Management and Reduction of Chemical Substances

Storing and Processing Waste

Management of PRTR-Designated Chemical Substances

Our refineries, petrochemical plants, oil depots and other facilities handle chemical substances subject to the Pollutant Release and Transfer Register (PRTR) Law.*1 Among the PRTR-designated chemical substances found in petroleum and petroleum products are volatile organic compounds (VOCs), such as benzene, toluene xylene and normal hexane. Whenever oil is transferred into or removed from storage tanks as well as when it is loaded onto tanker trucks and ships, there will be some evaporation of the VOCs it contains and the resulting gas will attempt to escape into the atmosphere. To minimize such VOC emissions, Idemitsu has installed internal floating roofs in storage tanks that reduce evaporation and carries out measures aimed ensuring VOC recovery during transport.

Furthermore, following the suspension of certain equipment, since 2016 we have eliminated emissions of dichloromethane, a chemical used in petrochemical manufacturing processes. The portion transferred to locations outside Idemitsu business sites is disposed of in compliance with the Waste Management Law.

*1 PRTR Law: The "Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof."

PRTR-Designated Chemical Substances Discharged and Transferred in FY2017 (tons)

Independent Practitioner's Assurance

CAS No.	Name	Discharged into atmosphere	Discharged into water	Discharged into soil	Transferred to locations outside business sites	Total
141-43-5	2-aminoethanol	0.0	0.0	0.0	63.0	63.0
1332-21-4	asbestos	0.0	0.0	0.0	58.1	58.1
80-05-7	4,4'-Isopropylidenediphenol (commonly known as bisphenol A)	0.0	0.0	0.0	3.8	3.8
100-41-4	ethylbenzene	6.5	0.0	0.0	1.4	7.9
1330-20-7	xylene	15.2	0.0	0.0	40.0	55.2
75-45-6	chlorodifluoromethane ; HCFC-22	0.3	0.0	0.0	0.0	0.3
75-09-2	dichloromethane ; methylene dichloride	0.5	0.0	0.0	11.9	12.4
77-73-6	dicyclopentadiene	0.3	0.0	0.0	0.0	0.3
68-12-2	N,N-dimethylformamide	0.0	0.0	0.0	7.2	7.2
100-42-5	styrene	28.6	0.0	0.0	0.4	29.0
127-18-4	tetrachloroethylene	0.0	0.0	0.0	1.4	1.4
95-63-6	1,2,4-trimethylbenzene	1.3	0.0	0.0	0.0	1.3
108-88-3	toluene	19.5	0.0	0.0	83.0	102.5
-	nickel compounds	0.0	0.0	0.0	1.8	1.8
-	vanadium compounds	0.0	0.0	0.0	5.2	5.2
108-95-2	phenol	0.2	0.0	0.0	4.2	4.4
112-02-7	hexadecyltrimethylammonium chloride	0.0	10.0	0.0	0.0	10.0
110-54-3	n-hexane	43.6	0.0	0.0	2.5	46.1
71-43-2	benzene	6.4	0.0	0.0	0.0	6.4
1336-36-3	polychlorinated biphenyls ; PCBs	0.0	0.0	0.0	5.9	5.9
-	manganese and its compounds	0.0	0.0	0.0	3.6	3.6
-	molybdenum and its compounds	0.0	0.0	0.0	1.1	1.1
Total		122.3	10.0	0.0	294.5	426.8

* Scope of tabulation: the Hokkaido Refinery, Chiba Complex (Petroleum), Aichi Refinery, the Chiba Complex (Chemicals), the Tokuyama Complex, the Omaezaki Factory, the Advanced Technology Research Laboratories, the Technology & Engineering Center, Prime Polymer Co., Ltd.'s Anesaki Works, Cray Valley Idemitsu Corporation, and BASF Idemitsu Co., Ltd.
Note: As of October 2017, the Chiba Refinery and Chiba Petrochemical Plant have been integrated into the Chiba Complex. Within this report, "Chiba Complex" refers to the combined total of the previous Chiba Refinery and Chiba Petrochemical Plant; "Chiba Complex (Petroleum)" refers to the previous Chiba Refinery only; and "Chiba Complex (Chemicals)" refers to the previous Chiba Petrochemical Plant only.

** Chemicals are not listed if the discharged and transferred amounts are less than 0.1 ton per year. Figures presented above may not be consistent with the totals since they are rounded off to the nearest whole number.

Controlling PCBs*2

In accordance with the Law concerning Special Measures for Promotion of Proper Treatment of PCB Wastes,*3 at refineries and petrochemical plants, the Idemitsu Group appropriately stores and manages oil containing polychlorinated biphenyls (PCBs) as well as transformers or other equipment that contain these substances. Under the same law and the Basic Plan for PCB Waste Treatment, final deadlines*4 have been set for the completion of the treatment of all PCB waste and, accordingly, the Group is steadily carrying out the processing of such waste. For electrical equipment containing low concentrations of PCBs, we have selected processing methods that include the energized natural circulation washing method*5 specified by the Ministry of Economy, Trade and Industry, and are working to reduce the amount of waste. The results of our processing of waste with high concentrations of PCB are shown below.

*2 Polychlorinated biphenyls
*3 The Basic Plan for PCB Waste Treatment: A plan setting out the steps needed to comprehensively and strategically promote the effective and proper treatment of PCB waste.
*4 The period for setting aside PCB waste:
- High concentrations of PCBs: processing completion deadlines spanning March 2019 through March 2024, and such waste must be set aside at least one year before the relevant deadline (dates differ by item and region).
- Low concentrations of PCBs: by the end of March 2027

*5 A processing method that can be selected only for equipment that meets particular structural and PCB concentration requirements. The equipment in question is drained of contaminated insulating oil and filled with new oil. The equipment is then run normally for at least 90 days to ensure that the new oil has flushed out any lingering PCBs. This method allows us to dispose of PCBs without decommissioning equipment.

High-Concentration PCB Waste Processing Results

Independent Practitioner's Assurance

Beginning storage volume (March 31, 2008): 871 tons
Volume reduced through treating and sorting in fiscal 2017: 86 tons
Storage volume as of March 2018: 41 tons

Note: The period for setting aside PCB waste is as described in note *4 above.

Managing CFCs

In accordance with the Act for Rationalized Use and Proper Management of Fluorocarbons, which came into effect on April 1, 2015, the Idemitsu Group has been implementing steps to prevent the leakage of fluorocarbons. The Safety, Environment & Quality Assurance Department undertakes annual inspections on the progress of changeover to non-fluorocarbon coolants at Idemitsu facilities. Although our oil refineries and petrochemical plants house a significant portion of the Group's large-scale processing equipment containing CFCs and HCFCs, which damage the ozone layer, this equipment can be upgraded only during the performance of major shutdown maintenance. With this in mind, we put priority on replacing all the more harmful ozone-damaging CFCs with alternative coolants, completing this task by fiscal 2016. In addition, we plan to systematically replace all large equipment using HCFCs with those using non-fluorocarbon coolants by fiscal 2025.

Amount of CFCs and HCFCs Used by Large-Scale Processing Equipment at the Idemitsu Group's Two Refineries and Two Complexes (tons)

Independent Practitioner's Assurance

	August 2002 Note	March 2018	March 2019 (Planned)	March 2026 (Planned)
CFC (t)	79.8	0.0	0.0	0.0
HCFC (t)	58.8	42.9	42.9	0.0

Note: At August 2002, there were six refineries and two petrochemical plants
(As of October 2017, the Chiba Refinery and Chiba Petrochemical Plant have been reorganized into the Chiba Complex.)

Idemitsu's estimated CFC leakage for fiscal 2017, calculated based on the Act for Rationalized Use and Proper Management of Fluorocarbons, is as shown below. Until this equipment is changed over to non-CFC coolants, we will take such preventive measures as setting up a temporary vacuum pump to capture CFCs before opening the processor and opening it less frequently.

Estimated Fiscal 2017 CFC Leakage*6

Independent Practitioner's Assurance

Equipment	Estimated leakage ($t\text{-}CO_2$ equivalent)
Large processors	277.8
Air conditioners	422.2
Others	6.1
Total	706.1

Scope of tabulation: Hokkaido and Aichi refineries, Chiba and Tokuyama complexes, Prime Polymer Co., Ltd.'s Anesaki Works, Cray Valley Idemitsu Corporation, BASF Idemitsu Co., Ltd., Idemitsu Unitech Co., Ltd., Advanced Technology Research Laboratories, and Performance Materials Laboratories
(As of October 2017, the Chiba Refinery & Petrochemical Plant has been reorganized into the Chiba Complex.)
*6 Leakage amount ($t\text{-}CO_2$ equivalent) = ∑[Each refrigerant number group for {(Amount filled (kg) – Amount recovered during maintenance (kg)) × global warming factor}] ÷ 1,000