

Outline of Results of the Environmental Survey and Monitoring of Chemicals in FY 2005

(1) History

In FY 1974, on the basis of the agreement at the establishment of the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances (No. 117, enacted in 1973) (hereafter, Chemical Substances Control Law), the Environmental Survey and Monitoring of Chemicals was begun for the purpose of understanding the presence of existing chemical substances in the general environment. Since FY 1979, the framework of the Comprehensive Survey of Chemicals on Environmental Safety based on the Priority List (list of chemicals to be preferentially surveyed) has been established, and the Environmental Survey and Monitoring of Chemicals was incorporated as a part of the Comprehensive Survey of Chemicals on Environmental Safety. In addition, as associated surveys, the Wildlife Monitoring, the Follow-up Survey of the Status of Pollution by Unintentionally Formed Chemicals, the Surface Water/Sediment Monitoring, the Examination Survey of the Designated Chemical Substances, and other surveys have been expanded.

On the other hand, the Priority List-based survey was fundamentally reviewed in order to enable an immediate and appropriate response to the changes in the situation of problems concerning chemicals in the environment and current policy issues, including the enforcement of the Law Concerning Reporting, etc. of Releases of Specific Chemical Substances to the Environment and Promoting Improvement in Their Management (No. 86, enacted in 1999) (hereafter, the PRTR Law) and the effectuation of the Stockholm Convention on Persistent Organic Pollutants (hereafter, Stockholm Convention).

As a result of the review, the Priority List-based method was changed to the method in which target chemicals are selected mainly from those proposed by each department such that the survey results can be effectively utilised to develop the policies concerning chemicals in the environment. In addition, the Environmental Survey and Monitoring of Chemicals consisting of subjective surveys, namely, the Initial Environmental Survey, the Environmental Survey for Exposure Study, and Environmental Monitoring, was adopted as a new framework.

However, the Environmental Survey and Monitoring of Chemicals has been implemented within a system that comprises the Initial Environmental Survey, the Detailed Environmental Survey, the Environmental Survey for Exposure Study, and Environmental Monitoring since FY 2005. At the same time, the Support Project for Exposure Estimation, Project for Preserving Environmental Specimens, and Analytical Method Development Project have also been actively tackled to support the above survey.

(2) Survey Procedure

Selection of target chemicals

Chemicals that were requested to be surveyed by each department and that were noted by academic experts as requiring surveys were regarded as candidates from among which the target chemicals were selected after examinations on the basis of the findings on their hazardousness, as evaluated by the Expert Group for Promotion of the Environmental Survey and Monitoring of Chemicals held on April 22nd, 2005, the PRTR data, the estimation of environmental persistence, the feasibility of the establishment of analysis technology, and social and administrative needs.

Contents of the survey

The Initial Environmental Survey

The Initial Environmental Survey was implemented in order to understand the environmental persistence of chemicals requiring examination of the appropriateness of their designation as the Designated Chemical Substance under the PRTR Law and chemicals requiring survey from social viewpoints. The survey data were precisely examined and analysed at the Expert Working Group for Reviewing the Results of the Initial Environmental Survey and Detailed Environmental Survey (held on September 8th and October 18th, 2006) and the Expert Working Group for Analysing the Results of the Initial Environmental Survey and Detailed Environmental Survey (held on December 5th, 2006 and January 9th, 2007). Moreover, analytical methods were also developed as necessary.

In FY 2005, 34 chemicals (groups), including *o*-anisidine, were selected as target chemicals.

The Detailed Environmental Survey

The Detailed Environmental Survey was implemented in order to understand the environmental persistence of the Specified Chemical Substances and the Monitored Chemical Substances under the Chemical Substances Control Law, and chemicals requiring the Initial Environmental Risk Assessment. Similarly to the Initial Environmental Survey, the survey data were examined in detail and analysed at the Expert Working Group for Reviewing the Results of the Initial Environmental Survey and Detailed Environmental Survey and the Expert Working Group for Analysing the Results of the Initial Environmental Survey and Detailed Environmental Survey. Moreover, analytical methods were also developed as necessary.

In FY 2005, 14 chemicals (groups), including 4,4'-isopropylidenediphenol (bisphenol A), were selected as target chemicals.

The Environmental Survey for Exposure Study

The Environmental Survey for Exposure Study was implemented in order to understand the environmental persistence of the Specified Chemical Substances and the Monitored Chemical

Substances under the Chemical Substances Control Law and chemicals requiring the Initial Environmental Risk Assessment. The survey data were examined in detail and analysed at the Expert Working Group for Analysing the Results of the Environmental Monitoring and the Environmental Survey for Exposure Study (held on December 19th, 2006 and January 15th, 2007).

In FY 2005, 21 chemicals, including acrolein, were selected as target chemicals.

The Environmental Monitoring

The Environmental Monitoring was implemented as an annual survey of the environmental persistence of the target chemicals listed in the Stockholm Convention, the possible candidate chemicals, and highly persistent chemicals among the Specified Chemical Substances and Monitored Chemical Substances in the Chemical Substances Control Law, whose environmental standards are not yet established but whose change in persistence in the environment must be understood. Similarly to the Environmental Survey for Exposure Study, the survey data were examined in detail and analysed at the Expert Working Group for Analysing the Results of the Environmental Monitoring and the Environmental Survey for Exposure Study.

In FY 2005, 10 chemicals (groups) in the Stockholm Convention and organotin compounds and other chemicals, namely, a total of 14 chemicals (groups), were selected as target chemicals.

Survey results

The Initial Environmental Survey

In surface water, 6 of 33 target chemicals (groups) were detected: 17 β -estradiol; estrone, 2,4,6-tribromophenol, poly(oxyethylene) alkylethers, poly(oxyethylene) nonylphenylethers, and 2-methoxy-5-methylaniline.

In sediment, 6 of 13 target chemicals (groups) were detected: 2,3-epoxypropane-1-ol, *m*-chloroaniline, 3,3'-dichloro-4,4'-diaminodiphenylmethane, medium-chain chlorinated paraffins, linear alkylbenzene sulfonate (LAS), 2,4-toluenediamine.

In wildlife (bivalves and fish), 1 of 2 target chemicals (groups), was detected: medium-chain chlorinated paraffins.

In air, the target chemical, *N*-(1,3-dimethylbutyl)-*N'*-phenyl-*p*-phenylenediamine, was detected.

The Detailed Environmental Survey

In surface water, 8 of 13 target chemicals (groups) were detected: 4,4'-isopropylidenediphenol (bisphenol A), ethylenediaminetetraacetic acid, *p*-octylphenols, *p*-dichlorobenzene, *N,N*-dimethylformamide, nonylphenol, perfluorooctanoic acid, and perfluorooctanoic sulfonic acid.

In sediment, 4 of 5 target chemicals (groups) were detected: diisopropylnaphthalene, hydrazine, perfluorooctanoic acid, and perfluorooctanoic sulfonic acid.

In wildlife (bivalves and fish), all 4 target chemicals (groups) were detected: diisopropylnaphthalene, short-chain chlorinated paraffins, perfluorooctanoic acid, and perfluorooctanoic sulfonic acid.

In air, the target chemical, *N,N*-dimethylformamide, was detected.

The Environmental Survey for Exposure Study

In surface water, 9 of 17 target chemicals were detected: aniline, 2-(2*H*-1,2,3-benzotriazol-2-yl)-4,6-di-*tert*-butylphenol, 2,4-di-*tert*-butyl-6-(5-chloro-2*H*-1,2,3-benzotriazol-2-yl)-phenol, 2-chloro-2',6'-diethyl-*N*-(2-propoxyethyl)acetanilide (pretilachlor), 1,3-dithiolan-2-ylidenemalonic acid diisopropyl (isoprothiolan), *S*-(2,3-dihydro-5-methoxy-2-oxo-1,3,4-thiadiazol-3-yl)methyl *O,O*-dimethyl dithiophosphate (methidathion or DMTP), *O,O*-dimethyl *O*-3-methyl-4-(methylthio)phenyl phosphorothioate (fenthion), *S*-benzyl *O,O*-diisopropyl phosphorothioate (iprobenfos), and α,α,α -trifluoro-2,6-dinitro-*N,N*-dipropyl-*p*-toluidine (trifluralin).

In sediment, 2 of 3 target chemicals were detected: vinclozolin (*N*-3,5-dichlorophenyl-5-methyl-5-vinyl-1,3-oxazolidine-2,4-dione) and methoxychlor.

In wildlife, 2 of 8 target chemicals were detected: *O,O*-diethyl-*S*-(2-ethylthioethyl) dithiophosphate (ethylthiometon) and α,α,α -trifluoro-2,6-dinitro-*N,N*-dipropyl-*p*-toluidine (trifluralin).

In food, the 2 target chemicals (groups) were detected: acrolein and linear alkylbenzenesulfonate (LAS).

In indoor air, the 2 target chemicals were detected: acrolein and 3-methyl-4-nitrophenol.

The Environmental Monitoring

When examining the change in the FY 2002 – 2005 data for surface water, it is considered that the concentration levels of chemicals in surface water and sediment remain unchanged or gradually decrease as a whole. By focusing on the distribution of chemicals in surface water and sediment by area, it was found that the chemicals frequently tended to be relatively high in concentration in areas that are subjected to human activities, such as harbors and semi-closed coastal areas near large cities, as expected.

When examining the change in the FY 2002 – 2005 data for wildlife, it is considered that the concentration levels of chemicals in wildlife remain unchanged or gradually decrease as a whole. Similarly to last fiscal year's data, it was observed that the concentrations of PCBs and DDTs

tended to be relatively high in fish living along coasts near populated areas.

When examining the change in the FY 2002 – 2005 data for air, it is considered that the concentration levels of chemicals in air remain unchanged or gradually decrease as a whole. As was the case in the previous fiscal year, the concentrations of chemicals in air were measured twice: warm season (September to October) and cold season (November to January). For all chemicals (groups), a nationwide tendency of higher concentrations in the warm season than in the cold season was recognised, as expected.

Conditions of detection in survey

From FY 1974 to 2005, the number of chemicals that were subjected to the Environmental Survey and Monitoring of Chemicals was 926, among which, 466 chemicals were detected in the general environment.

Stocktaking of the detection in the Environmental Survey and Monitoring of Chemicals (FY 1974 – FY 2005)

	Surface water	Sediment	Wildlife	Air	Food	Others	Total number of chemicals surveyed
Number of chemicals surveyed	879	797	313	289	17	24	926
Number of chemicals detected	218	287	141	195	13	11	466
Percentage of detected chemicals (%)	25%	36%	45%	67%	76%	46%	50%

(Note 1) Since FY 1985, the detection limit for surface water, sediment, and fish has been uniformly treated.

(Note 2) The total “926” is the total number of chemicals surveyed from FY 1974 to FY 2005, and the total number of chemicals detected (“466”) is the number of chemicals detected in any medium as a result of the survey.

(Note 3) “Others” under medium are precipitation and indoor air.

Schematic of Environmental Survey and Monitoring of Chemicals in FY 2005

