parameters</i>	<i>Sample quantity</i>	<i>Sample type</i>	<i>Preservation method</i>	<i>Price/EUR</i>
2020/Round II.	GW-Org-1,2	acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benz(a)pyrene, benz(e)pyrene, benz(b)fluoranthene, benz(k)fluoranthene, benz(g,h,i)perylene, dibenz(a,h)anthracene, phenanthrene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, chrysene, pyrene, PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153, PCB-180	2 x 4 cm ³	spike solution (solvent: acetonitrile)	by cooling	400
2020/Round II.	GW-Org-3,4	EPH (C ₁₀ -C ₄₀)	2 x 4 cm ³	spike solution (solvent: n-pentane : methanol = 2 : 8)	by cooling	90
2020/Round II.	GW-Org-5,6	benzene, toluene, ethylbenzene, xylenes (Σ o, m, p)	2 x 4 cm ³	spike solution (solvent: methanol)	by cooling	150
2020/Round II.	DW/GW-Org-1,2	atrazine, diazinon, prometryne, simazine, terbutryne	2 x 4 cm ³	spike solution (solvent: methanol)	by cooling	100
2020/Round II.	DW/GW-Org-3,4	acetochlor, alachlor, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endosulfan (α+β), lindane, metolachlor, propachlor, propisochlor, trifluralin	2 x 4 cm ³	spike solution (solvent: methanol)	by cooling	200
2020/Round II.	DW/GW-Org-5,6	aldrin, dieldrin, endrin, isodrin	2 x 4 cm ³	spike solution (solvent: methanol)	by cooling	83

Spike solutions are to be added to water free from the parameters to be quantified by Participants according to work instructions.

DW/GW denotes *drinking water/ground water* joint samples.

6.4. BATHING WATER testing

Samples offered in this theme:

Scheduled distribution	Sample code	Parameters	Sample quantity	Sample type	Preservation method	Price/EUR
2020/Round II.	BW/WW-G-1,2	pH (20°C), conductivity (20°C), total dissolved solids	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	66
2020/Round II.	SW/BW-G/M-1,2	Cl ⁻ , Ca, Mg, total hardness, Ni, Pb, Zn	2 x 500 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	14 mmol/dm ³ HNO ₃	133
2020/Round III.	SW/BW-G/M-3,4	SO ₄ ²⁻ , K, Na, Fe, Mn, Al, As, Cd, Cr, Cu	2 x 500 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	14 mmol/dm ³ HNO ₃	184
2020/Round II.	SW/BW-N-1,2	NH ₄ ⁺ -N, NO ₃ ⁻ -N, PO ₄ ³⁻ -P	2 x 500 cm ³	filtered natural surface water, spiked with parameters to be quantified if necessary	18 mmol/dm ³ H ₂ SO ₄ + heat sterilisation	66
2020/Round II.	SW/BW-Org-1,2	COD _{Mn} , TOC	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	50
2020/Round II.	SW/BW-Org-3,4	MBAS	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	34
2020/Round III.	DW/SW/BW-NS-1,2	turbidity	2 x 30 cm ³	simulated concentrate from deionised/high purity water	none	34

Simulated concentrates are to be diluted by Participants according to work instructions using water free from the parameters to be quantified.

BW/WW denotes *bathing water/wastewater* joint samples, SW/BW denotes *surface water/bathing water* joint samples, DW/SW/BW denotes *drinking water/surface water/bathing water* joint samples.

6.5. WASTEWATER testing

Samples offered in this theme:

Scheduled distribution	Sample code	Parameters	Sample quantity	Sample type	Preservation method	Price/EUR
2020/Round II.	BW/WW-G-1,2	pH (20°C), conductivity (20°C), total dissolved solids	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	66
2020/Round IV.	WW-G-3,4	Cl ⁻ , SO ₄ ²⁻ , K, Na	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	83
2020/Round IV.	WW-G/M-1,2	Ca, Mg, total hardness, Fe, Mn, Al, Ba	2 x 20 cm ³	simulated concentrate from deionised/high purity water	14 mmol/dm ³ HNO ₃	133
2020/Round I.	WW-M-1,2	As, Cd, Co, Cr, Cu, Ni, Pb, Zn	2 x 20 cm ³	simulated concentrate from deionised/high purity water	14 mmol/dm ³ HNO ₃	150
2020/Round I.	WW-M-3,4	Sb, Se, Sn	2 x 20 cm ³	simulated concentrate from deionised/high purity water	1,2 mol/dm ³ HCl	66
2020/Round IV.	WW-M-5,6	Ag	2 x 20 cm ³	simulated concentrate from deionised/high purity water	1,4 mol/dm ³ HNO ₃	34
2020/Round IV.	WW-M-7,8	B	2 x 20 cm ³	simulated concentrate from deionised/high purity water	12 mmol/dm ³ HCl	34
2020/Round IV.	WW-M-9,10	Mo	2 x 20 cm ³	simulated concentrate from deionised/high purity water	0,1 mol/dm ³ NH ₃	34
2020/Round IV.	WW-M-11,12	Cr(VI)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	34
2020/Round I.	WW-N-1,2	NH ₄ ⁺ -N, NO ₃ ⁻ -N, Kjeldahl N, PO ₄ ³⁻ -P, total P	2 x 30 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄ + heat sterilisation	100
2020/Round I.	WW-N/M-1,2	NO ₂ ⁻ , Hg	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	50
2020/Round IV.	WW-N/Org-1,2	total N, organic N, TOC	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄ + heat sterilisation	66
2020/Round I.	WW-Org-1,2	COD _{Cr} , cBOD ₅ , TOC	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	66
2020/Round II.	WW-Org-3,4	total OSE	2 x 250 cm ³	filtered natural surface water, spiked	18 mmol/dm ³ H ₂ SO ₄	34
2020/Round II.	WW-Org-5,6	AOX	2 x 20 cm ³	simulated concentrate from deionised/high purity water	14 mmol/dm ³ HNO ₃	34
2020/Round IV.	WW-Org-7,8	MBAS	2 x 20 cm ³	simulated concentrate from deionised/high purity water	18 mmol/dm ³ H ₂ SO ₄	34
2020/Round IV.	WW-Org-9,10	phenol index	2 x 20 cm ³	simulated concentrate from deionised/high purity water	3,5 mmol/dm ³ H ₃ PO ₄ + 1,9 g/dm ³ CuSO ₄ * 5H ₂ O	34
2020/Round IV.	WW-NS-1,2	CN ⁻ (total)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	0,4 mol/dm ³ NaOH	34
2020/Round I.	DW/WW-NS-1,2	F ⁻ (free)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	34

Simulated concentrates are to be diluted by Participants according to work instructions using water free from the parameters to be quantified.

DW/WW denotes *drinking water/wastewater* joint samples, BW/WW denotes *bathing water/wastewater* joint samples.

6.6. WASTEWATER SLUDGE/SURFACE WATER SEDIMENT testing

Samples offered in this theme:

Scheduled distribution	Sample code	Parameters	Sample quantity	Sample type	Preservation method	Price/EUR
2020/Round II.	SL-1,2	Ca, Mg, K, Na, Fe, Mn, As, B, Pb, Zn	2 x 20 g	natural river sediment mixed with wastewater sludge	none	233
2020/Round IV.	SL-3,4	dry matter content (105°C), residue on ignition (600°C), loss on ignition (600°C), ash content (800°C), total N, total P, Ba, Cd, Co, Cr, Cu, Mo, Ni, Se, Hg	2 x 20 g	natural river sediment mixed with wastewater sludge	none	267
2020/Round I.	SL/SO-Org-1,2	acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benz(a)pyrene, benz(e)pyrene, benz(b)fluoranthene, benz(k)fluoranthene, benz(g,h,i)perylene, dibenz(a,h)anthracene, phenanthrene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, chrysene, pyrene, PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153, PCB-180	2 x 20 g	natural soil, spiked with parameters to be quantified if necessary	none	397
2020/Round I.	SL/SO-Org-3,4	EPH (C ₁₀ -C ₄₀)	2 x 30 g	natural soil, spiked with parameters to be quantified if necessary	none	90

SL/SO denotes *wastewater sludge/surface water sediment/soil* joint samples.

6.7. SOIL testing

Samples offered in this theme:

Scheduled distribution	Sample code	Parameters	Sample quantity	Sample type	Preservation method	Price/EUR
2020/Round I.	SO-M-1,2	Ag, As, B, Ba, Cd, Co, Cr, Cu, Mo, Ni, Pb, Sb, Se, Sn, Zn, Hg	2 x 20 g	natural soil, spiked with parameters to be quantified if necessary	none	286
2020/Round II.	SO-Org-1,2	benzene, toluene, ethylbenzene, xylenes (Σ o, m, p)	2 x 3x5 g soil in 10 cm ³ methanolic suspension (3 parallels for each of the 2 samples)	natural soil, spiked with parameters to be quantified if necessary	by cooling	238
2020/Round I.	SL/SO-Org-1,2	acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benz(a)pyrene, benz(e)pyrene, benz(b)fluoranthene, benz(k)fluoranthene, benz(g,h,i)perylene, dibenz(a,h)anthracene, phenanthrene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, chrysene, pyrene, PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153, PCB-180	2 x 20 g	natural soil, spiked with parameters to be quantified if necessary	none	397
2020/Round I.	SL/SO-Org-3,4	EPH (C ₁₀ -C ₄₀)	2 x 30 g	natural soil, spiked with parameters to be quantified if necessary	none	90

SL/SO denotes *wastewater sludge/surface water sediment/soil* joint samples.

6.8. WASTE testing

Samples offered in this theme:

<i>Scheduled distribution</i>	<i>Sample code</i>	<i>Parameters</i>	<i>Sample quantity</i>	<i>Sample type</i>	<i>Preservation method</i>	<i>Price/ EUR</i>
2020/Round IV.	W-1,2	<u>From 1:1 water extract:</u> pH (25°C), conductivity (25°C), total water soluble material, SO₄²⁻, Cl⁻, F⁻ (free), Ba, Zn <u>From aqua regia digest:</u> As, Ba, Cd, Co, Cr, Cu, Mo, Ni, Pb, Zn	2 x 300 g	natural industrial waste	none	

Waste proficiency testing is not within accreditation scope.

The Provider reserves the right to choose different parameter(s) for evaluation if concentration of the proposed parameters is too low in the samples thus uncertainty of quantification is unsuitably high.

6.9. AIR POLLUTANT testing

Samples offered in this theme:

6.9.1. Emission quartz filters (digests)

<i>Scheduled distribution</i>	<i>Sample code</i>	<i>Parameters</i>	<i>Sample quantity</i>	<i>Sample type</i>	<i>Preservation method</i>	<i>Price/EUR</i>
2020/Round III.	EM-M-1,2	Mn, As, Cd, Co, Cr, Cu, Ni, Pb, Sb, Se, Sn, Te, Tl, Zn, V, Hg	2 x100 cm ³	simulated sample	1,2 mol/dm ³ HCl	284

6.9.2. Impinger solutions

<i>Scheduled distribution</i>	<i>Sample code</i>	<i>Parameters</i>	<i>Sample quantity</i>	<i>Sample type</i>	<i>Preservation method</i>	<i>Price/EUR</i>
2020/Round III.	IM-NO2-1,2	NO ₂	2 x 50 cm ³	simulated sample, matrix matched (15,0 g triethanolamine + 3,0 cm ³ buthanol /dm ³ high purity water)	none	50

6.10. SURFACE WATER – biological intercomparisons

Samples offered in this theme:

<i>Scheduled distribution</i>	<i>Sample code</i>	<i>Parameters</i>	<i>Sample quantity</i>	<i>Sample type</i>	<i>Preservation method</i>	<i>Price/EUR</i>
2020/Round II.	SW-HB-1,2	chlorophyll-a	2 x 1500 cm ³	natural surface water	by cooling	74
2020/Round II.	SW-HB-3,4	phytoplankton investigations: total number of algae, dominant taxa (phytoplankton), biomass estimate of algae	2 x 500 cm ³	natural surface water	Lugol's solution	74
2020/Round II.	SW-HB-5,6	saprobiological investigations: S-index, dominant taxa (saprobity)	2 x 500 cm ³	natural surface water	by cooling	74
2020/Round II.	SW-TOX-1,2	Daphnia toxicology tests: Daphnia test (24h), Daphnia test (48h)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	74
2020/Round III.	SW-TOX-3,4	seedling plant toxicology tests: seedling plant test (with own seeds), seedling plant test (with WESSLING seeds)	2 x 20 cm ³	simulated concentrate from deionised/high purity water	none	74

6.11. SAMPLING proficiency testing

Scheduled distribution	Sample code	Parameters	Sample quantity	Sample type	Preservation method	Price/ EUR
2020/Round IV.	DWS- „cations”, „anions+ COD _{Mn} ”	Drinking water sampling (on-site measurements by Participants: pH (20°C), conductivity (20°C), free active chlorine, bound active chlorine and temperature; laboratory measurements by Provider's subcontractor: Ca, Mg, Fe, Mn, Na, Cl ⁻ , COD _{Mn})	3 x 50 cm ³ for cations 3 x 500 cm ³ for anions+ COD _{Mn}	natural drinking water	Cations: HNO ₃ Anions+COD _{Mn} : by cooling	251
2020/Round II.	SWS- „cations”, „anions”	Surface water sampling (on-site measurements by Participants: pH (20°C), conductivity (20°C); laboratory measurements by Provider's subcontractor: Ca, Mg, Fe, Cl ⁻ , SO ₄ ²⁻ , NO ₃ ⁻ .)	3 x 50 cm ³ for cations 3 x 500 cm ³ for anions	natural surface water	Cations: HNO ₃ Anions: by cooling	267
2020/Round II.	DWS- „cations”, „anions”	Groundwater sampling (on-site measurements by Participants: pH (20°C), conductivity (20°C); laboratory measurements by Provider's subcontractor: Ca, Mg, Fe, Cl ⁻ , SO ₄ ²⁻ , NO ₃ ⁻ .)	3 x 50 cm ³ for cations 3 x 500 cm ³ for anions	natural surface water	Cations: HNO ₃ Anions: by cooling	267
2020/Round III.	BWS- „cations”, „COD _{Mn} + anions”	Bath water sampling (on-site measurements by Participants: pH (20°C), free active chlorine, bound active chlorine, total active chlorine; laboratory measurements by Provider's subcontractor: Ca, Mg, Fe, Mn, Cl ⁻ , NO ₃ ⁻ + COD _{Mn})	3 x 50 cm ³ for cations 3 x 500 cm ³ for anions+ COD _{Mn}	bathing water	Cations: HNO ₃ Anions+COD _{Mn} : by cooling	267
2020/Round III.	PSOS	Polluted soil sampling (laboratory measurements by Provider's subcontractor: acid soluble quasi-total As, Cd, Cu, Pb, Zn)	3 x 300 g	area with a history of soil pollution	none	300
2020/Round III.	WS	Waste sampling (laboratory measurements by Provider's subcontractor: water soluble Cl ⁻ , SO ₄ ²⁻ and acid soluble quasi-total As, Cd, Cu, Pb, Zn)	3 x 2000 g	waste disposal site	by cooling	300

Sampling proficiency testing is not within accreditation scope.

Sampling bottles, filter papers and chemicals for water sample preservation are provided by the proficiency testing Provider. Samples are transported to subcontracted laboratory by the Provider.

Participants should prepare three laboratory samples on-site: one is retained by the Participant, two are to be handed over to the Provider, who sends one sample to the subcontracted laboratory for analysis and stores the other sample in a refrigerator for reference (under special circumstances, this sample may also be sent to the subcontracted laboratory for analysis).

The Provider reserves the right to choose different parameter(s) for evaluation if concentration of the proposed parameters is too low in the samples thus uncertainty of quantification is unsuitably high.

Annex I.: Scheduled distribution in the QualcoDuna Proficiency Testing Scheme in 2020.

Laboratory proficiency testing programme

Parameters in one row are distributed as one sample (except for pesticides).

2020/Round I. (Week 12, 16.03 - 18.03.)	
Theme	Parameters
Drinking water	pH (20°C), conductivity (20°C)
	Ca, Mg, total hardness, As, Ni, Pb, Zn
	NH_4^+ , NO_3^- , PO_4^{3-}
	NO_2^- , Hg
	COD _{Mn} , TOC
	F ⁻ (free)
Wastewater	As, Cd, Co, Cr, Cu, Ni, Pb, Zn
	Sb, Se, Sn
	NH_4^+ -N, NO_3^- -N, Kjeldahl N, PO_4^{3-} -P, total P
	NO_2^- -N, Hg
	COD _{Cr} , cBOD ₅ , TOC
	F ⁻ (free)
Sediment/ sludge	PAHs, PCBs
	EPH (C ₁₀ -C ₄₀)
Soil	Ag, As, Ba, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Se, Zn and B, Sb, Sn
	PAHs, PCBs
	EPH (C ₁₀ -C ₄₀)

2020/Round III. (Week 36, 31.08 - 02.09.)	
Theme	Parameters
Drinking water	Cl^- , SO_4^{2-} , K, Na
	Fe, Mn, Al, Ba, Cd, Cr, Cu
	Sb, Se, Sn
	phenol index
	AOX
	CN ⁻ (total)
	turbidity
Surface water	SO_4^{2-} , K, Na, Fe, Mn, Al, As, Cd, Cr, Cu
	total N
	COD _{Cr} , cBOD ₅ , TOC
	Sb, Se, Sn
	phenol index
	AOX
	CN ⁻ (total)
Bathing water	SO_4^{2-} , K, Na, Fe, Mn, Al, As, Cd, Cr, Cu
	turbidity
Emission quartz filter (digest)	As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Se, Sn, Te, Tl, V, Zn
Impinger solution	NO ₂
Surface water - biology	Seedling plant toxicology tests

2020/Round II. (Week 21, 18.05 - 20.05.)	
Theme	Parameters
Drinking water	Pesticides
Surface water	Cl^- , Ca, Mg, total hardness, Ni, Pb, Zn
	NH_4^+ -N, NO_3^- -N, PO_4^{3-} -P
	COD _{Mn} , TOC
	MBAS
Groundwater	Hg
	PAHs, PCBs
	EPH (C ₁₀ -C ₄₀)
	BTEX
Bathing water	Pesticides
	pH (20°), conductivity (20°C), total dissolved solids
	Cl^- , Ca, Mg, total hardness, Ni, Pb, Zn
	NH_4^+ -N, NO_3^- -N, PO_4^{3-} -P
Wastewater	COD _{Mn} , TOC
	MBAS
	pH (20°C), conductivity (20°C), total dissolved solids
	total OSE
Sediment/ sludge	AOX
	K, Na, Ca, Mg, Fe, Mn, As, B, Pb, Zn
Soil	BTEX
Surface water - biology	Chlorophyll-a
	Phytoplankton investigations
	Saprobiological investigations
	Daphnia toxicology tests

2020/Round IV. (Week 42, 12.10-14.10.)	
Theme	Parameters
Wastewater	Cl^- , SO_4^{2-} , K, Na
	Ca, Mg, total hardness, Fe, Mn, Al, Ba
	Ag
	B
	Mo
	Cr(VI)
	total N, organic N, TOC
	MBAS
	phenol index
	CN ⁻ (total)
Sediment/sludge	dry matter content (105 °C), loss and residue on ignition (600 °C), ash content (800 °C), total N, total P, Ba, Cd, Co, Cr, Cu, Mo, Ni, Se, Hg
Waste	pH (25°), conductivity (25°C), total water soluble material, Cl^- , SO_4^{2-} , F ⁻ (free), As, Ba, Cd, Co, Cr, Cu, Mo, Ni, Pb, Zn

Sampling proficiency testing programme

Theme	Parameters	Scheduled date
Drinking water sampling	on-site: pH (20°C), conductivity (20°C), free active chlorine, bound active chlorine, temperature	October
	by subcontracted laboratory: Ca, Mg, Fe, Mn, Na, Cl ⁻ , COD _{Mn}	
Surface water sampling	on-site: pH (20°C), conductivity (20°C)	May
	by subcontracted laboratory: Ca, Mg, Fe, Cl ⁻ , SO ₄ ²⁻ , NO ₃ ⁻	
Groundwater sampling	on-site: pH (20°C), conductivity (20°C)	May
	by subcontracted laboratory: Ca, Mg, Fe, Cl ⁻ , SO ₄ ²⁻ , NO ₃ ⁻	
Bathing water sampling	on-site: pH (20°C), free active chlorine, bound active chlorine, total active chlorine	September
	by subcontracted laboratory: Ca, Mg, Fe, Mn, Cl ⁻ , NO ₃ ⁻ , COD _{Mn}	
Polluted soil sampling	by subcontracted laboratory: As, Cd, Cu, Pb, Zn	September
Waste sampling	by subcontracted laboratory: Cl ⁻ , SO ₄ ²⁻ , As, Cd, Cu, Pb, Zn	September

Annex II.: Planned methods for determination of assigned value, expected concentration ranges, planned standard deviations for proficiency assessment (% of assigned value, σ_{PT} %).

Parameters in subsequent rows with identical shading are distributed in the same sample.

DRINKING WATER testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round I.	pH (20°C)	pH unit	DW-G-1,2	Robust average	5,0 - 9,0	0,07 pH unit
	Conductivity (20°C)	$\mu\text{S}/\text{cm}$		Robust average	400 - 1600	2
2020/Round III.	Cl^-	mg/dm^3	DW-G-3,4	Robust average	50 - 200	3,5
	SO_4^{2-}	mg/dm^3		Robust average	50 - 200	5
	K	mg/dm^3		Robust average	2 - 20	5
	Na	mg/dm^3		Robust average	30 - 150	5
2020/Round I.	Ca	mg/dm^3	DW-G/M-1,2	Robust average	30 - 160	3,5
	Mg	mg/dm^3		Robust average	3 - 40	5
	Total hardness	$\text{CaO mg}/\text{dm}^3$		Robust average	50 - 250	3,5
	As	$\mu\text{g}/\text{dm}^3$		By formulation	3 - 25	7
	Ni	$\mu\text{g}/\text{dm}^3$		By formulation	5 - 40	7
	Pb	$\mu\text{g}/\text{dm}^3$		By formulation	4 - 30	7
	Zn	$\mu\text{g}/\text{dm}^3$		By formulation	10 - 300	7
2020/Round III.	Al	$\mu\text{g}/\text{dm}^3$	DW-M-1,2	By formulation	50 - 200	7
	Ba	$\mu\text{g}/\text{dm}^3$		By formulation	100 - 1000	7
	Fe	$\mu\text{g}/\text{dm}^3$		By formulation	100 - 350	7
	Mn	$\mu\text{g}/\text{dm}^3$		By formulation	20 - 150	7
	Cd	$\mu\text{g}/\text{dm}^3$		By formulation	0,5 - 5	7
	Cr	$\mu\text{g}/\text{dm}^3$		By formulation	5 - 40	7
	Cu	$\mu\text{g}/\text{dm}^3$		By formulation	10 - 100	7
2020/Round I.	NH_4^+	mg/dm^3	DW-N-1,2	Robust average	0,1 - 0,7	7
	NO_3^-	mg/dm^3		Robust average	5 - 75	3,5
	PO_4^{3-}	mg/dm^3		Robust average	0,1 - 1,2	5
2020/Round I.	NO_2^-	mg/dm^3	DW-N/M-1,2	Robust average	0,05 - 1,0	7
	Hg	$\mu\text{g}/\text{dm}^3$		Robust average	0,5 - 5,0	7
2020/Round I.	COD_{Mn}	mg/dm^3	DW-Org-1,2	Robust average	1,0 - 9,0	5
	TOC	mg/dm^3		Robust average	2,0 - 15,0	5
2020/Round I.	F^- (free)	mg/dm^3	DW/WW-NS-1,2	By formulation	0,5 - 2,5	5

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round III.	Sb	$\mu\text{g}/\text{dm}^3$	DW/SW-M-1,2	By formulation	1,0 – 10	8,5
	Se	$\mu\text{g}/\text{dm}^3$		By formulation	2,0 – 20	8,5
	Sn	$\mu\text{g}/\text{dm}^3$		By formulation	1,0 – 20	8,5
2020/Round III.	Phenol index	$\mu\text{g}/\text{dm}^3$	DW/SW-Org-1,2	Robust average	5 - 40	7
2020/Round III.	AOX	$\mu\text{g}/\text{dm}^3$	DW/SW-Org-3,4	Robust average	30 – 180	7
2020/Round III.	CN ⁻ (total)	$\mu\text{g}/\text{dm}^3$	DW/SW-NS-1,2	Robust average	20 - 120	8,5
2020/Round III.	Turbidity	FNU	DW/SW/BW-NS-1,2	Robust average	0,3 - 2,8	7
2020/Round II.	Atrazine	$\mu\text{g}/\text{dm}^3$	DW/GW-Org-1,2	Robust average	0,03 - 0,25	17
	Diazinon	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 - 0,25	17
	Prometryne	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 - 0,25	17
	Simazine	$\mu\text{g}/\text{dm}^3$		Robust average	0,05 - 0,25	17
	Terbutryne	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 - 0,25	17
2020/Round II.	Acetochlor	$\mu\text{g}/\text{dm}^3$	DW/GW-Org-3,4	Robust average	0,02 - 0,25	17
	Alachlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,04 - 0,25	17
	4,4'-DDE	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 - 0,10	17
	4,4'-DDD	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 - 0,10	17
	4,4'-DDT	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 - 0,10	17
	Endosulfan ($\alpha+\beta$)	$\mu\text{g}/\text{dm}^3$		Robust average	0,05 - 0,25	17
	Lindane	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 - 0,25	17
	Metolachlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 - 0,25	17
	Propachlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 - 0,25	17
	Propisochlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 - 0,25	17
	Trifluralin	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 - 0,25	17
2020/Round II.	Aldrin	$\mu\text{g}/\text{dm}^3$	DW/GW-Org-5,6	Robust average	0,02 – 0,20	17
	Dieldrin	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17
	Endrin	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17
	Isodrin	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17

SURFACE WATER testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round II.	Cl ⁻	mg/dm ³	SW/BW-G/M-1,2	Robust average	Natural surface water (spiked if necessary)	5
	Ca	mg/dm ³		Robust average		3,5
	Mg	mg/dm ³		Robust average		5
	Total hardness	CaO mg/dm ³		Robust average		3,5
	Ni	µg/dm ³		Robust average		7
	Pb	µg/dm ³		Robust average		7
	Zn	µg/dm ³		Robust average		7
2020/Round III.	SO ₄ ²⁻	mg/dm ³	SW/BW-G/M-3,4	Robust average		7
	K	mg/dm ³		Robust average		5
	Na	mg/dm ³		Robust average		5
	Fe	µg/dm ³		Robust average		7
	Mn	µg/dm ³		Robust average		7
	Al	µg/dm ³		Robust average		7
	As	µg/dm ³		Robust average		7
	Cd	µg/dm ³		Robust average		7
	Cr	µg/dm ³		Robust average		7
	Cu	µg/dm ³		Robust average		7
2020/Round II.	NH ₄ ⁺ - N	mg/dm ³	SW/BW-N-1,2	Robust average		7
	NO ₃ ⁻ - N	mg/dm ³		Robust average		7
	PO ₄ ³⁻ - P	mg/dm ³		Robust average		7
2020/Round II.	COD _{Mn}	mg/dm ³	SW/BW-Org-1,2	Robust average	2 – 10	5
	TOC	mg/dm ³		Robust average	3 – 15	5
2020/Round II.	MBAS	µg/dm ³	SW/BW-Org-3,4	Robust average	40 - 200	10
2020/Round II.	Hg	µg/dm ³	SW-M-1,2	Robust average	Natural surface water (spiked if necessary)	7
2020/Round III.	Total N	mg/dm ³	SW-N-1,2	Robust average		10
2020/Round III.	COD _k	mg/dm ³	SW-Org-1,2	Robust average		7
	cBOD ₅	mg/dm ³		Robust average		10
	TOC	mg/dm ³		Robust average		5
2020/Round III.	Sb	µg/dm ³	DW/SW-M-1,2	By formulation	1,0 – 10	8,5
	Se	µg/dm ³		By formulation	2,0 – 20	8,5
	Sn	µg/dm ³		By formulation	1,0 – 20	8,5



QualcoDuna Proficiency Testing Scheme

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WESSLING International Research
and Educational Center (WIREC)

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round III.	Phenol index	$\mu\text{g}/\text{dm}^3$	DW/SW-Org-1,2	Robust average	5 - 40	7
2020/Round III.	AOX	$\mu\text{g}/\text{dm}^3$	DW/SW-Org-3,4	Robust average	30 – 180	7
2020/Round III.	CN ⁻ (total)	$\mu\text{g}/\text{dm}^3$	DW/SW-NS-1,2	Robust average	20 - 120	8,5
2020/Round III.	Turbidity	FNU	DW/SW/BW-NS-1,2	Robust average	0,3 - 2,8	7

GROUNDWATER testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round II.	Acenaphthene	$\mu\text{g}/\text{dm}^3$	GW-Org-1,2	Robust average	PAH total: 0,2 - 1,2	17
	Acenaphthylene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Antracene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Benz(a)anthracene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Benz(a)pyrene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Benz(e)pyrene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Benz(b)fluoranthene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Benz(k)fluoranthene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Benz(g,h,i)perylene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Dibenz(a,h)anthracene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Phenanthrene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Fluoranthene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Fluorene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Indeno(1,2,3-cd)pyrene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Chrysene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	Pyrene	$\mu\text{g}/\text{dm}^3$		Robust average		17
	PCB-28	$\mu\text{g}/\text{dm}^3$		Robust average	PCB total: 0,01 - 0,12	14
	PCB-52	$\mu\text{g}/\text{dm}^3$		Robust average		14
	PCB-101	$\mu\text{g}/\text{dm}^3$		Robust average		14
	PCB-118	$\mu\text{g}/\text{dm}^3$		Robust average		14
	PCB-138	$\mu\text{g}/\text{dm}^3$		Robust average		14
	PCB-153	$\mu\text{g}/\text{dm}^3$		Robust average		14
	PCB-180	$\mu\text{g}/\text{dm}^3$		Robust average		14
2020/Round II.	EPH ($\text{C}_{10}\text{-C}_{40}$)	$\mu\text{g}/\text{dm}^3$	GW-Org-3,4	Robust average	30 – 200	17
2020/Round II.	Benzene	$\mu\text{g}/\text{dm}^3$	GW-Org-5,6	Robust average	0,3 - 3,5	17
	Toluene	$\mu\text{g}/\text{dm}^3$		Robust average	10 - 65	17
	Ethylbenzene	$\mu\text{g}/\text{dm}^3$		Robust average	10 - 65	17
	Xylenes (Σ o,m,p)	$\mu\text{g}/\text{dm}^3$		Robust average	5 - 65	17
2020/Round II.	Atrazine	$\mu\text{g}/\text{dm}^3$	DW/GW-Org-1,2	Robust average	0,03 – 0,25	17
	Diazinon	$\mu\text{g}/\text{dm}^3$		Robust average	0,04 – 0,25	17
	Prometryne	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17
	Simazine	$\mu\text{g}/\text{dm}^3$		Robust average	0,05 – 0,25	17
	Terbutryne	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round II.	Acetochlor	$\mu\text{g}/\text{dm}^3$	DW/GW-Org-3,4	Robust average	0,02 – 0,25	17
	Alachlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,04 – 0,25	17
	4,4'-DDE	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 – 0,10	17
	4,4'-DDD	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 – 0,10	17
	4,4'-DDT	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 – 0,10	17
	Endosulfan ($\alpha+\beta$)	$\mu\text{g}/\text{dm}^3$		Robust average	0,05 – 0,25	17
	Lindane	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 – 0,20	17
	Metolachlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 – 0,20	17
	Propachlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17
	Propisochlor	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 – 0,20	17
	Trifluralin	$\mu\text{g}/\text{dm}^3$		Robust average	0,01 – 0,20	17
2020/Round II.	Aldrin	$\mu\text{g}/\text{dm}^3$	DW/GW-Org-5,6	Robust average	0,02 – 0,20	17
	Dieldrin	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17
	Endrin	$\mu\text{g}/\text{dm}^3$		Robust average	0,02 – 0,20	17
	Isodrin	$\mu\text{g}/\text{dm}^3$		Robust average	0,03 – 0,20	17

BATHING WATER testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round II.	pH (20°C)	pH unit	BW/WW-G-1,2	Robust average	5 – 8	0,07 pH unit
	Conductivity(20°C)	$\mu\text{S}/\text{cm}$		Robust average	500 – 2000	3,5
	Total dissolved solids	mg/dm^3		Robust average	400 – 2000	3,5
2020/Round II.	Cl^-	mg/dm^3	SW/BW-G/M-1,2	Robust average	Natural surface water (spiked if necessary)	5
	Ca	mg/dm^3		Robust average		3,5
	Mg	mg/dm^3		Robust average		5
	Total hardness	$\text{CaO mg}/\text{dm}^3$		Robust average		3,5
	Ni	$\mu\text{g}/\text{dm}^3$		Robust average		7
	Pb	$\mu\text{g}/\text{dm}^3$		Robust average		7
	Zn	$\mu\text{g}/\text{dm}^3$		Robust average		7
2020/Round III.	SO_4^{2-}	mg/dm^3	SW/BW-G/M-3,4	Robust average		7
	K	mg/dm^3		Robust average		5
	Na	mg/dm^3		Robust average		5
	Fe	$\mu\text{g}/\text{dm}^3$		Robust average		7
	Mn	$\mu\text{g}/\text{dm}^3$		Robust average		7
	Al	$\mu\text{g}/\text{dm}^3$		Robust average		7
	As	$\mu\text{g}/\text{dm}^3$		Robust average		7
	Cd	$\mu\text{g}/\text{dm}^3$		Robust average		7
	Cr	$\mu\text{g}/\text{dm}^3$		Robust average		7
	Cu	$\mu\text{g}/\text{dm}^3$		Robust average		7
2020/Round II.	$\text{NH}_4^+ - \text{N}$	mg/dm^3	SW/BW-N-1,2	Robust average		7
	$\text{NO}_3^- - \text{N}$	mg/dm^3		Robust average		5
	$\text{PO}_4^{3-} - \text{P}$	mg/dm^3		Robust average		7
2020/Round II.	COD_{Mn}	mg/dm^3	SW/BW-Org-1,2	Robust average	2 – 10	5
	TOC	mg/dm^3		Robust average	3 – 15	5
2020/Round II.	MBAS	$\mu\text{g}/\text{dm}^3$	SW/BW-Org-3,4	Robust average	40 - 200	10
2020/Round III.	Turbidity	FNU	DW/SW/BW-NS-1,2	Robust average	0,3 - 2,8	7

WASTEWATER testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round II.	pH (20°C)	pH unit	BW/WW-G-1,2	Robust average	5 – 8	0,07 pH unit
	Conductivity(20°C)	$\mu\text{S}/\text{cm}$		Robust average	500 – 2000	3,5
	Total dissolved solids	mg/dm^3		Robust average	400 – 2000	3,5
2020/Round IV.	Cl^-	mg/dm^3	WW-G-1,2	Robust average	60 – 300	3,5
	SO_4^{2-}	mg/dm^3		Robust average	100 – 400	3,5
	K	mg/dm^3		Robust average	3 – 25	3,5
	Na	mg/dm^3		Robust average	60 – 250	3,5
2020/Round IV.	Ca	mg/dm^3	WW-G/M-1,2	Robust average	30 – 200	3,5
	Mg	mg/dm^3		Robust average	5 – 35	5
	Total hardness	$\text{CaO mg}/\text{dm}^3$		Robust average	100 – 300	3,5
	Fe	mg/dm^3		Robust average	3 – 25	3,5
	Mn	mg/dm^3		Robust average	0,5 – 8	3,5
	Al	mg/dm^3		Robust average	0,5 – 6	5
	Ba	mg/dm^3		Robust average	0,3 – 3,0	5
2020/Round I.	As	mg/dm^3	WW-M-1,2	By formulation	0,1 – 1,0	3,5
	Cd	mg/dm^3		By formulation	0,05 – 1,0	3,5
	Co	mg/dm^3		By formulation	0,1 – 2,5	3,5
	Cr	mg/dm^3		By formulation	0,2 – 2,0	3,5
	Cu	mg/dm^3		By formulation	0,5 – 6,0	3,5
	Ni	mg/dm^3		By formulation	0,5 – 4,0	3,5
	Pb	mg/dm^3		By formulation	0,1 – 2,0	3,5
	Zn	mg/dm^3		By formulation	0,5 – 10,0	3,5
2020/Round I.	Sb	mg/dm^3	WW-M-3,4	By formulation	0,3 – 2,5	5
	Se	mg/dm^3		By formulation	0,1 – 2,0	5
	Sn	mg/dm^3		By formulation	0,1 – 2,5	5

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round IV.	Ag	mg/dm ³	WW-M-5,6	By formulation	0,03 – 0,4	5
2020/Round IV.	B	mg/dm ³	WW-M-7,8	Robust average	0,1 – 2,5	5
2020/Round IV.	Mo	mg/dm ³	WW-M-9,10	By formulation	0,1 – 1,5	5
2020/Round IV.	Cr(VI)	mg/dm ³	WW-M-11,12	Robust average	0,05 – 1,5	5
2020/Round I.	NH ₄ ⁺ -N	mg/dm ³	WW-N-1,2	Robust average	2,0 – 18,0	5
	NO ₃ ⁻ - N	mg/dm ³		Robust average	8,0 – 80,0	3,5
	Kjeldahl - N	mg/dm ³		Robust average	3,0 – 18,0	7
	PO ₄ ³⁻ - P	mg/dm ³		Robust average	1,0 – 9,0	5
	Total P	mg/dm ³		Robust average	1,0 – 15,0	5
2020/Round I.	NO ₂ ⁻ - N	mg/dm ³	WW-N/M-1,2	Robust average	0,10 – 1,2	5
	Hg	µg/dm ³		Robust average	10 – 50	5
2020/Round IV.	Total nitrogen	mg/dm ³	WW-N/Org-1,2	Robust average	10 – 70	7
	Organic nitrogen	mg/dm ³		Robust average	1,0 – 5,0	10
	TOC	mg/dm ³		Robust average	20 – 200	3,5
2020/Round I.	COD _k	mg/dm ³	WW-Org-1,2	Robust average	250 – 1300	3,5
	cBOD ₅	mg/dm ³		Robust average	160 – 800	7
	TOC	mg/dm ³		Robust average	10 – 50	3,5
2020/Round II.	total OSE	mg/sample	WW-Org-3,4	Robust average	5 – 35	10
2020/Round II.	AOX	mg/dm ³	WW-Org-5,6	Robust average	0,3 – 2,0	7
2020/Round IV.	MBAS	mg/dm ³	WW-Org-7,8	Robust average	0,3 – 3,0	7
2020/Round IV.	Phenol index	mg/dm ³	WW-Org-9,10	Robust average	0,05 – 2,0	7
2020/Round IV.	CN ⁻ (total)	mg/dm ³	WW-NS-1,2	Robust average	0,7 – 3,5	5
2020/Round I.	F ⁻ (free)	mg/dm ³	DW/WW-NS-1,2	By formulation	0,5 – 2,5	5

WASTEWATER SLUDGE/SURFACE WATER SEDIMENT testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned % σ_{PT}
2020/Round II.	COD _k	g/kg d.w.	SL-1,2	Robust average	Natural river sediment mixed with wastewater sludge	7
	TOC	g/kg d.w.		Robust average		10
	Ca (HNO ₃ +H ₂ O ₂ or aqua regia)	g/kg d.w.		Robust average		10
	Mg (HNO ₃ +H ₂ O ₂ or aqua regia)	g/kg d.w.		Robust average		10
	K (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		14
	Na (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		14
	Fe (HNO ₃ +H ₂ O ₂ or aqua regia)	g/kg d.w.		Robust average		10
	Mn (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	As (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	B (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Pb (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Zn (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
2020/Round IV.	Dry matter content (105 °C)	g/kg	SL-3,4	Robust average	Natural river sediment mixed with wastewater sludge	1
	Residue on ignition (600 °C)	g/kg d.w.		Robust average		2
	Loss on ignition (600 °C)	g/kg d.w.		Robust average		10
	Ash content (800 °C)	g/kg d.w.		Robust average		2
	total N	mg/kg d.w.		Robust average		10
	total P	mg/kg d.w.		Robust average		10
	Ba (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cd (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Co (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cr (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cu (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Mo (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Ni (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Se (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Hg (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round I.	Acenaphthene	$\mu\text{g/kg d.w.}$	SL/SO-Org-1,2	Robust average	10 – 200	17
	Acenaphthylene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Antracene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(a)anthracene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(a)pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(e)pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(b)fluoranthene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(k)fluoranthene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(g,h,i)perylene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Dibenz(a,h)anthracene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Phenanthrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Fluoranthene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Fluorene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Indeno(1,2,3-cd)pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Chrysene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	PCB-28	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-52	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-101	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-118	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-138	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-153	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-180	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
2020/Round I.	EPH (C ₁₀ -C ₄₀)	mg/kg d.w.	SL/SO-Org-3,4	Robust average	50 – 1500	17

SOIL testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round I.	Ag (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.	SO-M-1,2	Robust average	Natural soil sample, spiked if necessary	From Horwitz-equation
	As (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Ba (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cd (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Co (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cr (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cu (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Hg (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Mo (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Ni (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Pb (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Se (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Zn (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	B (HNO ₃ +H ₂ O ₂ or aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Sb (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Sn (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
2020/Round II.	Benzene	mg/kg d.w.	SO-Org-1,2	Robust average	0,5 – 5	17
	Toluene	mg/kg d.w.		Robust average	0,5 – 8	17
	Ethylbenzene	mg/kg d.w.		Robust average	0,5 – 10	17
	Xylenes (Σ o,m,p)	mg/kg d.w.		Robust average	0,5 – 12	17

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round I.	Acenaphthene	$\mu\text{g/kg d.w.}$	SL/SO-Org-1,2	Robust average	10 – 200	17
	Acenaphthylene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Antracene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(a)anthracene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(a)pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(e)pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(b)fluoranthene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(k)fluoranthene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Benz(g,h,i)perylene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Dibenz(a,h)anthracene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Phenanthrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Fluoranthene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Fluorene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Indeno(1,2,3-cd)pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Chrysene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	Pyrene	$\mu\text{g/kg d.w.}$		Robust average	10 – 200	17
	PCB-28	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-52	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-101	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-118	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-138	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-153	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
	PCB-180	$\mu\text{g/kg d.w.}$		Robust average	10 – 150	14
2020/Round I.	EPH (C ₁₀ -C ₄₀)	mg/kg d.w.	SL/SO-Org-3,4	Robust average	50 – 1500	17

Waste testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round IV.	pH (25°C) (1:10 water extract)	pH unit	W-1,2	Robust average	Real industrial waste	0,20 pH unit
	Conductivity(25°C) (1:10 water extract)	$\mu\text{S/cm}$		Robust average		10
	total water soluble content (1:10 water extract)	g/kg d.w.		Robust average		10
	Cl^- (1:10 water extract)	mg/kg d.w.		Robust average		10
	SO_4^{2-} (1:10 water extract)	mg/kg d.w.		Robust average		10
	F^- (free) (1:10 water extract)	mg/kg d.w.		Robust average		15
	Al (aqua regia)	mg/kg d.w.		Robust average		10
	Ba (1:10 water extract and aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Co (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cr (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Cu (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Ni (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Pb (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Ti (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	Zn (1:10 water extract and aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation
	V (aqua regia)	mg/kg d.w.		Robust average		From Horwitz-equation

EMISSION QUARTZ FILTERS (digest) testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round III.	As	$\mu\text{g}/\text{dm}^3$	EM-M-1,2	Robust average	10 – 120	7
	Cd	$\mu\text{g}/\text{dm}^3$		Robust average	5 – 70	7
	Co	$\mu\text{g}/\text{dm}^3$		Robust average	10 – 90	7
	Cr	$\mu\text{g}/\text{dm}^3$		Robust average	40 – 180	7
	Cu	$\mu\text{g}/\text{dm}^3$		Robust average	10 – 120	7
	Hg	$\mu\text{g}/\text{dm}^3$		Robust average	2 – 30	7
	Mn	$\mu\text{g}/\text{dm}^3$		Robust average	40 – 250	7
	Ni	$\mu\text{g}/\text{dm}^3$		Robust average	30 – 130	7
	Pb	$\mu\text{g}/\text{dm}^3$		Robust average	40 – 150	7
	Sb	$\mu\text{g}/\text{dm}^3$		Robust average	5 – 90	10
	Se	$\mu\text{g}/\text{dm}^3$		Robust average	5 – 90	10
	Sn	$\mu\text{g}/\text{dm}^3$		Robust average	10 – 90	10
	Te	$\mu\text{g}/\text{dm}^3$		Robust average	10 – 90	13,5
	Tl	$\mu\text{g}/\text{dm}^3$		Robust average	5 – 80	13,5
	V	$\mu\text{g}/\text{dm}^3$		Robust average	50 – 200	10
	Zn	$\mu\text{g}/\text{dm}^3$		Robust average	50 – 180	7

IMPINGER SOLUTIONS testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round III.	NO ₂	mg/dm^3	IM-NO2-1,2	Robust average	0,2 – 2,0	7

SURFACE WATER – BIOLOGICAL INTERCOMPARISONS testing

Round	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
2020/Round II.	a-klorofill	$\mu\text{g}/\text{dm}^3$	SW-HB-1,2	Robust average	Natural surface water	15
	total number of algae	ind/cm^3	SW-HB-3,4	Robust average		25
	biomass estimate of algae	mg/dm^3	SW-HB-3,4	Robust average		25
	S-index	-	SW-HB-5,6	Robust average		5
2020/Round III.	Daphnia test (24h)	-	SW-TOX-1,2	Robust average	-	15
	Daphnia test (48h)	-	SW-TOX-1,2	Robust average	-	18
	Seedling plant test (with own seeds)	-	SW-TOX-3,4	Robust average	-	15
	Seedling plant test (with WESSLING seeds)	-	SW-TOX-3,4	Robust average	-	15

SAMPLING

Theme	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
Drinking water sampling	pH (20°C)	pH unit	DWS- on-site	Robust average	real drinking water	Rob. st. dev.(pH e.) (min. $0,75 \cdot \sigma_{lab}$, max. 0,2 pH e.)
	Conductivity(20°C)	$\mu S/cm$		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Free aktív chlorine	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Bound active chlorine	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Temperature	°C		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Ca	mg/dm^3	DWS- by subcontracted laboratory „cations”, „anions+ COD _{Mn} ”	Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Mg	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Fe	$\mu g/dm^3$		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Mn	$\mu g/dm^3$		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Na	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Cl ⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	COD _{Mn}	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
Surface water sampling	pH (20°C)	pH unit	SWS- on-site	Robust average	natural surface water	Rob. st. dev.(pH e.) (min. $0,75 \cdot \sigma_{lab}$, max. 0,2 pH e.)
	Conductivity(20°C)	$\mu S/cm$		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Ca	mg/dm^3	SWS- by subcontracted laboratory	Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Mg	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Fe	$\mu g/dm^3$	„cations”, „anions”	Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Cl ⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	SO ₄ ²⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	NO ₃ ⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)

Theme	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
Groundwater sampling	pH (20°C)	pH unit	GWS- on-site	Robust average	natural groundwater	Rob. st. dev.(pH e.) (min. $0,75 \cdot \sigma_{lab}$, max. 0,2 pH e.)
	Conductivity(20°C)	$\mu S/cm$		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Ca	mg/dm^3	GWS- by subcontracted laboratory „cations”, „anions”	Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Mg	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Fe	$\mu g/dm^3$		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Cl ⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	SO ₄ ²⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	NO ₃ ⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
Bathing water sampling	pH (20°C)	pH unit	BWS- on-site	Robust average	real bathing water	Rob. st. dev. (pH e.) (min. $0,75 \cdot \sigma_{lab}$, max. 0,2 pH e.)
	Free aktiv chlorine	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Bound active chlorine	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Total active chlorine	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Ca	mg/dm^3	BWS - by subcontracted laboratory „cation”, „anions + COD _{Mn}	Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Mg	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Fe	$\mu g/dm^3$		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Mn	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	Cl ⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	NO ₃ ⁻	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)
	COD _{Mn}	mg/dm^3		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 25 %)

Theme	Parameter	Unit of measurement	Sample ID	Planned method for determination of assigned value	Expected concentration range	Planned σ_{PT} %
Polluted soil sampling	As	mg/kg d.w.	PSOS- by subcontracted laboratory	Robust average	real polluted soil	Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Cd	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Cu	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Pb	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Zn	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
Waste sampling	Cl ⁻	mg/kg d.w.	WS- by subcontracted laboratory	Robust average	real waste	Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	SO ₄ ²⁻	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	As	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Cd	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Cu	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Pb	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)
	Zn	mg/kg d.w.		Robust average		Rob. st. dev. % (min. $0,75 \cdot \sigma_{lab}$, max. 30 %)

Record of issue status and modifications:

Issue	Issue date	Details

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