



Efforts to Prevent Environmental Pollution

The petroleum industry learned from the environmental problems that arose during its period of high growth and has since implemented a number of environmental protection measures at its refineries. Showa Shell has aggressively increased capital expenditures at its refineries with environmental considerations in mind. It has added new pollution-control equipment, including flue gas denitration, dust separator, and drainage treatment facilities. The company intends to improve these facilities, as it progressively raises the standards of its overall pollutant removal technology, and to continue to use fuels that do not contain atmospheric pollutants.

Air Pollution Countermeasures

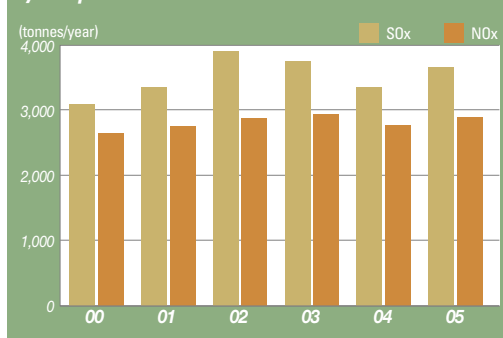
SOx

SOx is produced by fuel oils and gases in refinery furnaces and boilers. Showa Shell has been able to maintain SOx emissions at below regulation levels by using low-sulfur fuel oil and sulfur-free clean fuel gas. The sulfur content is removed using gas-cleaning equipment.

NOx

Showa Shell is implementing measures for removal of NOx, which is produced from flue gases by furnaces and boilers. Improved combustion methods, such as new low-NOx burners and flue gas denitration equipment, reduce the amount of NOx produced. The company is further controlling atmospheric pollution by introducing electric dust-collection equipment.

Total Volume of Atmospheric Pollutant Emissions by Group Refineries



VOC Emission Control Measures

The Air Pollution Control Law was revised in May 2004, and new emission regulations concerning VOCs were implemented. VOCs are thought to be a causative agent of oxidants and suspended particulate matter, which make achieving atmospheric environmental standards difficult. VOCs may be emitted into the atmosphere from the fixed roof of oil tanks or

during loading of tank lorries. Showa Shell is taking measures to minimize such occurrences by replacing fixed roof tanks with floating roof tanks and introducing vapor recovery equipment to its loading facilities. The company continues to examine other means of reducing VOCs.

- ① Floating roof tank: minimizes gasoline loss through evaporation with a floating-type roof that rests directly on the liquid's surface. In fixed roof tanks, evaporation occurs in the air space between the surface of the liquid and the roof.
- ② Vapor recovery system for loading machinery: Recovery equipment uses liquid to absorb vaporized gas emitted when loading tank lorries or tankers.
- ③ Vapor return system at service station: returns vapors containing gasoline leaked while unloading gasoline from tank lorry to service station underground tanks.

