Chapter 2 Results of the Detailed Environmental Survey in FY 2009

1. Purpose of the survey

The Detailed Environmental Survey is aimed at understanding the environmental persistence of the Specified Chemical Substances and the Monitored Chemical Substances under the Chemical Substances Control Law (Law No.117 of 1973) and chemicals requiring the Initial Environmental Risk Assessment.

2. Target chemicals

In the FY 2009 Detailed Environmental Survey, 17 chemicals (groups) that were selected and designated as target chemicals. The combinations of target chemicals and the surveyed media are given below.

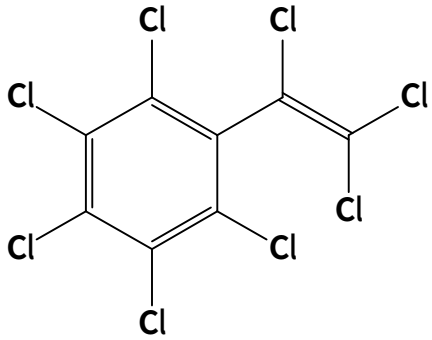
No.	Name	The Chemical Substances Control Law	The PRTR Law		Surveyed media			
			Before the revision	After the revision	Surface water	Sediment	Wildlife	Air
[1]	Octachlorostyrene				○			
[2]	Cumene			I 83				○
[3]	Cresols		I 67	I 86				
	o-Cresol							○
	m-Cresol							○
	p-Cresol							○
[4]	Chlorobenzene	III Monitored	I 93	I 125			○	
[5]	2,4-Diaminotoluene	II Monitored	I 228	I 301	○			
[6]	Diisopropylnaphthalene	I Monitored				○	○	○
[7]	*N*,*N*-Dicyclohexylamine	II Monitored III Monitored		I 118				○
[8]	*N*,*N*-Dicyclohexyl-1,3-benzothiazole-2-sulphenamide	I Monitored		I 189	○			
[9]	2,4-Dinitrophenol	II Monitored III Monitored	I 158	I 201	○		○	
[10]	5α-Dihydrotestosterone				○			
[11]	2,3-Dihydro-6-propyl-2-thioxo-4(1*H*)-pyrimidinone	II Monitored	II 36	II 44	○			
[12]	1,2,3-Trichloropropane	II Monitored		I 289				○
[13]	Trimethylbenzenes							
	1,2,4-Trimethylbenzene	III Monitored		I 296	○			
	1,3,5-Trimethylbenzene		I 224	I 297	○			
[14]	Bis(1-methyl-1-phenylethyl) peroxide	II Monitored III Monitored		I 330	○			
[15]	Hydroquinone	II Monitored	I 254	I 336	○			
[16]	2-Butenal			I 375	○			
[17]	2-Methyl-*N*-[4-nitro-3-(trifluoromethyl)phenyl]propanamide				○			

(Note 1) “The PRTR Law” hereinafter means “Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (Law No. 86 of 1999).”

(Note 2) “Before the revision” in "The PRTR Law" means “appointments before the revision of government ordinance on November 21, 2008" and “After the revision” in "The PRTR Law" means “appointments after that revision".

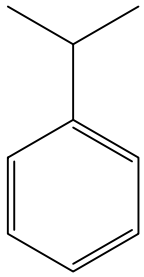
Chemical and physical properties of target chemicals of the Detailed Environmental Survey are as follows.

[1] Octachlorostyrene



Molecular formula: C_8Cl_8
CAS: 29082-74-4
ENCS: No pertinence
MW: 379.71
mp: 99°C [1)]
bp: Uncertain
sw: Uncertain
Specific gravity: Uncertain
logPow: Uncertain

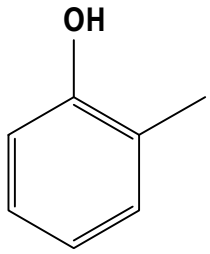
[2] Cumene (synonym:Isopropylbenzene)



Molecular formula: C_9H_{12}
CAS: 98-82-8
ENCS: 3-22
MW: 120.19
mp: -96.02°C[1)]
bp: 152～153°C[2)]
sw: 0.050g/kg（25°C）[1)]
Specific gravity: 0.862（20/4°C）[2)]
logPow: 3.66[3)]

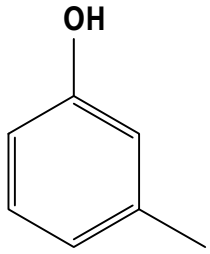
[3] Cresols

[3-1] *o*-Cresol



Molecular formula: C_7H_8O
CAS: 95-48-7
ENCS: 3-499、4-57
MW: 108.14
mp: 30°C[2)]
bp: 191～192°C[2)]
sw: 31.8g/kg（40°C）[1)]
Specific gravity: 1.047（20/4°C）[2)]
logPow: 1.95[3)]

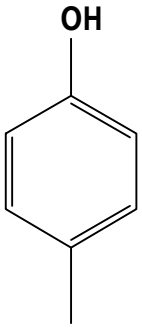
[3-2] *m*-Cresol



Molecular formula: C_7H_8O
CAS: 108-39-4
ENCS: 3-499、4-57
MW: 108.14
mp: 11～12°C[2)]
bp: 202°C[2)]
sw: 25.7g/kg（40°C）[1)]
Specific gravity: 1.034（20/4°C）[2)]
logPow: 1.96[3)]

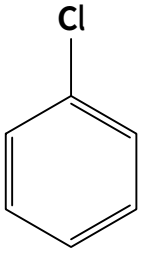
(Abbreviations) CAS: CAS registry number, ENCS: registry number in the Existing and New Chemical Substances List, MW: molecular weight, mp: melting point, bp: boiling point, SW: solubility in water, logPow: *n*-octanol-water partition coefficient, kPa: kilopascal (1 atom 101.3kPa).

[3-3] *p*-Cresol



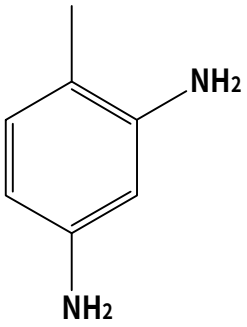
Molecular formula: C_7H_8O
CAS: 106-44-5
ENCS: 3-499、4-57
MW: 108.14
mp: 11～12°C[2)]
bp: 202°C[2)]
sw: 25.7g/kg（40°C）[1)]
Specific gravity: 1.034（20/4°C）[2)]
logPow: 1.96[3)]

[4] Chlorobenzene



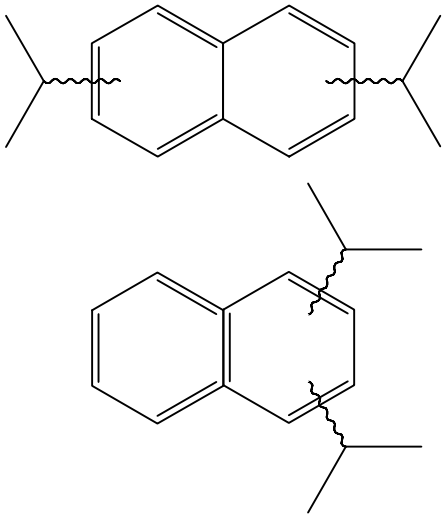
Molecular formula: C_6H_5Cl
CAS: 108-90-7
ENCS: 3-31
MW: 112.56
mp: -45.31°C[1)]
bp: 131.72°C[1)]
sw: 0.50g/kg（25°C）[1)]
Specific gravity: 1.107（20/4°C）[2)]
logPow: 2.84[1)]

[5] 2,4-Diaminotoluene (synonym:2,4-Toluenediamine)



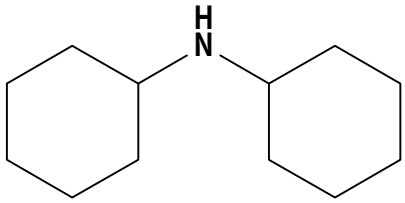
Molecular formula: $C_7H_{10}N_2$
CAS: 95-80-7
ENCS: 3-126
MW: 122.17
mp: 99°C[4)]
bp: 288°C[4)]
sw: 38g/L（25°C）[4)]
Specific gravity: 1.256g/cm^3 [4)]
logPow: 0.074（25°C）[4)]

[6] Diisopropylnaphthalenes



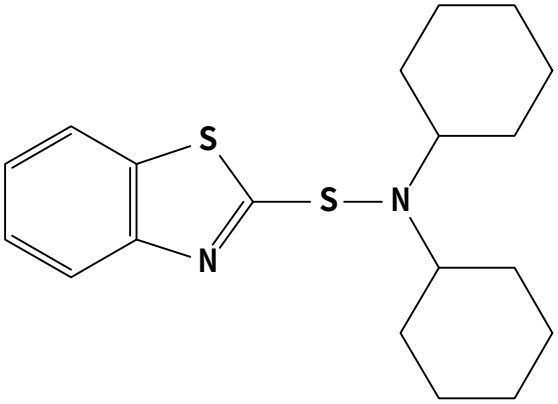
Molecular formula: $C_{16}H_{20}$
CAS: 38640-62-9
ENCS: 4-961
MW: 212.33
mp: Uncertain
bp: 290～299°C[5)]
sw: 0.18～0.44mg/L（20°C）[5)]
Specific gravity: 0.96g/cm^3（15°C）[5)]
logPow: 6.08[6)]

[7] *N*,*N*-Dicyclohexylamine



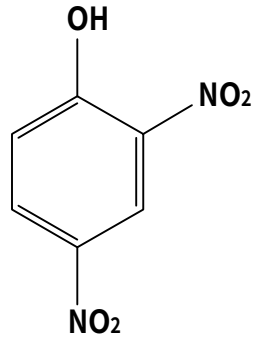
Molecular formula: $C_{12}H_{23}N$
CAS: 101-83-7
ENCS: 3-2259、3-2686
MW: 181.32
mp: -0.1°C[2)]
bp: 256°C[2)]
sw: 0.8g/L（25°C）[7)]
Specific gravity: 0.9104（25/25°C）[2)]
logPow: Uncertain

[8] *N*,*N*-Dicyclohexyl-1,3-benzothiazole-2-sulphenamide



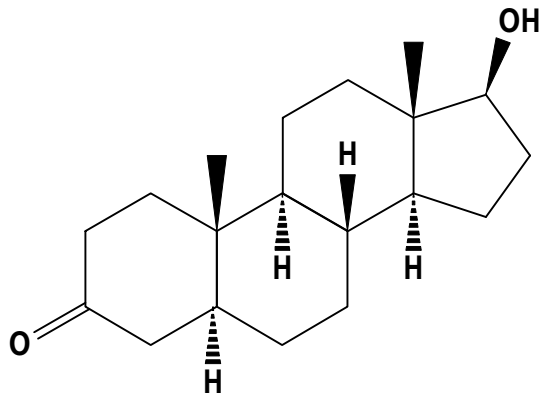
Molecular formula: $C_{19}H_{26}N_2S_2$
CAS: 4979-32-2
ENCS: 5-256
MW: 346.55
mp: 99°C[8)]
bp: >300°C[8)]
sw: 0.0019mg/L（25°C）[8)]
Specific gravity: Uncertain[8)]
logPow: >4.8（25°C）[8)]

[9] 2,4-Dinitrophenol



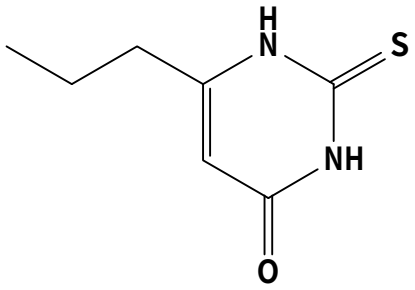
Molecular formula: $C_6H_4N_2O_5$
CAS: 51-28-5
ENCS: 3-797
MW: 184.11
mp: 112～114°C[2)]
bp: Uncertain（sublimation）[1)]
sw: 0.69g/kg（25°C）[1)]
Specific gravity: 1.683g/cm^3 [2)]
logPow: 1.67[3)]

[10] 5α-Dihydrotestosterone



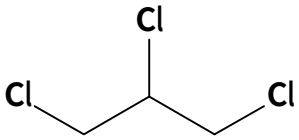
Molecular formula: $C_{19}H_{30}O_2$
CAS: 521-18-6
ENCS: No pertinence
MW: 290.44
mp: 181°C[2)]
bp: 135°C（sublimation）[2)]
sw: 42g/L[9)]
Specific gravity: Uncertain
logPow: 3.55[3)]

[11] 2,3-Dihydro-6-propyl-2-thioxo-4(1*H*)-pyrimidinone (synonym: Propylthiouracil)



Molecular formula: $C_7H_{10}N_2OS$
CAS: 51-52-5
ENCS: 5-936、5-3810
MW: 170.23
mp: 219～221°C[2)]
bp: Uncertain
sw: 1.20g/kg（25°C）[1)]
Specific gravity: Uncertain
logPow: Uncertain

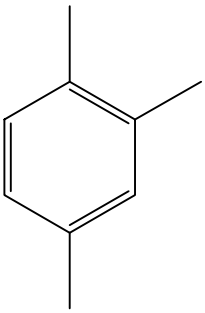
[12] 1,2,3-Trichloropropane



Molecular formula: $C_3H_5Cl_3$
CAS: 96-18-4
ENCS: 2-83
MW: 147.43
mp: -14.7°C[1)]
bp: 157°C[1)]
sw: 2.0g/kg（25°C）[1)]
Specific gravity: 1.3889g/cm^3（20°C）[1)]
logPow: 2.63[1)]

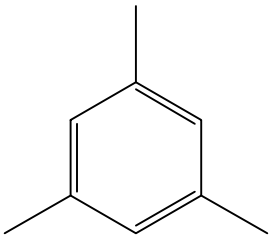
[13] Trimethylbenzenes

[13-1] 1,2,4-Trimethylbenzene



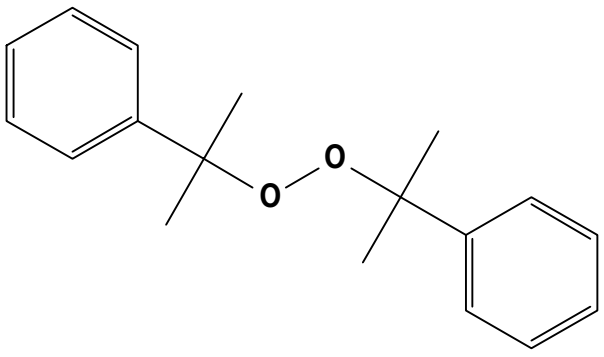
Molecular formula: C_9H_{12}
CAS: 95-63-6
ENCS: 3-7、3-3427
MW: 120.19
mp: -43.78°C[2)]
bp: 169～171°C[2)]
sw: 0.057g/kg（25°C）[1)]
Specific gravity: 0.8761（20/4°C）[2)]
logPow: 3.63[3)]

[13-2] 1,3,5-Trimethylbenzene



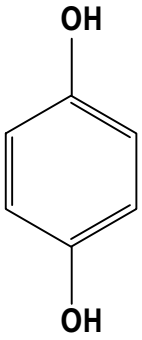
Molecular formula: C_9H_{12}
CAS: 108-67-8
ENCS: 3-7、3-3427
MW: 120.19
mp: -44.8°C[2)]
bp: 164.7°C[2)]
sw: 0.050g/kg（25°C）[1)]
Specific gravity: 0.8637（20/4°C）[2)]
logPow: 3.42[3)]

[14] Bis(1-methyl-1-phenylethyl) peroxide



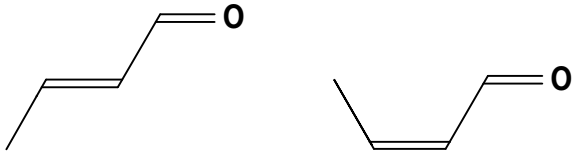
Molecular formula: $C_{18}H_{22}O_2$
CAS: 80-43-3
ENCS: 3-1086
MW: 270.37
mp: 40°C[1)]
bp: 118°C[10)]
sw: 0.46mg/L（25°C）[9)]
Specific gravity: 1110kg/m^3（20°C）1[0)]
logPow: 5.50[11)]

[15] Hydroquinone



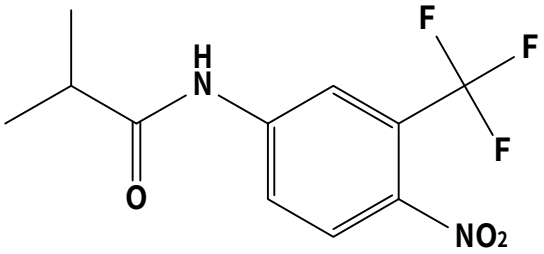
Molecular formula: $C_6H_6O_2$
CAS: 123-31-9
ENCS: 3-543
MW: 110.11
mp: 170～171°C[2)]
bp: 285～287°C[2)]
sw: 80.1g/kg（25°C）[1)]
Specific gravity: 1.332（15°C）[2)]
logPow: 0.59[3)]

[16] 2-Butenal



Molecular formula: C_4H_6O
CAS: 4170-30-3
ENCS: 2-524
MW: 70.09
mp: -74°C[12)]
bp: 101～103°C[12)]
sw: 150g/L（20°C）[12)]
Specific gravity: 0.850～0.856g/cm^3（20°C）[12)]
logPow: Uncertain

[17] 2-Methyl-*N*-[4-nitro-3-(trifluoromethyl)phenyl]propanamide (synonym:Flutamide)



Molecular formula: $C_{11}H_{11}F_3N_2O_3$
CAS: 13311-84-7
ENCS: No pertinence
MW: 276.21
mp: 111.5～112.5°C[2)]
bp: Uncertain
sw: Uncertain
Specific gravity: Uncertain
logPow: 3.35[9)]

References

1) Lide, CRC Handbook of Chemistry and Physics, 90th Edition, CRC Press LLC (2009)
2) O'Neil, The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals 14th Edition, Merck Co. Inc. (2006)
3) Hansch et al., Exploring QSAR - Hydrophobic, Electronic and Steric Constants, American Chemical Society (1995)
4) OECD, Toluene-2,4-diamine, SIDS Initial Assessment Profile for 22th SIAM (2006)
5) European Commission European Chemicals Bureau, Bis(isopropyl)naphthalene, International Uniform Chemical Information Database (IUCLID) Dataset (2000)
6) Meylan et al., Atom/fragment contribution method for estimating octanol-water partition coefficients, Journal of Pharmacological Sciences, 84, 83-92(1995)
7) OECD, Dicyclohexylamine, SIDS Initial Assessment Report for 22th SIAM (2006)
8) OECD, *N*,*N*-Dicyclohexyl-2-benzothiazolesulfenamide, SIDS Initial Assessment Report for 18th SIAM (2004)
9) Howard et al., Handbook of Physical Properties of Organic Chemicals, CRC Press Inc. (1996)
10) European Commission European Chemicals Bureau, Bis(alpha,alpha-dimethylbenzyl)peroxide, International Uniform Chemical Information Database (IUCLID) Dataset (2000)
11) Japan Chemical Industry Ecology-Toxicology & Information Center (1992)
12) European Commission European Chemicals Bureau, Crotonaldehyde, International Uniform Chemical Information Database (IUCLID) Dataset (2000)

3. Surveyed site and procedure

In the Detailed Environmental Survey, the sampling and analysis of specimens was entrusted to prefectural governments and government-designated cities across Japan, and some specimens were sampled and analyzed by private analytical laboratories.

(1) Organisations responsible for sampling

Local communities	Organisations responsible for sampling	Surveyed media			
		Surface water	Sediment	Wildlife	Air
Hokkaido	Hokkaido Institute of Environmental Sciences	○	○		○*2
Sapporo City	Sapporo City Institute of Public Health	○	○		○
Iwate Pref.	Research Institute for Environmental Sciences and Public Health of Iwate Prefecture	○	○	○	
Miyagi Pref.	Miyagi Prefectural Institute of Public Health and Environment	○			
Sendai City	Sendai City Institute of Public Health	○	○		○*2
Yamagata Pref.	Environmental Science Research Center of Yamagata Prefecture	○	○		
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center	○	○		○*2
Tochigi Pref.	Tochigi Prefectural Institute of Public Health and Environmental Science	○			
Gunma Pref.	Gunma Prefectural Institute of Public Health and Environmental Sciences	○			
Saitama Pref.	Center for Environmental Science in Saitama	○			○*2
Chiba Pref.	Chiba Prefectural Environmental Research Center	○	○		○*2
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection	○	○	○	○
Kanagawa Pref.	Kanagawa Environmental Research Center				○
Yokohama City	Yokohama Environmental Science Research Institute	○		○	
Kawasaki City	Kawasaki Municipal Research Institute for Environmental Protection	○	○	○	
Niigata Pref.	Niigata Prefectural Institute of Public Health and Environmental Sciences	○	○	○	
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science	○	○		○*2
Nagano Pref.	Nagano Environmental Conservation Research Institute	○	○		○
Gifu Pref.	Gifu Prefectural Research Institute for Health and Environmental Sciences				○*2
Shizuoka Pref.	Shizuoka Institute of Environment and Hygiene	○	○		
Aichi Pref.	Aichi Environmental Research Center	○	○		
Nagoya City	Nagoya City Environmental Science Research Institute	○			○
Mie Pref.	Mie Prefecture Health and Environment Research Institute	○	○		○
Shiga Pref.	Lake Biwa Environmental Research Institute	○		○	
Kyoto Pref.	Kyoto Prefectural Institute of Public Health and Environment	○			
Kyoto City	Kyoto City Institute for Public Health and Environmental sciences	○	○		○
Osaka Pref.	Research Institute of Environment, Agriculture and Fisheries, Osaka Prefectural Government	○	○	○	○*3
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○	○	○	
Hyogo Pref.	Water Quality Division, Agricultural Administration and Environment Bureau, Hyogo Prefectural Government	○	○	○	○*2
Kobe City	Environmental Conservation and Guidance Division, (Environment Bureau, Kobe city)	○	○		
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health	○			
Okayama Pref.	Okayama Prefectural Institute for Environmental Science and Public Health	○	○		
Yamaguchi Pref.	Yamaguchi Prefectural Public Health and Environment	○	○	○	○
Tokushima Pref.	Tokushima Prefectural Institute of Public Health and Environmental Sciences	○			○*3
Kagawa Pref.	Kagawa Prefectural Research Institute for Environmental Sciences and Public Health	○	○		○
Ehime Pref.	Ehime Prefectural Institute of Public Health and Environmental Science	○			
Fukuoka Pref.	Fukuoka Institute of Health and Environmental Science	○	○		○*2
Kitakyushu City	Kitakyushu City Institute of Environmental Sciences	○			○
Fukuoka Pref.	Fukuoka City Institute for Hygiene and the Environment		○		
Saga Pref.	Saga Prefectural Environmental Research Center	○	○		○
Kumamoto Pref.	Kumamoto Prefectural Institute of Public Health and Environmental Science				○
Oita Pref.	Environmental Preservation Division (Life and Environment Department, Oita Prefecture)	○		○	

(Note 1) *1: Organisations responsible for sampling are described by their official names in FY 2009.
(Note 2) *2: Those organizations sampled some specimens, and cooperated with a private analytical laboratory in sampling other specimens.
(Note 3) *3: Those organizations cooperated with a private analytical laboratory in sampling specimens.

(2) Surveyed sites (or areas) and target chemicals

Surveyed sites and target chemicals for surface water are shown in Table 2-1-1 and Figure 2-1-1. Surveyed sites and target chemicals for sediment are shown in Table 2-1-2 and Figure 2-1-1. Surveyed sites and target chemicals for air are shown in Table 2-1-4 and Figure 2-1-3. The breakdown is summarized as follows. Surveyed sites and target chemicals for surface water and sediment at the pesticide survey are shown in Table 2-1-3 and Figure 2-1-2.

Surveyed media	Numbers of local communities	Numbers of target chemicals	Numbers of surveyed sites	Numbers of samples at a surveyed site
Surface water	38	11	51	3
Sediment	26	1	30	3
Wildlife	11	3	14	3
Air	23*3	5	25	3
All media	42	17	86	

(Note 1) *1: 9 of the 23 organizations sampled some of the specimens and cooperated with private analytical laboratories in sampling other specimens. 2 organizations cooperated with private analytical laboratories in sampling all specimens.

Table 2-1-1 List of surveyed sites (surface water) and target chemicals in the Detailed Environmental Survey in FY 2009

Local communities	Surveyed sites	Target chemicals										
		[1]	[5]	[8]	[9]	[10]	[11]	[13]	[14]	[15]	[16]	[17]
Hokkaido	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari(Ishikari City)		○		○	○		○	○	○	○	○
Sapporo City	Nakanuma of Riv.Toyohira(Sapporo City)	○		○			○					
	Daiichishinkawa-bashi Bridge, Riv. Shin(Sapporo City)	○		○			○					
Iwate Pref.	Riv. Toyosawa(Hanamaki City)	○	○	○	○	○		○				○
Miyagi Pref.	Nishimae Bridge of Riv. Hasama(Tome City)					○	○				○	○
	Funaoka-ohashi Bridge, Riv.Shiraishi(Shibata Town)					○	○				○	○
Sendai City	Hirose-ohashi Bridge, Riv. Hirose(Sendai City)									○		
Yamagata Pref.	Mouth of Riv. Mogami(Sakata City)	○							○			
Ibaraki Pref.	Katta-bashi Bridge, Riv. Naka(Hitachinaka City)		○	○	○	○	○	○				○
	Tonekamome-ohasi Bridge, Mouth of Riv. Tone(Kamisu City)		○	○	○	○	○	○				○
Tochigi Pref.	Riv. Tagawa(Utsunomiya City)							○				
Gunma Pref.	Tako Bridge of Riv. Kabura(Takasaki City)								○	○		
Saitama Pref.	Shiki-ohasi Bridge, Riv. Yanase(Shiki City)								○	○		
	Kachi-hashi Bridge, Riv. Ichino(Yoshimi Town)								○	○		
Chiba Pref.	Coast of Ichihara and Anegasaki				○				○	○		
	Asai-bashi Bridge, Riv.Yourou(Ichihara City)		○			○	○					○
Tokyo Met.	Mouth of Riv. Arakawa(Koto Ward)	○	○	○	○	○	○	○	○	○	○	○
	Mouth of Riv. Sumida(Minato Ward)	○	○	○	○	○	○	○	○	○	○	○
Yokohama City	Kamenoko Bridge over Riv.Tsurumi(Yokohama City)		○		○	○		○				
	Yokohama Port		○		○	○		○				
Kawasaki City	Mouth of Riv. Tama(Kawasaki City)	○	○	○	○	○	○	○	○	○	○	○
	Keihin Canal, Port of Kawasaki							○				
Niigata Pref.	Lower Riv. Shinano(Niigata City)			○		○	○	○			○	○
Ishikawa Pref.	Mouth of Riv. Sai(Kanazawa City)	○	○	○	○	○	○	○	○	○	○	○
Nagano Pref.	Lake Suwa(center)	○	○	○	○	○	○	○	○	○	○	○
Shizuoka Pref.	Shimizu Port	○									○	
	Riv. Tenryu(Iwata City)	○									○	
Aichi Pref.	Nagoya Port	○	○	○	○	○	○	○	○	○	○	○
Nagoya City	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)					○						
Mie Pref.	Yokkaichi Port	○	○	○	○	○	○	○	○	○	○	○
Shiga Pref.	Lake Biwa(center, offshore of Karasaki)				○	○	○	○			○	○
Kyoto Pref.	Miyazu Port	○	○	○	○	○	○	○	○	○	○	○
Kyoto City	Miyamae-bashi Bridge, Miyamae Bridge, Riv. Katsura(Kyoto City)	○	○	○	○	○	○	○	○	○	○	○
Osaka Pref.	Mouth of Riv. Yamato(Sakai City)	○	○	○	○	○	○	○	○	○	○	○
Osaka City	Kema Bridge, Riv. Oh-kawa (Osaka City)				○	○	○					○
	Osaka Port	○	○	○	○	○	○	○	○	○	○	○
Hyogo Pref.	Offshore of Himeji									○		
Kobe City	Kobe Port(center)	○	○	○	○	○	○	○	○	○	○	○
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa(Wakayama City)											○
Okayama Pref.	Otoidezeki of Riv. Asahi(Okayama City)	○					○					
	Offshore of Mizushima	○	○	○	○	○	○	○	○	○	○	○
Yamaguchi Pref.	Tokuyama Bay	○	○	○	○	○	○	○	○	○	○	○
	Offshore of Hagi	○						○				
Tokushima Pref.	Mouth of Riv. Yoshino(Tokushima City)						○					
Kagawa Pref.	Takamatsu Port			○				○				
Ehime Pref.	Mishima area, Riv. Iwamatsu(Uwajima City)	○	○	○	○	○	○	○	○	○	○	○
Fukuoka Pref.	Kabura-bashi Bridge, River Raizan(Maebaru City)				○			○				
	Offshore of Omuta		○		○			○				
Kitakyushu City	Dokai Bay			○								
Saga Pref.	Imari Bay	○	○	○	○	○	○	○	○	○	○	○
Oita Pref.	Mouth of Riv. Oita(Oita City)				○							

[1] Octachlorostyrene, [5] 2,4-Diaminotoluene, [8] *N*,*N*-Dicyclohexyl-1,3-benzothiazole-2-sulphenamide, [9] 2,4-Dinitrophenol, [10] 5α-Dihydrotestosterone, [11] 2,3-Dihydro-6-propyl-2-thioxo-4(1*H*)-pyrimidinone, [13] 1,2,4-Trimethylbenzene, [14] Bis(1-methyl-1-phenylethyl) peroxide, [15] Hydroquinone, [16] 2-Butenal, [17] 2-Methyl-*N*-[4-nitro-3-(trifluoromethyl)phenyl]propanamide

Table 2-1-2 List of surveyed sites (sediment) and target chemicals in the Detailed Environmental Survey in FY 2009

Local communities	Surveyed sites	Target chemicals
		[6] Diisopropylnaphthalene
Hokkaido	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari(Ishikari City)	○
	Tomakomai Port	○
Sapporo City	Nakanuma of Riv.Toyohira(Sapporo City)	○
	Daiichishinkawa-bashi Bridge, Riv. Shin(Sapporo City)	○
Iwate Pref.	Riv. Toyosawa(Hanamaki City)	○
Sendai City	Hirose-ohashi Bridge, Riv. Hirose(Sendai City)	○
Yamagata Pref.	Mouth of Riv. Mogami(Sakata City)	○
Ibaraki Pref.	Tonekamome-ohasi Bridge, Mouth of Riv. Tone(Kamisu City)	○
Chiba Pref.	Coast of Ichihara and Anegasaki	○
Tokyo Met.	Mouth of Riv. Arakawa(Koto Ward)	○
	Mouth of Riv. Sumida(Minato Ward)	○
Kawasaki City	Mouth of Riv. Tama(Kawasaki City)	○
	Keihin Canal, Port of Kawasaki	○
Niigata Pref.	Lower Riv. Shinano(Niigata City)	○
Ishikawa Pref.	Mouth of Riv. Sai(Kanazawa City)	○
Nagano Pref.	Lake Suwa(center)	○
Shizuoka Pref.	Shimizu Port	○
Aichi Pref.	Nagoya Port	○
Mie Pref.	Yokkaichi Port	○
Kyoto City	Miyamae-bashi Bridge, Miyamae Bridge, Riv. Katsura(Kyoto City)	○
Osaka Pref.	Mouth of Riv. Yamato(Sakai City)	○
Osaka City	Osaka Port	○
Hyogo Pref.	Offshore of Himeji	○
Kobe City	Kobe Port(center)	○
Okayama Pref.	Offshore of Mizushima	○
Yamaguchi Pref.	Tokuyama Bay	○
Kagawa Pref.	Takamatsu Port	○
Fukuoka Pref.	Offshore of Omuta	○
Fukuoka City	Hakata Bay	○
Saga Pref.	Imari Bay	○

Figure 2-1-1 Surveyed sites (surface water and sediment) in the Detailed Environmental Survey in FY 2009

Table 2-1-3 List of surveyed sites (wildlife) and target chemicals in the Detailed Environmental Survey in FY 2009

Local communities	Surveyed sites	Wildlife species	Target chemicals		
			[4]	[6]	[9]
Iwate Pref.	Yamada Bay	Blue mussel	○	○	○
		Greenling	○	○	○
Tokyo Met.	Tokyo Bay	Sea bass	○	○	○
Yokohama City	Riv. Tsurumi(Yokohama City)	Carp	○	○	○
	Yokohama Port	Blue mussel	○	○	○
Kawasaki City	Offshore of Ogishima Island, Port of Kawasaki	Sea bass	○	○	○
Niigata Pref.	Lower Riv. Shinano (Niigata City)	Carp	○	○	○
Shiga Pref.	Lake Biwa, Riv. Azumi (Takashima City)	Dace	○	○	○
Osaka Pref.	Osaka Bay	Sea bass	○	○	○
Osaka City	Osaka Port	Sea bass		○	
Hyogo Pref.	Offshore of Himeji	Sea bass	○	○	○
Yamaguchi Pref.	Tokuyama Bay	Striped mullet	○	○	○
	Offshore of Hagi	Striped mullet	○	○	○
Oita Pref.	Mouth of Riv. Oita(Oita City)	Sea bass	○	○	○

[4] Chlorobenzene, [6] Diisopropylnaphthalene, [9] 2,4-Dinitrophenol

Figure 2-1-2 Surveyed sites (wildlife) in the Detailed Environmental Survey in FY 2009

Table 2-1-4 List of surveyed sites (air) and target chemicals in the Detailed Environmental Survey in FY 2009

Local communities	Surveyed sites	Target chemicals				
		[2]	[3]	[6]	[7]	[12]
Hokkaido	Hokkaido Institute of Environmental Sciences	○		○	○	○
Sapporo City	Sapporo City Institute of Public Health(Sapporo City)	○	○			
Sendai City	Tsutsujigaoka Park(Sendai City)	○	○	○	○	○
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center(Tsuchiura City)	○	○	○	○	○
Saitama Pref.	Center for Environmental Science in Saitama (Kasu City)		○	○	○	○
Chiba Pref.	Ichihara-Matsuzaki Air Quality Monitoring Station(Ichihara City)	○	○	○	○	○
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection(Koto Ward)	○	○	○	○	○
	Chichijima Island	○	○			
Kanagawa Pref.	Kanagawa Environmental Research Center (Hiratsuka City)	○	○	○	○	○
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science(Kanazawa City)	○	○	○	○	○
Nagano Pref.	Nagano Environmental Conservation Research Institute(Nagano City)	○	○	○	○	○
Gifu Pref.	Gifu Prefectural Research Institute for Health and Environmental Sciences(Kakamigahara City)			○	○	○
Nagoya City	Chikusa Ward Heiwa Park(Nagoya City)	○	○	○	○	○
Mie Pref.	Mie Prefecture Health and Environment Research Institute(Yokkaichi City)	○	○	○	○	○
Kyoto City	Kyoto City Hall(Kyoto City)	○	○			
Osaka Pref.	Research Institute of Environment, Agriculture and Fisheries, Osaka Prefectural Government(Osaka City)	○	○	○	○	○
Hyogo Pref.	Hyogo Prefectural Environmental Research Center(Kobe City)	○	○	○	○	○
Yamaguchi Pref.	Yamaguchi Prefectural Public Health and Environment(Yamaguchi City)	○	○	○	○	○
Tokushima Pref.	Tokushima Prefectural Institute of Public Health and Environmental Sciences(Tokushima City)	○	○	○	○	○
Kagawa Pref.	Takamatsu Joint Prefectural Government Building(Takamatsu City)		○	○	○	○
Fukuoka Pref.	Omuta City Government Building(Omuta City)	○	○	○	○	○
	Munakata Prefectural Government Building (Munakata City)	○				
Kitakyushu City	Kitakyushu Monitoring Station (Kitakyushu City)	○				
Saga Pref.	Saga Prefectural Environmental Research Center (Saga City)	○	○	○	○	○
Kumamoto Pref.	Kumamoto Prefectural Institute of Public Health and Environmental Science(Udo City)		○	○	○	○

[2] Cumene, [3] Cresols, [6] Diisopropylnaphthalene, [7] *N*,*N*-Dicyclohexylamine, [12] 1,2,3-Trichloropropane

Figure 2-1-4 Surveyed sites (air) in the Detailed Environmental Survey in FY 2009

(3) Detection limit

The detection limits of analysed values reported by the analytical laboratory are not necessarily the same because of differences in the properties of specimens and in the available measurement equipment. To enable summarisation, therefore, a unified detection limit is predetermined and the analytical values reported by the analytical laboratory are summarised by the following procedure.

Treatment of measured value as an undetected value in high-sensitivity analysis

In the case of high-sensitivity analysis, in which the detection limit of the analytical laboratory is lower than the unified detection limit, any measured value lower than the unified detection limit is treated as an undetected value in the nationwide summary (see schematic (A)).

Elimination of undetected values in low-sensitivity analysis from summary subject

When the detection limit of the analytical laboratory is higher than the unified detection limit, any target chemical not detected is eliminated from the subject of the summary (see schematic (B)).

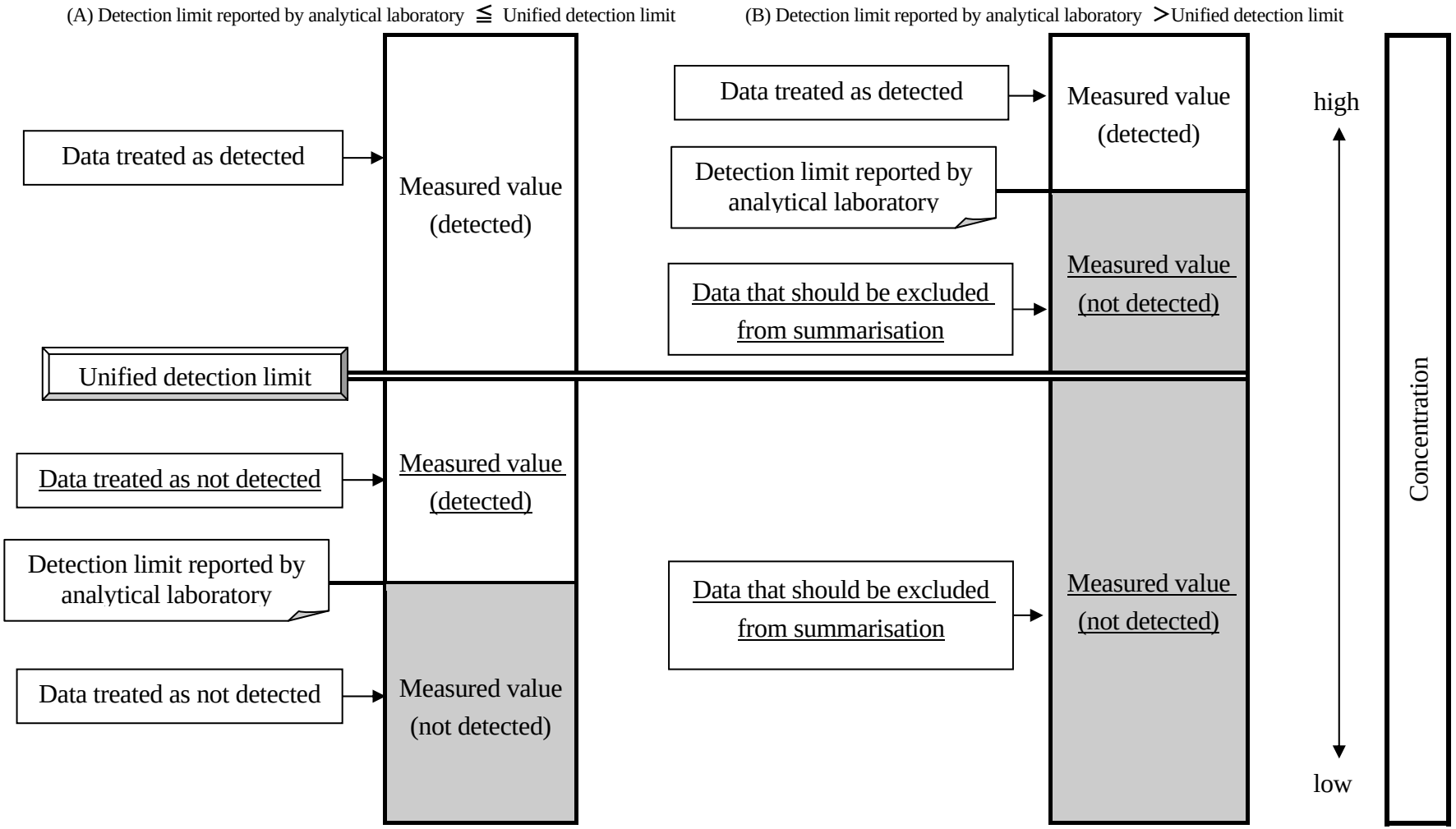
When the instrument detection limit (IDL) and the method detection limit (MDL) are given in the analytical method, which is described in reports on the investigation of the development of analytical methods for chemicals and adopted in the Detailed Environmental Survey (hereinafter, the Detailed Environmental Survey Analytical Method), if the IDL measured by the analytical laboratory is lower than the given IDL, the MDL of the Detailed Environmental Survey Analytical Method is used as the detection limit by the analytical laboratory.

When IDL and MDL are not given in the Detailed Environmental Survey Analytical Method, the detection limit is predetermined by the following procedure.

When the analytical laboratory calculates the appropriate IDL and MDL following the calculation method stated in the analytical method development instruction manuals, this calculated MDL is used as the detection limit by the analytical laboratory.

When the appropriate IDL and MDL are not calculated by the analytical laboratory, one of the following procedures was employed to establish the detection limit by the analytical laboratory.

- deduction from the IDL and MDL calculated for the corresponding chemical by Detailed Environmental Survey Analytical Method or other analytical laboratories
- deduction from the lowest calibration curve concentration and the results of recovery tests
- deduction from the results of addition and collection tests, the results of operation blank tests, and the signal/noise ratio (S/N ratio) obtained from the chromatogram of environmental specimens



Schematic of procedure for data summarisation

4. Summary of survey results

The detection ranges and the detection limits are shown in Table 2-2. The survey results are summarized as follows.

In surface water, 5 out of the 11 target chemicals (groups) were detected.

・[9] 2,4-Dinitrophenol: 28 of the 28 valid sites
・[13] Trimethylbenzenes
・[13-1] 1,2,4-Trimethylbenzene: 1 of the 30 valid site
・[15] Hydroquinone: 23 of the 23 valid sites
・[16] 2-Butenal: 20 of the 23 valid sites
・[17] 2-Methyl-*N*-[4-nitro-3-(trifluoromethyl)phenyl]propanamide: 1 of the 27 valid site

In sediment, 1 out of the 1 target group was detected.

・[6] Diisopropylnaphthalenes: 23 of the 28 valid sites

In wildlife (bivalves or fish), 3 out of the 3 target chemicals (groups) were detected.

・[4] Chlorobenzene: 3 of the 13 valid sites
・[6] Diisopropylnaphthalenes: 13 of the 14 valid sites
・[9] 2,4-Dinitrophenol: 2 of the 13 valid sites

In air, 4 out of the 5 target chemicals (groups) were detected.

・[2] Cumene (synonym:Isopropylbenzene): 20 of the 21 valid sites
・[3] Cresols
・[3-1] *o*-Cresol: 17 of the 20 valid sites
・[3-2] *m*-Cresol: 18 of the 20 valid sites
・[3-3] *p*-Cresol: 19 of the 20 valid sites
・[6] Diisopropylnaphthalenes: 20 of the 20 valid sites
・[12] 1,2,3-Trichloropropane: 20 of the 20 valid sites

Table 2-2 Summary of the detection ranges and the detection limits in the Detailed Environmental Survey in FY 2009

No.	Target chemicals	Surface water [ng/L]		Sediment [ng/g-dry]		Wildlife [ng/g-wet]		Air [ng/m^3]	
		Detection range and frequency	Detection range and frequency	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[1]	Octachlorostyrene	nd 0/24	0.046						
[2]	Cumene							nd～990 20/21	2.9
[3]	Cresols								
[3-1]	*o*-Cresol							nd～74 17/20	12
[3-2]	*m*-Cresol							nd～44 18/20	6.8
[3-3]	*p*-Cresol							nd～67 19/20	6.8
[4]	Chlorobenzene					nd～0.10 3/13	0.045		
[5]	2,4-Diaminotoluene	nd 0/24	6.2						
[6]	Diisopropylnaphthalene			nd～230 23/28	0.64	nd～11 13/14	0.46	nd～22 20/20	0.66
[7]	*N*,*N*-Dicyclohexylamine							nd 0/20	9
[8]	*N*,*N*-Dicyclohexyl-1,3-benzothiazole-2-sulphenamide	nd 0/23	1.1						
[9]	2,4-Dinitrophenol	1.0～230 28/28	1.0			nd～0.15 2/13	0.11		
[10]	5α-Dihydrotestosterone	nd 0/27	0.092						
[11]	2,3-Dihydro-6-propyl-2-thioxo-4(1*H*)-pyrimidinone	nd 0/28	4.6						
[12]	1,2,3-Trichloropropane							1.5～150 20/20	0.076
[13]	Trimethylbenzenes								
[13-1]	1,2,4-Trimethylbenzene	nd～32 1/30	31						
[13-2]	1,3,5-Trimethylbenzene	nd 0/30	44						
[14]	Bis(1-methyl-1-phenylethyl) peroxide	nd 0/22	7						
[15]	Hydroquinone	3.5～75 23/23	1.5						
[16]	2-Butenal	nd～250 20/23	12						
[17]	2-Methyl-*N*-[4-nitro-3-(trifluoromethyl)phenyl]propanamide	nd～0.56 1/27	0.094						

(Note 1) Detection frequency is based on the number of sites or areas, thus means (the number of detected sites/the number of surveyed sites). A site where data was not available was excluded from the number of surveyed sites. A site where the data became invalid under a unified detection limit was also excluded. 3 samples were measured for a site or area, and the detection in more than one out of samples from a site or area can be defined as one detected site or area.

(Note 2) Detection range is based on the number of samples and therefore can be shown as "nd～" even if a target chemical is detected in all sites (or areas).

(Note 3) ☐ means the medium was not surveyed.