

# Chapter 1 Results of the Initial Environmental Survey in FY2015

## 1. Purpose of the survey

Initial Environmental Surveys are implemented in compliance with the Law Concerning Reporting, etc. of Releases of Specific Chemical Substances to the Environment and Promoting Improvement in Their Management (Law No. 86, 1999) (hereafter, the PRTR); these surveys provide the basic resources to properly evaluate chemical substances which may present environmental risk by compiling and tracking data notably from areas susceptible to high concentrations in their general environments, as well as for evaluating environmental and exposure risks to chemical substances that are other than as designated by law.

## 2. Target chemicals

In the FY2015 Initial Environmental Survey, 15 chemicals (groups) that were selected and designated as target chemicals. The combinations of target chemicals and the surveyed media are given below.

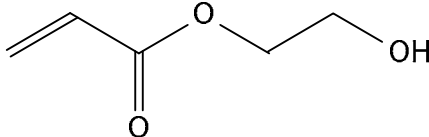
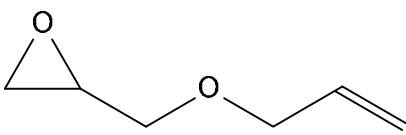
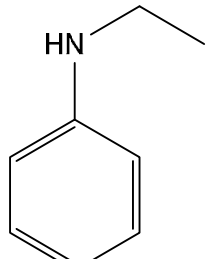
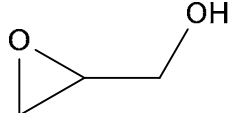
No.	Name	The Chemical Substances Control Law		The PRTR Law		Surveyed media	
		Before the revision	After the revision	Before the revision	After the revision	Surface water	Air
[1]	2-Hydroxyethyl acrylate	II Monitored			I 6		○
[2]	1-Allyloxy-2,3-epoxypropane	II Monitored		I 23	I 29		○
[3]	<i>N</i> -Ethylaniline	II Monitored III Monitored		I 10	II 9	○	
[4]	2,3-Epoxy-1-propanol	II Monitored		I 55	I 67		○
[5]	Silver and its compounds (as Silver)			I 64	I 82	○	
[6]	2,4-Diaminoanisole				I 142	○	
[7]	2,4-Dichlorophenol	II Monitored III Monitored			II 34	○	
[8]	<i>N,N</i> -Dimethylacetamide	II Monitored			I 213	○	
[9]	2,3-Dimethylaniline	II Monitored III Monitored		II 42	II 50	○	
[10]	2,3,5,6-Tetrachloro- <i>p</i> -benzoquinone	III Monitored			I 264	○	
[11]	1,2,3-Trimethylbenzene					○	
[12]	<i>N</i> -Nitrosodimethylamine						○
[13]	Bis (4-aminocyclohexyl) methane (synonym: Diaminodicyclohexylmethane)					○	
[14]	1,3-Bis[(2,3-epoxypropyl)oxy]benzene				I 324	○	
[15]	Organotin compounds			I 176	I 239		
	[15-1] Monobutyltin compounds					○	○
	[15-2] Dibutyltin compounds					○	○
	[15-3] Dimethyltin compounds					○	○

(Note 1) “The Chemical Substances Control Law” hereafter means “Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances (Law No. 117 of 1973).”

(Note 2) Pre-Revision “Areas as designated under the Chemical Substances Control Law” refer to those areas designated prior to the 20 May 2009 revision of the law (which went into effect on 1 April 2011), while “Post Revision Areas” refer to the areas defined as designated post-20 May 2009.

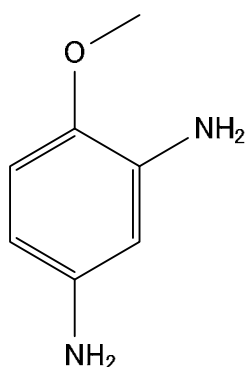
(Note 3) “Before the revision” in “The PRTR Law” means “appointments before the revision of government ordinance on November 21, 2008” and “After the revision” in “The PRTR Law” means “appointments after that revision”.

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

<p>[1] 2-Hydroxyethyl acrylate</p> 	<p>Molecular formula: C<sub>5</sub>H<sub>8</sub>O<sub>3</sub>            CAS: 818-61-1            ENCS: 2-995            MW: 116.12            mp: -60.2°C<sup>1)</sup>            bp: 191°C<sup>2)</sup>            sw: 1,000,000mg/L (25°C)<sup>1)</sup>            Specific gravities: 1.011g/cm<sup>3</sup> (23°C)<sup>2)</sup>            logPow: -0.21<sup>1)</sup></p>
<p>[2] 1-Allyloxy-2,3-epoxypropane</p> 	<p>Molecular formula: C<sub>6</sub>H<sub>10</sub>O<sub>2</sub>            CAS: 106-92-3            ENCS: 2-393            MW: 114.14            mp: -100°C<sup>3)</sup>            bp: 154°C<sup>2)</sup>            sw: 140,000mg/L<sup>3)</sup>            Specific gravities: 0.9698g/cm<sup>3</sup> (20°C)<sup>2)</sup>            logPow: 0.34<sup>4)</sup></p>
<p>[3] N-Ethylaniline</p> 	<p>Molecular formula: C<sub>8</sub>H<sub>11</sub>N            CAS: 103-69-5            ENCS: 3-118, 3-206            MW: 121.18            mp: -63.4°C<sup>2)</sup>            bp: 204°C<sup>2)</sup>            sw: 2,410mg/L (25°C)<sup>5)</sup>            Specific gravities: 0.9625g/cm<sup>3</sup> (20°C)<sup>2)</sup>            logPow: 2.16<sup>5)</sup></p>
<p>[4] 2,3-Epoxy-1-propanol</p> 	<p>Molecular formula: C<sub>3</sub>H<sub>6</sub>O<sub>2</sub>            CAS: 556-52-5            ENCS: 2-2389            MW: 74.08            mp: -45°C<sup>3)</sup>            bp: 167°C (Decomposition)<sup>6)</sup>            sw: Miscible<sup>6)</sup>            Specific gravities: 1.1143(25°C /4°C)<sup>6)</sup>            logPow: -0.95<sup>7)</sup></p>
<p>[5] Silver and its compounds (as Silver)</p> <p style="text-align: center; font-size: 2em;"><b>Ag</b></p>	<p>Molecular formula: Not specified            CAS: 7440-22-4 etc.            ENCS: Not specified            MW: Not specified            mp: Not specified            bp: Not specified            sw: Not specified            Specific gravities: Not specified            logPow: Not specified</p>

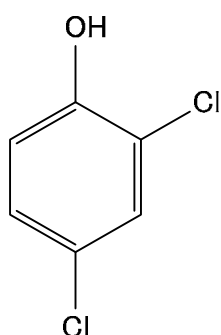
(Abbreviations) CAS CAS registry number, ENCS registry number in the Existing and New Chemical Substances List, MW molecular weight, mp melting point, bp boiling point, SW solubility in water, Specific gravities Specific gravity(no unit) or density, logPow *n*-octanol-water partition coefficient, kPa kilopascal (1 atom approximately equal to 101.3kPa).

[6] 2,4-Diaminoanisole



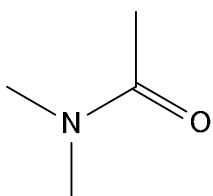
Molecular formula: C<sub>7</sub>H<sub>10</sub>N<sub>2</sub>O  
CAS: 615-05-4  
ENCS: 3-730  
MW: 138.17  
mp: 67.5°C<sup>2)</sup>  
bp: Uncertain  
sw: Uncertain  
Specific gravities: Uncertain  
logPow: Uncertain

[7] 2,4-Dichlorophenol



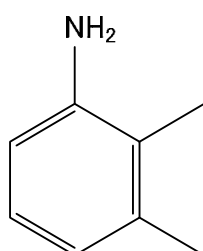
Molecular formula: C<sub>6</sub>H<sub>4</sub>Cl<sub>2</sub>O  
CAS: 120-83-2  
ENCS: 3-903, 3-930  
MW: 163.00  
mp: 43°C<sup>2)</sup>  
bp: 210°C<sup>2)</sup>  
sw: 5.5g/kg (25°C)<sup>2)</sup>  
Specific gravities: 1.38 (60°C / 25°C)<sup>7)</sup>  
logPow: 3.23<sup>2)</sup>

[8] *N,N*-Dimethylacetamide



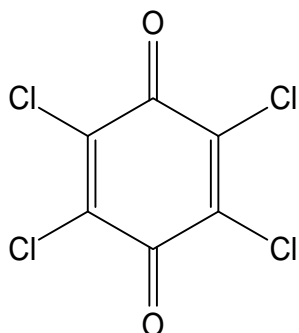
Molecular formula: C<sub>4</sub>H<sub>9</sub>NO  
CAS: 127-19-5  
ENCS: 2-723  
MW: 87.12  
mp: -19°C<sup>2)</sup>  
bp: 165.9°C<sup>2)</sup>  
sw: 1,000,000mg/L (25°C)<sup>8)</sup>  
Specific gravities: 0.9372g/cm<sup>3</sup> (25°C)<sup>2)</sup>  
logPow: -0.77<sup>2)</sup>

[9] 2,3-Dimethylaniline



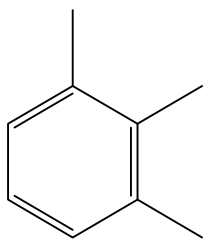
Molecular formula: C<sub>8</sub>H<sub>11</sub>N  
CAS: 87-59-2  
ENCS: 3-129  
MW: 121.18  
mp: 3°C<sup>2)</sup>  
bp: 223°C<sup>2)</sup>  
sw: 15g/100ml (20°C)<sup>3)</sup>  
Specific gravities: 0.9931g/cm<sup>3</sup> (20°C)<sup>2)</sup>  
logPow: 2.2<sup>7)</sup>

[10] 2,3,5,6-Tetrachloro-*p*-benzoquinone



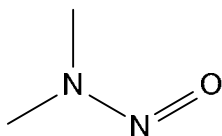
Molecular formula: C<sub>6</sub>Cl<sub>4</sub>O<sub>2</sub>  
CAS: 118-75-2  
ENCS: 3-1007  
MW: 245.88  
mp: 298.3°C<sup>2)</sup>  
bp: Uncertain  
sw: 0.25g/kg (20°C)<sup>2)</sup>  
Specific gravities: 1.97<sup>5)</sup>  
logPow: 3, 4.9<sup>3)</sup>

[11] 1,2,3-Trimethylbenzene



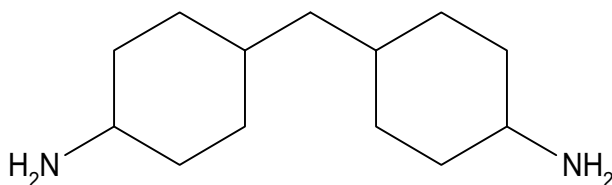
Molecular formula:  $C_9H_{12}$   
CAS: 526-73-8  
ENCS: 3-7, 3-3427  
MW: 120.19  
mp:  $-25.32^{\circ}C^{(2)}$   
bp:  $176.0^{\circ}C^{(2)}$   
sw:  $0.070mg/kg(25^{\circ}C)^{(2)}$   
Specific gravities:  $0.8944g/cm^3(20^{\circ}C)^{(2)}$   
logPow:  $3.60^{(2)}$

[12] *N*-Nitrosodimethylamine



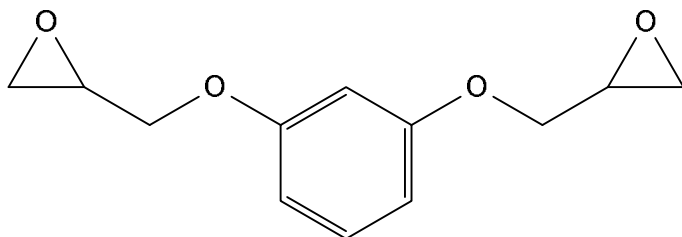
Molecular formula:  $C_2H_6N_2O$   
CAS: 62-75-9  
ENCS: No pertinence  
MW: 74.08  
mp:  $<25^{\circ}C^{(8)}$   
bp:  $164^{\circ}C^{(2)}$   
sw:  $1,000,000mg/L^{(7)}$   
Specific gravities:  $1.0048g/cm^3(20^{\circ}C)^{(2)}$   
logPow:  $-0.57^{(5)}$

[13] Bis(4-aminocyclohexyl) methane (synonym: Diaminodicyclohexylmethane)



Molecular formula:  $C_{13}H_{26}N_2$   
CAS: 1761-71-3  
ENCS: 3-2272, 4-101  
MW: 210.37  
mp:  $15^{\circ}C^{(2)}$   
bp:  $320^{\circ}C^{(2)}$   
sw: Uncertain  
Specific gravities:  $0.92g/cm^3(75^{\circ}C)^{(2)}$   
logPow: Uncertain

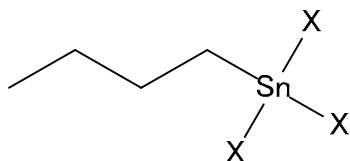
[14] 1,3-Bis[(2,3-epoxypropyl)oxy]benzene



Molecular formula:  $C_{12}H_{14}O_4$   
CAS: 101-90-6  
ENCS: 7-1284  
MW: 222.24  
mp:  $42.5^{\circ}C^{(2)}$   
bp:  $147(0.4mmHg)^{(2)}$   
sw: Miscible<sup>(5)</sup>  
Specific gravities:  $1.2183g/cm^3(30^{\circ}C)^{(2)}$   
logPow: Uncertain

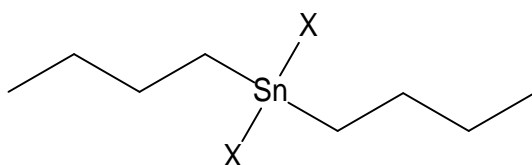
[15] Organotin compounds

[15-1] Monobutyltin compounds



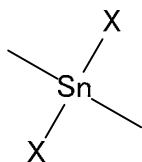
Molecular formula: Not specified  
CAS: Not specified  
ENCS: Not specified  
MW: Not specified  
mp: Not specified  
bp: Not specified  
sw: Not specified  
Specific gravities: Not specified  
logPow: Not specified

[15-2] Dibutyltin compounds



Molecular formula: Not specified  
CAS: Not specified  
ENCS: Not specified  
MW: Not specified  
mp: Not specified  
bp: Not specified  
sw: Not specified  
Specific gravities: Not specified  
logPow: Not specified

[15-3] Dimethyltin compounds



Molecular formula: Not specified  
CAS: Not specified  
ENCS: Not specified  
MW: Not specified  
mp: Not specified  
bp: Not specified  
sw: Not specified  
Specific gravities: Not specified  
logPow: Not specified

References

- 1) OECD, Screening Information Data Sets (SIDS) for High Product inVolume Chemicals (Processed by UNEP Chemicals) (<http://www.inchem.org/pages/sids.html>)
- 2) Lide, D.R. (ed), CRC Handbook of Chemistry and Physics 97th Edition(2016)
- 3) International Programme on Chemical Safty, International Chemical Safety Cards (ICSC)
- 4) Chemical Products Division Basic Industries Bureau Ministry of International Trade and Industry, Existing Chemical Substances Safety Evaluation Data, Official Bulletin of Ministry of International Trade and Industry (July 28, 1995)
- 5) U.S. National Library of Medicine, Hazardous Substances Data Bank (HSDB) (<https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>)
- 6) O'Neil, M.J. (ed), The Merck Index 14th Edition(2006)
- 7) Verschueren, K. (ed), Handbook of Environmental Data on Organic Chemicals(2008)
- 8) U.S. EPA, Estimation Programs Interface (EPI) Suite v4.1 (<http://www.epa.gov/oppt/exposure/pubs/episuite.html>)

### 3. Surveyed site and procedure

In the Initial 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 analysed by private analytical laboratories.

#### (1) Organisations responsible for sampling

Local communities	Organisations responsible for sampling* <sup>1</sup>	Surveyed media	
		Surface water	Air
Hokkaido	Environmental Promotion Section, Environment Division, Department of Environment and Lifestyle, Hokkaido Prefectural Government and Hokkaido Research Organization Environmental and Geological Research Department Institute of Environmental Sciences	○	○
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		○
Akita Pref.	Akita Research Center for Public Health and Environment	○	
Yamagata Pref.	Yamagata Institute of Environmental Sciences	○	
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center	○	○
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	○	○
Saitama City	Saitama City Institute of Health Science and Research		○
Chiba Pref.	Chiba Prefectural Environmental Research Center	○	○
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection	○	○
Kanagawa Pref.	Kanagawa Environmental Research Center		○
Yokohama City	Yokohama Environmental Science Research Institute	○	
Niigata Pref.	Niigata Prefectural Institute of Public Health and Environmental Sciences	○	○
Toyama Pref.	Toyama Prefectural Environmental Science Research Center	○	○
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science	○	○
Nagano Pref.	Nagano Environmental Conservation Research Institute	○	○
Shizuoka Pref.	Shizuoka Institute of Environment and Hygiene	○	
Aichi Pref.	Aichi Environmental Research Center	○	○
Nagoya City	Nagoya City Environmental Science Research Center	○	○
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 of Health and Environmental Sciences		○
Osaka Pref.	Environment Preservation Division, Environment Management Office, Department of Environment, Agriculture, Forestry and Fisheries, Osaka Prefectural Government and Research Institute of Environment, Agriculture and Fisheries, Osaka Prefecture	○	○* <sup>2</sup>
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○	
Hyogo Pref.	Water and Air Quality Control Division, Environmental Management Bureau, Agricultural and Environmental Affairs Department, Hyogo Prefectural Government	○	○
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health	○	○
Okayama Pref.	Okayama Prefectural Institute for Environmental Science and Public Health	○	
Hiroshima Pref.	Hiroshima Prefectural Technology Research Institute Health and Environment Center	○	○
Yamaguchi Pref.	Yamaguchi Prefectural Institute of Public Health and Environment	○	○
Kagawa Pref.	Kagawa Prefectural Research Institute for Environmental Sciences and Public Health	○	○
Ehime Pref.	Ehime Prefectural Institute of Public Health and Environmental Science		○
Kochi Pref.	Kochi Prefectural Environmental Research Center	○	
Fukuoka Pref.	Fukuoka Institute of Health and Environmental Sciences	○	○
Kitakyushu City	Kitakyushu City Institute of Environmental Sciences	○	○
Fukuoka City	Fukuoka City Institute for Hygiene and the Environment	○	
Saga Pref.	Saga Prefectural Environmental Research Center		○
Oita Pref.	Oita Prefectural Institute of Health and Environment, Life and Environment Department	○	
Miyazaki Pref.	Miyazaki Prefectural Institute for Public Health and Environment	○	

(Note 1) \*1: Organisations responsible for sampling are described by their official names in FY 2015.

(Note 2) \*2: That organization cooperated with a private analytical laboratory in sampling specimens

## (2) Surveyed sites and target chemicals

The number of target chemicals (groups) and the number of surveyed sites, etc. by surveyed medium in the initial environmental survey were as shown in the following table.

The target chemicals and the national distribution map of the survey sites for each medium are shown in Table 1-1-1 and Figures 1-1-1 for surface water, Table 1-1-2 and Fig.1-1-2 for air.

In addition, about 20 sites were selected as survey sites per target chemical. To obtain data for areas to be expected to high concentrations in the general environment survey sites are selected based on information regarding releases and emissions. Among the sites considering to rank in the top of PRTR emissions, it was included the surrounding sites where samples can be taken in the survey sites.

Surveyed media	Numbers of local communities	Numbers of target chemicals (groups)	Numbers of surveyed sites	Numbers of samples at a surveyed site
Surface water	36	11	59	1
Air	30*	5	36	3
All media	43	15	95	

(Note) \*:For 1 of the 30 organizations, it was cooperated with a private analytical laboratory in sampling specimens.

## (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 Initial Environmental Survey (hereafter, the Initial Environmental Survey Analytical Method), if the IDL measured by the analytical laboratory is lower than the given IDL, the MDL of the Initial Environmental Survey Analytical Method is used as the detection limit by the analytical laboratory.

When IDL and MDL are not given in the Initial 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.

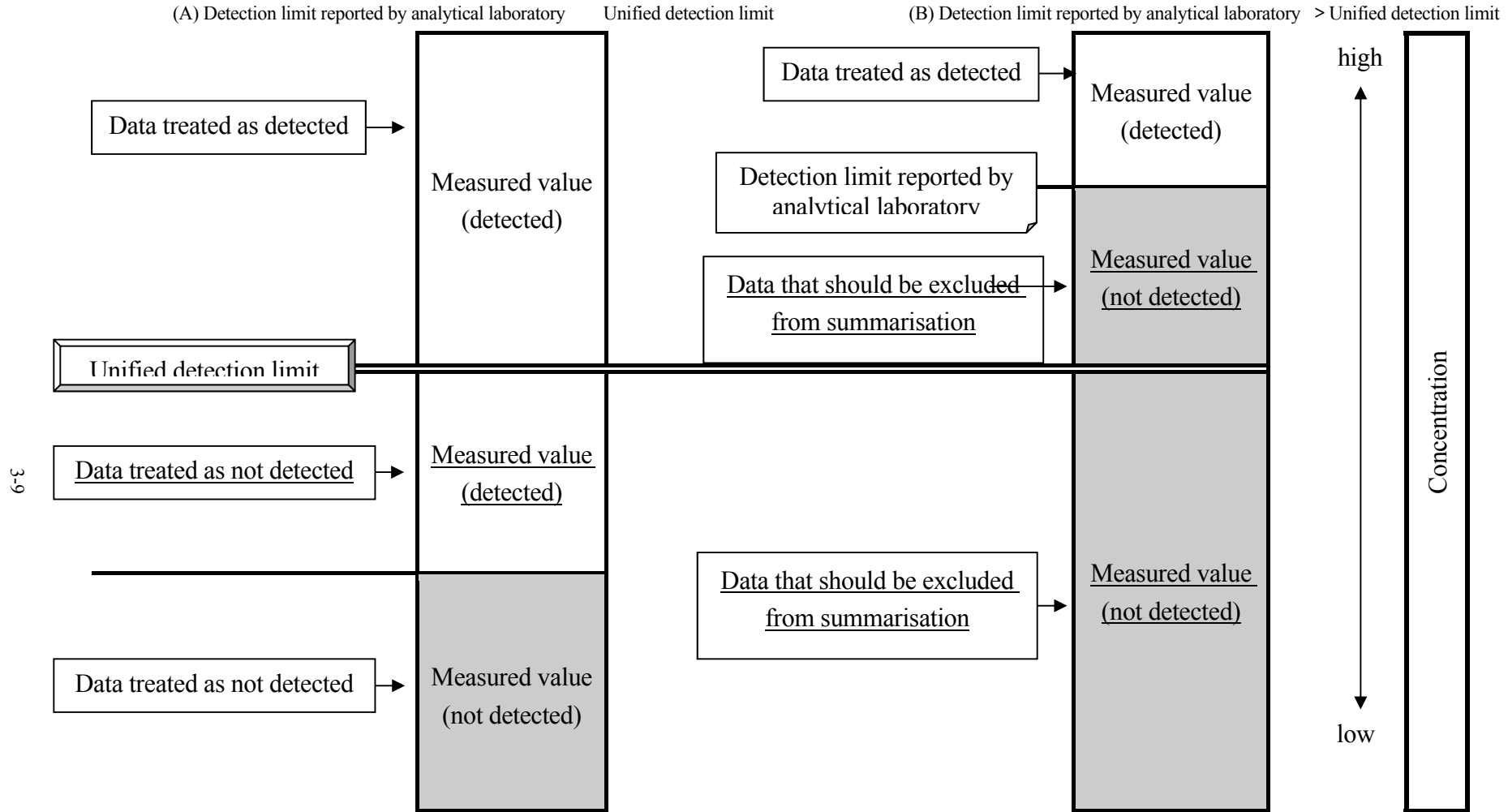
When the appropriate IDL and MDL are not calculated by the analytical laboratory, one of the following procedures was employed to establish the detection limit by the analytical laboratory.

- deduction from the IDL and MDL calculated for the corresponding chemical by Initial 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

Table 1-1-1 List of surveyed sites (surface water) and target chemicals in the Initial Environmental Survey in FY2015

Local communities	Surveyed sites	Target chemicals										
		[3]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[13]	[14]	[15]
Hokkaido	Bifuka Bridge, Riv. Teshio (Bifuka Town)	○			○		○			○		
	Suzuran-ohashi Bridge, Riv. Tokachi (Obihiro City)	○			○		○			○		○
	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.	Futatsuya-bashi Bridge, Riv. Hasama (Tome City)		○		○							
	Sakura-hodoukyou Bridge, Riv.Shiroishi (Shibata Town)		○		○							
Akita Pref.	Akita Canal (Akita City)	○	○	○	○	○	○	○	○	○	○	○
Yamagata Pref.	Mouth of Riv. Mogami (Sakata City)	○		○			○	○	○	○	○	
	Tozawa Bridge, Riv. Sake (Tozawa Village)		○									
Ibaraki Pref.	Miyatagawa Bridge, Riv. Miyata (Hitachi City)		○									
	Tonekamome-ohasi Bridge, Mouth of Riv. Tone (Kamisu City)	○	○				○					
Tochigi Pref.	Riv. Tagawa(Utsunomiya City)					○						
Saitama Pref.	Do-bashi Bridge, Riv. Naka (Kazo City)											○
	Akigaseshusui of Riv. Arakawa (Shiki City)										○	
Chiba Pref.	Asai-bashi Bridge, Riv.Yourou (Ichihara City)					○			○	○	○	
Tokyo Met.	Mouth of Riv. Arakawa (Koto Ward)	○	○	○	○	○	○	○	○	○	○	○
	Mouth of Riv. Sumida (Minato Ward)	○	○	○	○	○	○	○	○	○	○	○
Yokohama City	Kamenoko-bashi Bridge, Riv.Tsurumi (Yokohama City)	○	○	○	○	○	○	○	○	○	○	○
	Ebisu Canal											○
	Yokohama Port	○	○	○	○	○	○	○	○	○	○	○
Niigata Pref.	Oun Bridge, Riv. Agano (Niigata City)		○									
	Lower Riv. Shinano (Niigata City)	○		○			○	○			○	
Toyama Pref.	Daimon-ohashi Bridge, Riv. Sho (Imizu City)					○						
Ishikawa Pref.	Mouth of Riv. Sai (Kanazawa City)					○	○					○
Nagano Pref.	Ozeki Bridge, Riv.Chikuma (Iiyama City)		○									
Shizuoka Pref.	Riv. Tenryu(Iwata City)											○
Aichi Pref.	Sakai-ohashi Bridge, Riv Aizuma (Kariya City)											○
	Nagoya Port , West of Shiomi Wharf*	○	○	○	○		○	○	○	○	○	○
Nagoya City	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)									○		
	Nagoya Port , East of Shiomi Wharf											○
Mie Pref.	Yokkaichi Port			○	○	○			○			○
Shiga Pref.	Lake Biwa (center, offshore of Minamihira)					○					○	○
	Lake Biwa (center, offshore of Karasaki)					○					○	○
Kyoto Pref.	Miyazu Port		○		○							
Osaka Pref.	Mouth of Riv. Yamato (Sakai City)										○	○
Osaka City	Kema-bashi Bridge, Riv. Oh-kawa (Osaka City)				○							○
	Osaka Port				○							○
Hyogo Pref.	Coast of Amagasaki	○		○			○	○	○	○		○
	Manago Bridge, Riv. Hayashida (Taishi Town)										○	
	Offshore of Himeji										○	
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa(Wakayama City)			○	○							○
Okayama Pref.	Sasagase-bashi Bridge, Riv. Sasagase Otoidezeki of Riv. Asahi(Okayama City)			○					○	○		
	Offshore of Mizushima	○	○	○			○	○	○	○	○	
	Bisan-seto		○									
Hiroshima Pref.	Offshore of Otake-iwakuni					○						
Yamaguchi	Tokuyama Bay					○						○

Local communities	Surveyed sites	Target chemicals											
		[3]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[13]	[14]	[15]	
Pref.	Offshore of Hagi				○								○
Kagawa Pref.	Takamatsu Port	○		○	○	○	○	○	○	○	○		
Kochi Pref.	Shinkawa-gawa Bridge, Riv. Shinkawa (Kochi City)					○							
Fukuoka Pref.	Kabura-bashi Bridge, Riv. Raizan (Maebaru Itoshima City)				○	○				○			
	Offshore of Omuta				○	○				○			
Kitakyushu City	Dokai Bay								○			○	
Fukuoka City	Hakata Bay	○		○		○	○	○					
Oita Pref.	Saganoseki Port		○										
	Mouth of Riv. Oita (Oita City)	○	○	○			○	○	○	○	○	○	
Miyazaki Pref.	Hoori-ohashi Bridge, Riv. Hoori (Nobeoka City)					○							
	Naka Bridge, Riv. Hama (Nobeoka City)					○							

[3] *N*-Ethylaniline, [5] Silver and its compounds (as Silver), [6] 2,4-Diaminoanisoole, [7] 2,4-Dichlorophenol, [8] *N,N*-Dimethylacetamide, [9] 2,3-Dimethylaniline, [10] 2,3,5,6-Tetrachloro-*p*-benzoquinone, [11] 1,2,3-Trimethylbenzene, [13] Bis (4-aminocyclohexyl) methane (synonym: Diaminodicyclohexylmethane), [14] 1,3-Bis[(2,3-epoxypropyl)oxy]benzene, [15] Organictin compounds

(Note) \*: “Nagoya Port, West of Shiomi Wharf” of Initial and Detailed Environmental Survey and “Nagoya Port” of Environmental Monitoring are the same point each.

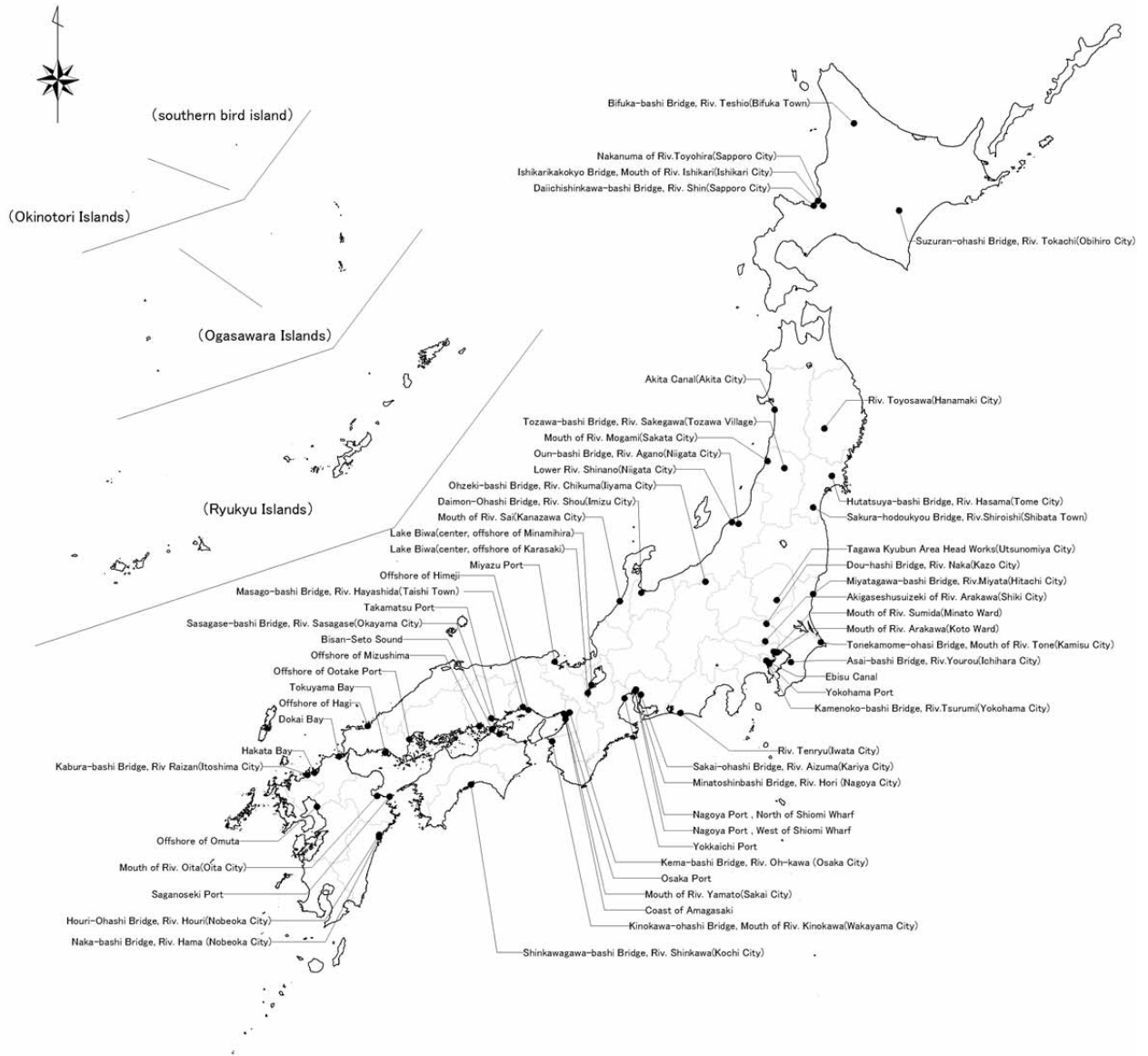


Figure 1-1-1 Surveyed sites (surface water and sediment) in the Initial Environmental Survey in FY 2015

Table 1-1-2 List of surveyed sites (air) and target chemicals in the Initial Environmental Survey in FY 2015

Local communities	Surveyed sites	Target chemicals				
		[1]	[2]	[4]	[12]	[15]
Hokkaido	Hokkaido Research Organization Environmental and Geological Research Department Institute of Environmental Sciences (Sapporo City)	○	○	○	○	○
Sapporo City	Sapporo City Institute of Public Health (Sapporo City)			○		
Iwate Pref.	Yoshichou Air Quality Monitoring Station (Kitakami City)					○
Sendai City	Tsutsujigaoka Park (Sendai City)			○		
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center(Tsuchiura City)				○	
Gunma Pref.	Annaka Municipal Annaka Elementary School Air Quality Monitoring Station (Annaka City)		○			
Saitama Pref.	Center for Environmental Science in Saitama (Kazo City)					○
Saitama City	Saitama City Public Health Center(Saitama City)	○	○			○
Chiba Pref.	Sodegaura-daijuku Air Quality Monitoring Station (Sodegaura City)		○	○	○	
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection (Koto Ward)		○			○
	Chichijima Island		○			○
Kanagawa Pref.	Kanagawa Environmental Research Center (Hiratsuka City)	○	○	○	○	○
Niigata Pref.	Nishifukushima Air Quality Monitoring Station (Jyouetsu City)		○			
Toyama Pref.	Takaoka Fushiki Air Quality Monitoring Station (Takaoka City)	○				
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science (Kanazawa City)	○		○	○	
	Mikawa Air Quality Monitoring Station (Hakusan City)	○				
	Komatsu Air Quality Monitoring Station (Komatsu City)		○			
Nagano Pref.	Nagano Environmental Conservation Research Institute (Nagano City)	○	○	○	○	○
Aichi Pref.	Tougouchou-haruki Air Quality Monitoring Station (Tougou Town)	○				
Nagoya City	Chikusa Ward Heiwa Park(Nagoya City)	○			○	○
Mie Pref.	Mie Prefecture Health and Environment Research Institute (Yokkaichi City)	○	○	○	○	
Kyoto Pref.	Uji Prefectural Government Building (Uji City)	○		○	○	
Kyoto City	Kyoto City Government Building (Kyoto City)				○	
Osaka Pref.	Ibaraki City Government Building (Ibaraki City)					○
Hyogo Pref.	Harima Town Government Building Air Quality Monitoring Station(Harima Town)	○				○
	Onoe Air Quality Monitoring Station (Kakogawa)	○				
	Aboshi Air Quality Monitoring Station (Himeji)		○			
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health (Wakayama City)			○		○
Hiroshima Pref.	Otake-Yumi Park (Otake City)	○				
Yamaguchi Pref.	Yamaguchi Prefectural Institute of Public Health and Environment (Yamaguchi City)		○	○	○	○
Kagawa Pref.	Kagawa Prefectural Public Swimming Pool (Takamatsu City)	○	○	○	○	○
Ehime Pref.	Mibu Air Quality Monitoring Station (Matsuyama)		○			
Fukuoka Pref.	Fukuoka Institute of Health and Environmental SciencesMunakata Prefectural Government Building (Munakata dDazaifu City)	○		○		
	Omuta City Government Building (Omuta City)	○		○		
Kitakyushu City	Kitakyushu Monitoring Station (Kitakyushu City)			○		
Saga Pref.	Saga Prefectural Environmental Research Center (Saga City)	○	○	○		

[1] 2-Hydroxyethyl acrylate, [2] 1-Allyloxy-2,3-epoxypropane, [4] 2,3-Epoxy-1-propanol, [12] N-Nitrosodimethylamine, [15] Organictin compounds



Figure 1-1-2 Surveyed sites (air) in the Initial Environmental Survey in FY 2015

#### 4. Summary of survey results

The detection ranges and the detection limits are shown in Table 1-2. The survey results are summarized as follows.

In surface water, 5 out of the 11 target chemicals (groups) were detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

- [5] Silver and its compounds (as Silver) : 19 of the 21 valid sites
- [7] 2,4-Dichlorophenol : 2 of the 21 valid sites
- [8] *N,N*-Dimethylacetamide : 11 of the 20 valid sites
- [11] 1,2,3-Trimethylbenzene : 2 of the 16 valid sites
- [15] Organotin compounds
  - [15-1] Monobutyltin compounds : 7 of the 23 valid sites
  - [15-2] Dibutyltin compounds : 7 of the 22 valid sites
  - [15-3] Dimethyltin compounds : 6 of the 23 valid sites

In air, 2 out of the 6 target chemicals (groups) were detected.

- [2] 1-Allyloxy-2,3-epoxypropane : 3 of the 16 valid sites
- [12] *N*-Nitrosodimethylamine : 12 of the 12 valid sites
- [15] Organotin compounds
  - [15-1] Monobutyltin compounds : 5 of the 14 valid sites
  - [15-3] Dimethyltin compounds : 1 of the 14 valid sites

Table 1-2 Summary of the detection ranges and the detection limits in the Initial Environmental Survey in FY 2015

No.	Target chemicals	Surface water [ng/L]		Air [ng/m <sup>3</sup> ]	
		Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[1]	2-Hydroxyethyl acrylate *			nd 0/18	58
[2]	1-Allyloxy-2,3-epoxypropane *			nd~14 3/16	8.6
[3]	<i>N</i> -Ethylaniline	nd 0/15	13		
[4]	2,3-Epoxy-1-propanol			nd 0/16	1,000
[5]	Silver and its compounds (as Silver) *	nd~120 19/21	0.6		
[6]	2,4-Diaminoanisole	nd 0/16	160		
[7]	2,4-Dichlorophenol	nd~8.3 2/21	1.9		
[8]	<i>N,N</i> -Dimethylacetamide *	nd~73,000 11/20	14		
[9]	2,3-Dimethylaniline	nd 0/15	12		
[10]	2,3,5,6-Tetrachloro- <i>p</i> -benzoquinone	nd 0/14	180		
[11]	1,2,3-Trimethylbenzene	nd~11 2/16	4.8		
[12]	<i>N</i> -Nitrosodimethylamine			0.17~380 12/12	0.017
[13]	Bis (4-aminocyclohexyl) methane (synonym: Diaminodicyclohexylmethane)	nd 0/16	14		
[14]	1,3-Bis[(2,3-epoxypropyl)oxy]benzene	nd 0/19	9.7		
[15]	Organictin compounds *				
[15-1]	[15-1] Monobutyltin compounds	nd~220 7/23	4.4	nd~16 5/14	4.7
[15-2]	[15-2] Dibutyltin compounds	nd~160 7/22	1.7	nd 0/14	4.9
[15-3]	[15-3] Dimethyltin compounds	nd~110 6/23	7.0	nd~18 1/14	3.7

(Note 1) Detection frequency is based on the number of sites, 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. In sediment, wildlife and air, 3 samples were measured for a site, and the detection in more than one out of samples from a site can be defined as one detected site.

(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.

(Note 3)  means the medium was not surveyed.

(Note 4)\* connote target substances or points selected for survey in light of documentation or submittals regarding emissions.