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Meeting of the Parties to the
Convention on Access to Information,
Public Participation in Decision-making and
Access to Justice in Environmental Matters

Working Group on Pollutant Release and Transfer Registers
(Second meeting, Geneva, 13-15 April 2005)

ANNEXES ^{*/}

I. GLOSSARY AND TABLE OF DEFINITIONS

A. Glossary

(i) Abbreviations

- a. BAT: Best Available Technology
- b. BREF notes: BAT reference documents
- c. BTEX: Benzene, Toluene, Ethyl Benzene and Xylenes
- d. CAS: Chemical Abstract Service
- e. CEC: Commission for Environmental Corporation
- f. CEFIC: Cefic - European Chemical Industry Council
- g. CEN: European Committee for Standardization
- h. CRF: Common Reporting Format (United Nations Framework Convention on Climate Change (UNFCCC) reporting)

^{*/} This document was submitted late due to the need to hold in-depth consultations over the text with a number of leading experts on the topic of pollution registers.

- i. EECCA: Eastern Europe, Caucasus and Central Asia
- j. EPER: European Pollutant Emission Register
- k. E-PRTR: European PRTR
- l. EU: European Union
- m. ICCA: International Council of Chemical Associations
- n. IOMC: Inter-Organization Programme of Sound Management of Chemicals
- o. IPCC: Intergovernmental Panel on Climate Change
- p. IPPC Directive: Integrated Pollution Prevention and Control Directive of the Council of the European Union (96/61/EC)
- q. ISIC: International Standard Industrial Classification
- r. ISO: International Organization for Standardization
- s. LRTAP: UNECE Convention on Long-Range Transboundary Air Pollutants
- t. MARPOL: International Convention for the Prevention of Pollution from Ships
- u. MPU: Manufacture, use or process, in relation to the employee approach on selecting facilities and using thresholds
- v. NFR: Nomenclature for reporting (LRTAP reporting format)
- w. NGO: Non-governmental organization
- x. NMVOC: The generic term for the sum of all non methane volatile organic compounds. The group includes individual VOCs such as benzene, polycyclic aromatic hydrocarbons (PAHs) and 1,3-butadiene
- y. NPRI: Canada's National Pollutant Release Inventory
- z. OECD: Organisation For Economic Cooperation and Development
- aa. OSPAR: Convention for the Protection of the Marine Environment of the North-east Atlantic
- bb. POPs: Persistent Organic Pollutants
- cc. PRTR: Pollutant Release and Transfer Register
- dd. QA/QC: Quality assurance and quality control
- ee. RET: Release estimation technique
- ff. SME: Small and medium-sized enterprises
- gg. TEQ: Toxic equivalent (dioxins and furans)
- hh. TOC: Total organic carbon
- ii. TRI: United States Toxics Release Inventory
- jj. UNCED: United Nations Conference on Environment and Development
- kk. UNECE: United Nations Economic Committee for Europe
- ll. UNFCCC: United Nations Framework Convention on Climate Change
- mm. UNITAR: United Nations Institute for Training and Research
- nn. XML: Extensible markup language

(ii) **Definitions**

a. **Definitions from Article 2 of the PRTR Protocol**

- i. “Competent authority” means the national authority or authorities, or any other competent body or bodies, designated by a Party to manage a national pollutant release and transfer register system;

- ii. “Convention” means the Convention on Access to Information, Public Participation in Decision making and Access to Justice in Environmental Matters, done at Aarhus, Denmark, on 25 June 1998;
- iii. “Diffuse sources” means the many smaller or scattered sources from which pollutants may be released to land, air or water, whose combined impact on those media may be significant and for which it is impractical to collect reports from each individual source;
- iv. “Facility” means one or more installations on the same site, or on adjoining sites, that are owned or operated by the same natural or legal person;
- v. The terms “national” and “nationwide” shall, with respect to the obligations under the Protocol on Parties that are regional economic integration organizations, be construed as applying to the region in question unless otherwise indicated;
- vi. “Off-site transfer” means the movement beyond the boundaries of the facility of either pollutants or waste destined for disposal or recovery and of pollutants in waste water destined for waste-water treatment;
- vii. “Party” means, unless the text indicates otherwise, a State or a regional economic integration organization referred to in article 24 which has consented to be bound by this Protocol and for which the Protocol is in force;
- viii. “Pollutant” means a substance or a group of substances that may be harmful to the environment or to human health on account of its properties and of its introduction into the environment;
- ix. “The public” means one or more natural or legal persons, and, in accordance with national legislation or practice, their associations, organizations or groups;
- x. “Release” means any introduction of pollutants into the environment as a result of any human activity, whether deliberate or accidental, routine or non-routine, including spilling, emitting, discharging, injecting, disposing or dumping, or through sewer systems without final wastewater treatment;
- xi. “Waste” means substances or objects which are:
 - (a) Disposed of or recovered;
 - (b) Intended to be disposed of or recovered; or
 - (c) Required by the provisions of national law to be disposed of or recovered;
- xii. “Hazardous waste” means waste that is defined as hazardous by the provisions of national law;
- xiii. “Other waste” means waste that is not hazardous waste;
- xiv. “Waste water” means used water containing substances or objects that is subject to regulation by national law.

b. Definitions based on the European Union EPER Decision

- i. "Emission" is the direct release of a pollutant to air, soil and water as well as the indirect release by transfer to an off-site wastewater treatment plant.
- ii. "Reporting cycle" is the cycle of the total reporting process, consisting of the collection, validation, submission, management and dissemination of the reported data.
- iii. "Site" is the geographical location of the facility."
- iv. "Substance" means any chemical element and its compounds, with the exception of radioactive substances.

c. Definitions based on the European Union IPPC Directive

- i. "Emission" shall mean the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into the air, water or land;
- ii. "Operator" shall mean any natural or legal person who operates or controls the installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated.
- iii. "Pollution" shall mean the direct or indirect introduction as a result of human activity, of substances, vibrations, heat or noise into the air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment.

d. Definitions based on the European Union proposal for an E-PRTR

- i. "Channelled releases" means the releases of pollutants into the environment through any kind of pipe, regardless of the shape of its cross-section.
- ii. "Installation" means a stationary technical unit where one or more activities listed in Annex I are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution.
- iii. "Reporting year" means the calendar year for which data on releases of pollutants and off-site transfers must be gathered.

II. FURTHER READING

A. United Nations Institute for Training and Research (UNITAR)

1. International guidance documents on PRTR design¹

- (a) Implementing a National PRTR Design Project 1997 English, Spanish
- (b) Supplement 1: Preparing a National PRTR Infrastructure Assessment 1997 English, Spanish
- (c) Supplement 2: Designing the Key Features of a National PRTR System 1997 English, Spanish
- (d) Supplement 3: Implementing a PRTR Pilot Reporting Trial 1997 English, Spanish
- (e) Supplement 4: Structuring a National PRTR Proposal 1997 English, Spanish
- (f) Addressing Industry Concerns Related to PRTRs 1998 English

2. Estimation and reporting of emission releases²

- (a) Guidance for Facilities on PRTR Data Estimation and Reporting 1998 English
- (b) Estimating Environmental Releases for Facility PRTR Reporting: Introduction and Guide to Methods, The Hampshire Research Institute for UNITAR 1997 English
- (c) Guidance on Estimating Non-point Source Emissions 1998 English
- (d) International PRTR Conferences, Workshops and Related Events

3. Pollutant release and transfer registers in the Americas³

- (a) Memorias del Taller Sobre el registro de Emisiones y Transferencia de Contaminantes Para los Países de las Américas, 29-31 July 1997, Queretaro, Mexico - UNITAR, OECD, SEMARNAP, CEC, UNEP 1998 Spanish, Memoria-7 with annex, table and PRTR web sites.

4. Training and Capacity Building Programme⁴

- (a) UNITAR Training and Capacity Building Programme to Facilitate the Design and Implementation of National Pollutant Release and Transfer Registers (PRTRs) Online Version and Offline (PDF) Version.

III. ANALYTICAL PROCEDURES FOR 86 POLLUTANTS

1. In tables 1 – 3 indicative lists are given of standardized analytical procedures for the measurement of some of the 86 PRTR pollutants of annex II in releases and transfers to air, water and land. When no standardized analytical procedure is given it means that there is (yet) no agreement on an international level on how to determine the pollutant and one should look for procedures used nationally.

A. Standardized analytical procedures for the determination of pollutants of annex II released to air

2. Table 1 gives an indicative list of measurement methods of pollutants to air.

Table 1 indicative list of standardized analytical procedures for the determination of the 86 pollutants of annex II in releases and transfers to air, water and land

No.	CAS number	Pollutant	
1	74-82-8	Methane (CH ₄)	
2	630-08-0	Carbon monoxide (CO)	ISO 12039:2001
3	124-38-9	Carbon dioxide (CO ₂)	ISO 12039:2001
4		Hydro-fluorocarbons (HFCs)	
5	10024-97-2	Nitrous oxide (N ₂ O)	
6	7664-41-7	Ammonia (NH ₃)	
7		Non-methane volatile organic compounds (NMVOC)	EN 12619:1999
			EN 13526:2001
			EN 13649:2001
8		Nitrogen oxides (NO _x /NO ₂)	ISO 10849:1996, ISO 11564:1998,
9		Perfluorocarbons (PFCs)	
10	2551-62-4	Sulphur hexafluoride (SF ₆)	
11		Sulphur oxides (SO _x /SO ₂)	ISO 7934:1989, ISO 7935:1992, ISO 11632:1998
12		Total nitrogen	
13		Total phosphorus	
14		Hydrochlorofluorocarbons (HCFCs)	
15		Chlorofluorocarbons (CFCs)	
16		Halons	
17	7440-38-2	Arsenic and compounds (as As)	EN 14385:2004
18	7440-43-9	Cadmium and compounds (as Cd)	EN 14385:2004
19	7440-47-3	Chromium and compounds (as Cr)	EN 14385:2004
20	7440-50-8	Copper and compounds (as Cu)	EN 14385:2004
21	7439-97-6	Mercury and compounds (as Hg)	EN 13211:2001
22	7440-02-0	Nickel and compounds (as Ni)	EN 14385:2004
23	7439-92-1	Lead and compounds (as Pb)	EN 14385:2004
24	7440-66-6	Zinc and compounds (as Zn)	
25	15972-60-8	Alachlor	
26	309-00-2	Aldrin	
27	1912-24-9	Atrazine	
28	57-74-9	Chlordane	
29	143-50-0	Chlordecone	
30	470-90-6	Chlorfenvinphos	
31	85535-84-8	Chloro-alkanes, C10-C13	
32	2921-88-2	Chlorpyrifos	
33	50-29-3	DDT	
34	107-06-2	1,2-dichloroethane	
35	75-09-2	Dichloromethane	
36	60-57-1	Dieldrin	
37	330-54-1	Diuron	
38	115-29-7	Endosulphan	
39	72-20-8	Endrin	
40		Halogenated organic compounds (as AOX)	
41	76-44-8	Heptachlor	

No.	CAS number	Pollutant	
42	118-74-1	Hexachlorobenzene (HCB)	
43	87-68-3	Hexachlorobutadiene (HCBd)	
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	
45	58-89-9	Lindane	
46	2385-85-5	Mirex	
47		PCDD + PCDF (dioxins + furans) as Teq	EN 1948-1:1996 / EN 1948-2:1996 / EN 1948-3:1996
48	608-93-5	Pentachlorobenzene	
49	87-86-5	Pentachlorophenol (PCP)	
50	1336-36-3	Polychlorinated biphenyls (PCBs)	
51	122-34-9	Simazine	
52	127-18-4	Tetrachloroethylene (PER)	
53	56-23-5	Tetrachloromethane (TCM)	
54	12002-48-1	Trichlorobenzenes (TCBs)	
55	71-55-6	1,1,1-trichloroethane	
56	79-34-5	1,1,2,2-tetrachloroethane	
57	79-01-6	Trichloroethylene	
58	67-66-3	Trichloromethane	
59	8001-35-2	Toxaphene	
60	75-01-4	Vinyl chloride	
61	120-12-7	Anthracene	
62	71-43-2	Benzene	
63		Brominated diphenylethers (PBDE)	
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	
65	100-41-4	Ethyl benzene	
66	75-21-8	Ethylene oxide	
67	34123-59-6	Isoproturon	
68	91-20-3	Naphthalene	
69		Organotin compounds (as total Sn)	
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	
71	108-95-2	Phenols (as total C)	
72		Polycyclic aromatic hydrocarbons (PAHs) b/	ISO 11338-1:2003 ISO 11338-2:2003
73	108-88-3	Toluene	
74		Tributyltin and compounds	
75		Triphenyltin and compounds	
76		Total organic carbon (TOC) (as total C or COD/3)	
77	1582-09-8	Trifluralin	
78	1330-20-7	Xylenes	
79		Chlorides (as total Cl)	
80		Chlorine and inorganic compounds (as HCl)	EN 1911-1:1998 EN 1911-2:1998 EN 1911-3:1998
81	1332-21-4	Asbestos	ISO 10397:1993
82		Cyanides (as total CN)	
83		Fluorides (as total F)	
84		Fluorine and inorganic compounds (as HF)	
85	74-90-8	Hydrogencyanide (HCN)	
86		Particulate matter (PM10)	ISO 9096:2003, ISO 10155:1995, ISO 12141:2002, ISO 14164:1999, EN 13284-1:2001 EN 13284-2:2004

**B. Standardized analytical procedures for the determination
of pollutants of annex II in water**

3. Table 2 gives an indicative list measurement of pollutants to water.

Table 2 indicative list of standardized analytical procedures for the determination of the 86 pollutants of Annex II in releases and transfers to water.

No.	CAS number	Pollutant	Standard	Analytical method	Working range
1	74-82-8	Methane (CH ₄)		Only in air	
2	630-08-0	Carbon monoxide (CO)		Only in air	
3	124-38-9	Carbon dioxide (CO ₂)		Only in air	
4		Hydro-fluorocarbons (HFCs)		Only in air	
5	10024-97-2	Nitrous oxide (N ₂ O)		Only in air	
6	7664-41-7	Ammonia (NH ₃)		Only in air	
7		Non-methane volatile organic compounds (NMVOC)		Only in air	
8		Nitrogen oxides (NO _x /NO ₂)		Only in air	
9		Perfluorocarbons (PFCs)		Only in air	
10	2551-62-4	Sulphur hexafluoride (SF ₆)		Only in air	
11		Sulphur oxides (SO _x /SO ₂)		Only in air	
12		Total nitrogen	DIN 38409-27	Oxid. or Red./Chemolumin.	over 0,5 mg/l
			EN 12260	Oxidation / Chemolumin.	0,5 -200 mg/l
			EN ISO 11905-1	Oxidation with Peroxodisulfat	0,02 - 5 mg/l
13		Total phosphorus	ISO 15681-1/-2	Peroxodisulfat, FIA/CFA	0,1 -10 mg/l
			EN 1189	Peroxodisulfat, Photometry	0,005 - 0,8 mg/l
14		Hydrochlorofluorocarbons (HCFCs)		Only in air	
15		Chlorofluorocarbons (CFCs)		Only in air	
16		Halons		Only in air	
17	7440-38-2	Arsenic and compounds (as As)	ASTM D5673	ICP-MS	over 1 µg/l
			EN ISO 11969	Hydrid-AAS	1 -10 µg/l
		DIN 38406-29 should be deleted, because by 02/2005 it is planed to replace it by DIN EN ISO 17294-2	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0.08 mg/l
18	7440-43-9	Cadmium and compounds (as Cd)	ASTM D5673	ICP-MS	over 0,1 µg/l
			EN ISO 5961	ET-AAS	0,3 - 3 µg/l
			DIN 38406-16	Voltammetry	0,1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 0,5 µg/l
			ISO 17294-2	ICP-MS	over 0,1 µg/l
			EN ISO	ICP-AES	over 0.01

No.	CAS number	Pollutant	Standard	Analytical method	Working range
			11885		mg/l
19	7440-47-3	Chromium and compounds (as Cr)	ASTM D5673	ICP-MS	over 0,1 µg/l
			EN 1233	ET-AAS	5 - 100 µg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0,01 mg/l
20	7440-50-8	Copper and compounds (as Cu)	ASTM D5673	ICP-MS	over 0,1 µg/l
			DIN 38406-7	ET-AAS	2 - 50 µg/l
			DIN 38406-16	Voltammetry	1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0,01 mg/l
21	7439-97-6	Mercury and compounds (as Hg)	EN 1483	Cold vapour-AAS	0,1 - 10 µg/l
			EN12338	CV-AAS with amalgamation	0,01 - 1 µg/l
22	7440-02-0	Nickel and compounds (as Ni)	ASTM D5673	ET-AAS	over 0.2 µg/l
			DIN 38406-11	ET-AAS	5 - 100 µg/l
			DIN38406-16	Voltammetry	0,1 - 10 µg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	
23	7439-92-1	Lead and compounds (as Pb)	ASTM D5673	ICP-MS	over 0,1 µg/l
			DIN 38406-6	ET-AAS	5 - 50 µg/l
			DIN 38406-16	Voltammetry	0,1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 0,1 µg/l
			ISO 17294-2	ICP-MS	over 0,1 µg/l
			EN ISO 11885	ICP-AES	over 0,07 mg/l
24	7440-66-6	Zinc and compounds (as Zn)	ASTM D5673	ICP-MS	over 0.2 µg/l
			DIN 38406-16	Voltammetry	1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0,005 mg/l
25	15972-60-8	Alachlor	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
26	309-00-2	Aldrin	EN ISO	GC/ECD	over

No.	CAS number	Pollutant	Standard	Analytical method	Working range
			6468		approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
27	1912-24-9	Atrazine	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			EN ISO 11369	HPLC/UV	over approx. µg/l
			EN ISO 10695	GC/NPD (MS for conf.)	over 50 ng/l
28	57-74-9	Chlordane			
29	143-50-0	Chlordecone			
30	470-90-6	Chlorfenvinphos	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			DIN EN 12918	GC	0,01 - 1 µg/l
31	85535-84-8	Chloro -alkanes, C10- C13			
32	2921-88-2	Chlorpyrifos	DIN EN 12918	GC	0,01 - 1 µg/l
33	50-29-3	DDT	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
34	107-06-2	1,2-dichloroethane	EN ISO 10301	GC or Headspace-GC	over 5 or over 100 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
35	75-09-2	Dichloromethane	EN ISO 10301	GC or Headspace-GC	over 50 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
36	60-57-1	Dieldrin	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
37	330-54-1	Diuron	EN ISO 11369	HPLC/UV	over 0,1 µg/l
38	115-29-7	Endosulphan	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
39	72-20-8	Endrin	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
40		Halogenated organic compounds (as AOX)	DIN 38409-22	SPE-AOX	over 10 µg/l
			ISO 9562	AOX	over 10 µg/l

No.	CAS number	Pollutant	Standard	Analytical method	Working range
41	76-44-8	Heptachlor	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
42	118-74-1	Hexachlorobenzene (HCB)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
43	87-68-3	Hexachlorobutadiene (HCBd)	EN ISO 10301	GC after extraction	over 0,01 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
45	58-89-9	Lindane (Gamma-HCH)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
46	2385-85-5	Mirex			
47		PCDD + PCDF as Teq (dioxins + furans)	ISO 18073	GC/MS	
48	608-93-5	Pentachlorobenzene	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
49	87-86-5	Pentachlorophenol (PCP)	EN 12673	GC/ECD/MS after derivatization	0,1 - 1000 µg/l
			ISO 8165-2	GC/ECD after derivatization	over 0,1 µg/l
50	1336-36-3	Polychlorinated biphenyls (PCBs)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
51	122-34-9	Simazine	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			EN ISO 11369	HPLC/UV	over 0,1 µg/l
			EN ISO 10695	GC/NPD (MS for conf.)	over 50 ng/l
52	127-18-4	Tetrachloroethylene (PER)		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,1 or over 0,2 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
53	56-23-5	Tetrachloromethane (TCM)		Only in air	
			EN ISO	GC or Headspace-GC	over 0,01

No.	CAS number	Pollutant	Standard	Analytical method	Working range
			10301		or over 0,1 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
54	12002-48-1	Trichlorobenzenes (TCBs)		Only in air	
			EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
55	71-55-6	1,1,1-trichloroethane		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,02 or over 0,1 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
56	79-34-5	1,1,2,2-tetrachloroethane		Only in air	
			EN ISO 10301	GC after Extraction	over 0,05 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
57	79-01-6	Trichloroethylene		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,05 or over 0,2 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
58	67-66-3	Trichloromethane		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,05 or over 0,3 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
59	8001-35-2	Toxaphene			
60	75-01-4	Vinyl chloride	DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
61	120-12-7	Anthracene	ISO 17993	HPLC/Fluorescence	over 0,01 µg/l
62	71-43-2	Benzene	DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
63		Brominated diphenylethers (PBDE)			
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	ISO/FDIS 18857-1	GC/MS	0,02 - 0,2 µg/l
65	100-41-4	Ethyl benzene	DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
66	75-21-8	Ethylene oxide			
67	34123-59-6	Isoproturon	EN ISO 11369	HPLC/UV	over 0,1 µg/l
68	91-20-3	Naphthalene	DIN EN ISO	Purge/Trap + Therm.	10 ng/l -

No.	CAS number	Pollutant	Standard	Analytical method	Working range
			15680	Desorp.	100 µg/l
			ISO 17993	HPLC/Fluorescence	over 0,01 µg/l
69		Organotin compounds (as total Sn)	DIN 38407-13	GC/MS - FPD - AED	10 - 1000 ng/l
			ISO 17353	GC/MS - FPD - AED	10 - 1000 ng/l
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	prEN ISO 18856	GC/MS	0,02 - 0,150 µg/l
71	108-95-2	Phenols (as total C)	EN 12673	GC/ECD/MS after derivatisation	0,1 -1000 µg/l
			ISO 8165-2	GC/ECD after derivatisation	over 0,1 µg/l
			CNR-IRSA 5060	Distillation/Photometry	over 1 µg/l
72		Polycyclic aromatic hydrocarbons (PAHs) b/	ISO 17993	HPLC/Fluorescence	over 0,01 µg/l
73	108-88-3	Toluene	DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
74		Tributyltin and compounds	DIN 38407-13	GC/MS - FPD - AED	10 - 1000 ng/l
			ISO 17353	GC/MS - FPD - AED	10 - 1000 ng/l
75		Triphenyltin and compounds	DIN 38407-13	GC/MS - FPD - AED	10 - 1000 ng/l
			ISO 17353	GC/MS - FPD - AED	10 - 1000 ng/l
76		Total organic carbon (TOC) (as total C or COD/3)	DIN EN 1484	TOC/DOC	0,3 - 1000 mg/l
			ISO 8245	TOC/DOC	0,3 -1000 mg/l
77	1582-09-8	Trifluralin	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			EN ISO 10695	GC/NPD (MS for conf.)	over 50 ng/l
78	1330-20-7	Xylenes	DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
79		Chlorides (as total Cl)	EN ISO 10304-1*	IC	0,1 - 50 mg/l
			EN ISO 10304-2*	IC	0,1 - 50 mg/l
			EN ISO 10304-4*	IC	0,1 - 50 mg/l
			CNR-IRSA 4070	Potentiometric titration	over 0.7 mg/l
80		Chlorine and inorganic compounds (as HCl)		Only in air	
			DIN EN ISO 7393-1/-2/-3	Titrimetric or colorimetric or iodometric	0,03 - 5 or 0,71- 15 mg/l Cl ₂
81	1332-21-4	Asbestos		Only in air	
82		Cyanides (as total CN)	DIN EN ISO	UV-Digestion/CFA	over 3 µg/l

No.	CAS number	Pollutant	Standard	Analytical method	Working range
			14403		
			DIN 38405-14	Distillation/Photometry	0,01 - 1 mg/l
			ISO 6703-1	Photometric or titrimetric	
83		Fluorides (as total F)	DIN EN ISO 10304-1[6]	IC	0,01 - 10 mg/l
			ISO 10359-1	Elektrochemical technique	0,2 - 2 mg/l
			DIN 38405-4	Ionselective electrode	0,2 - 2000 mg/l
84		Fluorine and inorganic compounds (as HF)		Only in air	
85	74-90-8	Hydrogencyanide (HCN)		Only in air	
86		Particulate matter (PM10)		Only in air	
			ISO 11923	Glass-fibre filtration	

C. Standardized analytical procedures for the determination of pollutants of annex II in waste

4. Table 3 gives an indicative list measurement of pollutants in waste and sludge. The overview is based on CEN standards cited in the IPPC Bref on monitoring.

Table 3 indicative list of standardized analytical procedures for the determination of the 86 pollutants of annex II in waste (solid and/or sludge).

No.	CAS number	Pollutant	Sampling plan / taking / transport storage	Pre treatment	Extraction	Analysis quantification	Overall measurement report
1	74-82-8	Methane (CH ₄)					
2	630-08-0	Carbon monoxide (CO)					
3	124-38-9	Carbon dioxide (CO ₂)					
4		Hydro-fluorocarbons (HFCs)					
5	10024-97-2	Nitrous oxide (N ₂ O)					
6	7664-41-7	Ammonia (NH ₃)					
7		Non-methane volatile organic compounds (NMVOC)					
8		Nitrogen oxides (NO _x /NO ₂)					
9		Perfluorocarbons (PFCs)					
10	2551-62-4	Sulphur hexafluoride (SF ₆)					
11		Sulphur oxides (SO _x /SO ₂)					
12		Total nitrogen	GR1 / GR5 / GR6			EN 13342 (2000)	
13		Total phosphorus	GR1 / GR5 / GR6			WI 308-034	
14		Hydrochlorofluorocarbons (HCFCs)					
15		Chlorofluorocarbons (CFCs)					
16		Halons					
17	7440-38-2	Arsenic and compounds (as As)					
18	7440-43-9	Cadmium and compounds (as Cd)					
19	7440-47-3	Chromium and compounds (as Cr)	GR4			WI 292-036 / WI 292-036	
20	7440-50-8	Copper and compounds (as Cu)					
21	7439-97-6	Mercury and compounds (as Hg)					
22	7440-02-0	Nickel and compounds (as Ni)					
23	7439-92-1	Lead and compounds (as Pb)					
24	7440-66-6	Zinc and compounds (as Zn)					

No.	CAS number	Pollutant	Sampling plan / taking / transport storage	Pre treatment	Extraction	Analysis quantification	Overall measurement report
25	15972-60-8	Alachlor					
26	309-00-2	Aldrin					
27	1912-24-9	Atrazine					
28	57-74-9	Chlordane					
29	143-50-0	Chlordecone					
30	470-90-6	Chlorfenvinphos					
31	85535-84-8	Chloro -alkanes, C10-C13					
32	2921-88-2	Chlorpyrifos					
33	50-29-3	DDT					
34	107-06-2	1,2-dichloroethane					
35	75-09-2	Dichloromethane					
36	60-57-1	Dieldrin					
37	330-54-1	Diuron					
38	115-29-7	Endosulphan					
39	72-20-8	Endrin					
40		Halogenated organic compounds (as AOX)	GR1 / GR5 / GR6	WI 308-047	WI 308-047	WI 308-047	
41	76-44-8	Heptachlor					
42	118-74-1	Hexachlorobenzene (HCB)					
43	87-68-3	Hexachlorobutadiene (HCBd)					
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)					
45	58-89-9	Lindane					
46	2385-85-5	Mirex					
47		PCDD + PCDF (dioxins + furans) as Teq					
48	608-93-5	Pentachlorobenzene					
49	87-86-5	Pentachlorophenol (PCP)					
50	1336-36-3	Polychlorinated biphenyls (PCBs)	GR4 / GR1 / GR5 / GR6			WI 292-021 / WI308-046	
51	122-34-9	Simazine					
52	127-18-4	Tetrachloroethylene (PER)					
53	56-23-5	Tetrachloromethane (TCM)					
54	12002-48-1	Trichlorobenzenes (TCBs)					
55	71-55-6	1,1,1-trichloroethane					
56	79-34-5	1,1,2,2-tetrachloroethane					
57	79-01-6	Trichloroethylene					
58	67-66-3	Trichloromethane					
59	8001-35-2	Toxaphene					
60	75-01-4	Vinyl chloride					
61	120-12-7	Anthracene					
62	71-43-2	Benzene					
63		Brominated diphenylethers (PBDE)					
64		Nonylphenol ethoxylates					

No.	CAS number	Pollutant	Sampling plan / taking / transport storage	Pre treatment	Extraction	Analysis quantification	Overall measurement report
		(NP/NPEs) and related substances					
65	100-41-4	Ethyl benzene					
66	75-21-8	Ethylene oxide					
67	34123-59-6	Isoproturon					
68	91-20-3	Naphthalene					
69		Organotin compounds (as total Sn)					
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)					
71	108-95-2	Phenols (as total C)					
72		Polycyclic aromatic hydrocarbons (PAHs) b/					
73	108-88-3	Toluene					
74		Tributyltin and compounds					
75		Triphenyltin and compounds					
76		Total organic carbon (TOC) (as total C or COD/3)	GR1 / GR5 / GR6			EN 13137 (2001)	
77	1582-09-8	Trifluralin					
78	1330-20-7	Xylenes					
79		Chlorides (as total Cl)					
80		Chlorine and inorganic compounds (as HCl)					
81	1332-21-4	Asbestos					
82		Cyanides (as total CN)					
83		Fluorides (as total F)					
84		Fluorine and inorganic compounds (as HF)					
85	74-90-8	Hydrogencyanide (HCN)					

¹ See <http://www.unitar.org/cwm/prtr/UNITAR.htm>

² Op cit.

³ Op cit.

⁴ Op cit.