

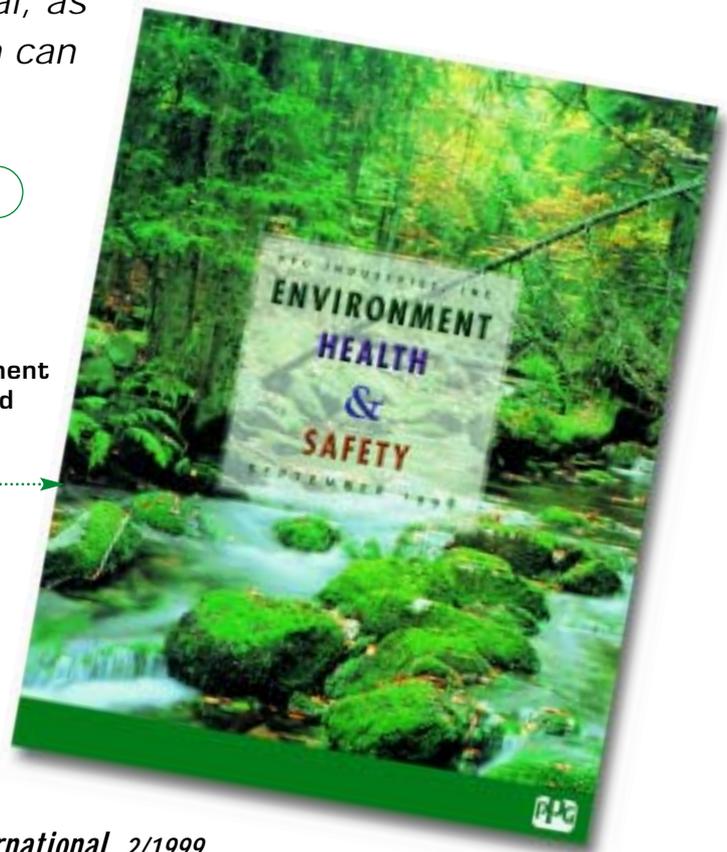
Concern for the environment. The PPG experience.

PPG's long-standing concern for environmental issues has prompted the large US glass manufacturer to establish an Environment, Health and Safety (EH&S) Policy. The aim of the blueprint is to manufacture, sell and distribute products worldwide in a manner that is safe for the company's customers, employees and neighbours. The firm has already been assigned a number of awards for its waste reduction programmes, which involve recycling and reusing discarded material, as well as diminishing landfilled refuse which can be harmful to the environment.

Sofia Jennifer Teodori

The US glassmaker PPG Industries was founded in 1883 as the Pittsburgh Plate Glass Co. In fact, the firm began as a plate glass producer, and then diversified into chemicals, paints and fibreglass. The company's name was changed about 30 years ago, when the more efficient and environment-friendly float process rapidly replaced the old plate process for making flat glass. Today the firm manufactures automotive and industrial coatings, aircraft transparencies, flat and fabricated glass, continuous-strand fibreglass for reinforcements and electronic and speciality products. PPG is

The front cover of PPG's "Environment Health and Safety" brochure



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also a major producer of chloralkali, derivative and speciality chemicals, as well as architectural coatings.

In 1998, the firm had more than 100 production facilities in 21 countries, including subsidiaries, joint ventures and equity interests. However, PPG's main research and development facilities are in the Pittsburgh area.

PPG'S EH&S POLICY

PPG's Blueprint is the name given to the firm's stated values and objectives regarding safety, health and environmental performance. The Environment, Health and Safety (EH&S) policy of PPG Industries is to manufacture, sell and distribute products worldwide in a manner that is safe and protective of public health and the environment, and reducing accidents and illnesses as far as possible. PPG operates its facilities so as to conserve energy, water and raw materials and to minimize manufacturing waste, and advises customers on the safe use and handling of its products. An important part of PPG's policy is to promptly alert potentially affected people to the known or reasonably foreseeable hazards of its raw materials, products, by-products and activities; the firm also works with others to resolve problems created by past handling or disposal of hazardous substances. PPG trains, equips and supports its employees in the management and implementation of EH&S activities and its location.

In order to effectively initiate, improve and sustain growing EH&S performance expectations among internal and external stakeholders, PPG has embraced a special management system which is part of the structure of each strategic business unit, and is mainly based on a prevention process.

EH&S MANAGEMENT SYSTEM

PPG's concern and responsibility for environment, health and safety begins with its board of directors and senior management, which establish the firm's EH&S policy.

The company ensures that every level of management be actively involved in this policy, as well as all of its employees. PPG's EH&S Committee develops the EH&S policy, and along with the Corporate EH&S Department,

oversees compliance. Each strategic business unit is responsible for planning and implementing its activities in a way that is consistent with the policy and its guiding principles, and for monitoring and assessing operations so that objectives can be met. The company establishes and measures specific corporate and strategic business unit objectives for key environment, health and safety areas, including pollution prevention, regulatory compliance and other activities.

PPG's operating units are responsible for compliance with applicable laws, regulations, company policies and other requirements. The staff departments are responsible, as appropriate, for assisting the operating units with their obligation to carry out this policy, its goals and objectives. The firm intends to formally review its policy annually and have it updated at periodic intervals in light of changes in activities and assessment of performance.

EH&S performance will be reported every year and made available to principal stake-holders.

STANDARDS AND PRACTICES

The Responsible Care initiative, which is the chemical industry's commitment to continuous improvement of EH&S performance, has been applied by PPG throughout the company, not just in chemicals operations. Management provisions of the Responsible Care initiative address community awareness and emergency response to environmental hazards or disasters, waste pollutant reduction, improved process safety, minimizing risks in storage, distribution, handling and repackaging, as well as employee health and safety improvement and development-to-disposal product stewardship.

As regards conservation and procedures for public energy consumption, PPG's Energy Policy encourages energy conservation goals for each business unit and location, monitoring progress and related air pollution reduction, employee support for conservation, development of energy-conserving products, and public policy advocacy addressing voluntary conservation and long-term energy needs.

PPG's Energy Council provides implementation leadership and facilitates cross-company sharing of effective energy strategies and practices. Senior managers are responsible for find-

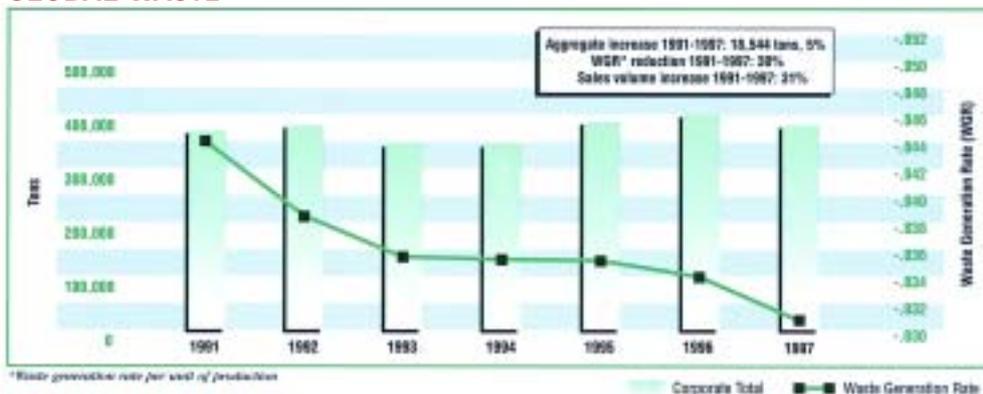
ing ways of effectively improving energy performance while reducing costs.

Furthermore, the firm created an audit system in 1983 for formal environmental management and practices, and since then about 380 comprehensive operations reviews have been conducted globally. Safety management also became part of the audit process. Trained teams audit operations with significant regulatory, permit and policy exposure, but they also check low-risk facilities such as warehouses and offices.

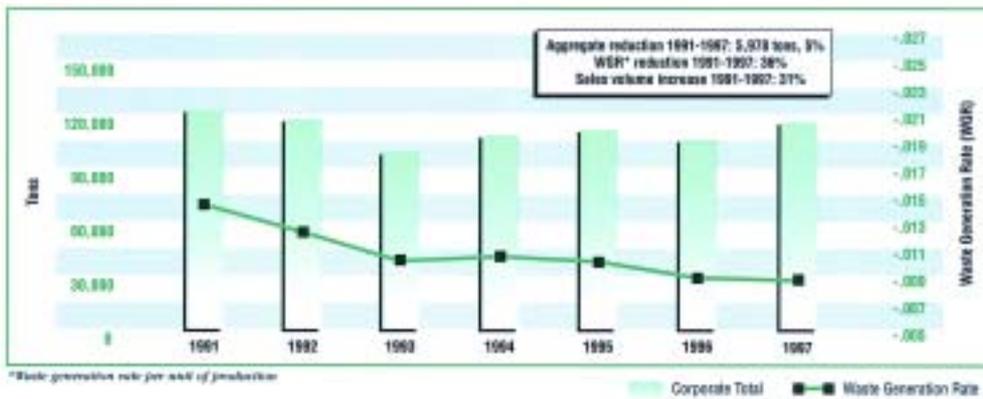
The scope of these audits is to examine regulatory and policy compliance, EH&S management, environment and worker protection, and employee awareness and training. Additional audits assure safe shipping of dangerous material and regulatory compliance, and if any deficiencies are found, they are corrected promptly, thanks also to enforcement scrutiny carried out by various environmental agencies.

Operating facilities are, in fact, evaluated by a comprehensive site assessment programme. Site remediation is initiated on PPG's own initiative or at the direction of regulators; the goal is to correct environmental problems for which the firm is responsible. At several facilities and former plant sites where less advanced processes and practices were carried out, the firm is checking for any sign of contamination. PPG has recently negotiated with government agencies about 65 sites, including 31 National Priority List (NPL, or Superfund) sites in the US, for which the company was identified as a potentially responsible party. PPG operations were sources of wastes at a number of NPL sites, but according to the firm it is not a major source of waste and probably contributed none at some sites. (Remediation costs for such sites are usually allocated among involved parties).

GLOBAL WASTE



GLOBAL HAZARDOUS WASTE



RESEARCH AND DEVELOPMENT

Besides achieving environmental benefits in chemicals and coatings operations, the firm has also continuously shown EH&S concern for its glass and glass-related operations.

Glass

As far back as 1934, PPG announced its first "environmental" glass - Solex heat absorbing glass, with about half the solar transmittance of clear glass. Still in use, it combines high visible light transmittance with reduced infrared transmittance to lower solar heat loads for buildings and automobiles.

Since then, PPG research has developed coatings and unique glass compositions to improve comfort and energy efficiency of homes, commercial buildings and vehicles. The company manufactures a variety of spectrally selective glasses that absorb, reflect and/or transmit solar energy, to aid in controlling interior environments and meeting performance requirements.

Since introducing its low-emissivity coated residential glass in 1983, PPG has developed a very broad product line and produces low-E glasses by two processes. Sungate coated low-E glasses provide superior thermal performance and high visible light transmittance. Sun-

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ENVIRONMENTAL RESERVES: FINANCIAL FIGURES

■ Year-end Environmental Reserves		■ Pre-tax Charges Against Income To Increase Environmental Reserves		■ Spending Against Environmental Reserves	
1991	\$115 million	1991	\$23 million	1991	\$48 million
1992	\$107 million	1992	\$16 million	1992	\$58 million
1993	\$90 million	1993	\$23 million	1993	\$40 million
1994	\$90 million	1994	\$36 million	1994	\$36 million
1995	\$100 million	1995	\$49 million	1995	\$39 million
1996	\$91 million	1996	\$27 million	1996	\$36 million
1997	\$100 million	1997	\$34 million	1997	\$25 million

gate low-E windshields and solar-control tinted products such as Solargreen and Solextra glasses are gaining car-maker acceptance, because their high performance allows comfortable vehicles with smaller, efficient and less costly air conditioning systems. Automotive solar-control glazing is further improved by adding such products as GL-35 and GL-20 tinted glasses.

PPG has also developed a leading insulating glass technology, the high quality "warm-edge" Intercept insulating units that can be produced in large quantities at reduced cost. The firm has achieved advanced spacer designs and sealants to reduce perimeter heat loss, temperature-change structural stress and condensation. Since Intercept technology was introduced commercially in 1972, about 70 insulating unit makers have been licensed to use PPG's proprietary spacer technology, which is now used on more than 130 production lines in six countries.

Fibre glass

Chemical compounds are used to protect wood utility poles and pier and dock pilings from rot as well as from pests such as bacteria, termites, sea borers and birds. However, these compounds, or volatile organic compounds (VOCs), can raise environment and health issues. PPG has helped to find substitutes for wood to eliminate such hazards. TPI Composites, Inc., in Portsmouth, Rhode Island, has developed

CAPITAL SPENDING ENVIRONMENTAL PROJECTS/TOTAL

	Total	Environmental Projects
1998*	\$350 million*	\$30 million*
1997	\$829 million	\$32 million
1996	\$489 million	\$18 million
1995	\$454 million	\$25 million
1994	\$356 million	\$19 million
1993	\$293 million	\$29 million
1992	\$283 million	\$48 million
1991	\$335 million	\$18 million

* Estimated

what it calls the SCRIMP moulding process for making long-lasting composite poles and pilings. The entire composite production process occurs in a closed mould, drastically reducing emissions of VOCs.

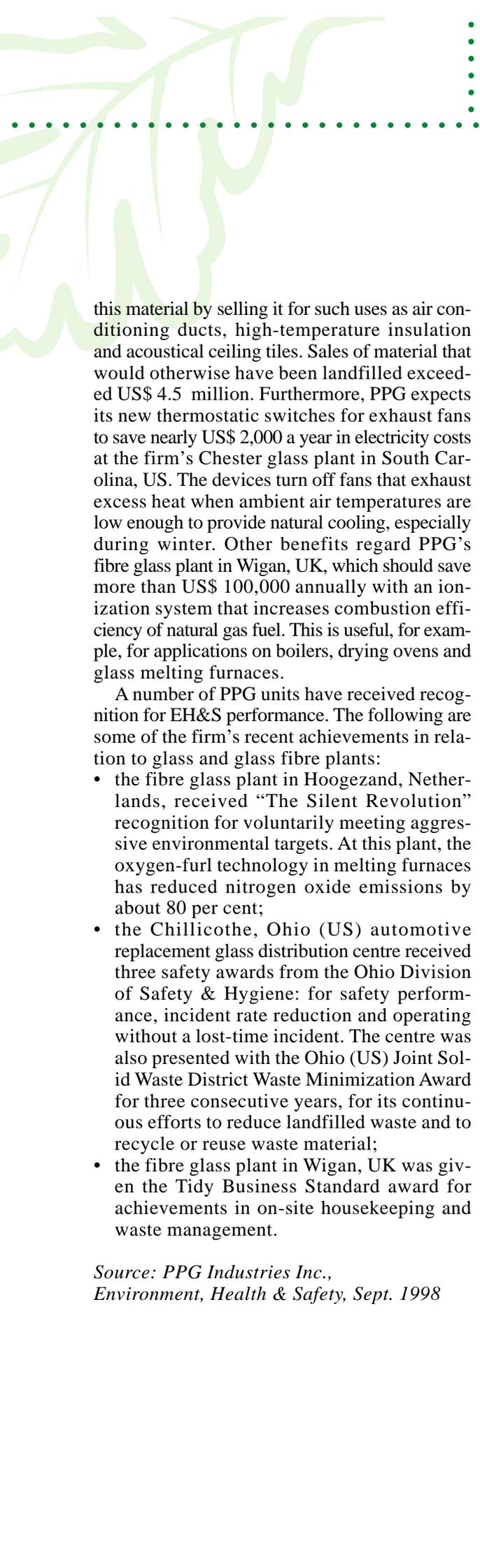
PPG's newly developed ZetaMat three-dimensional reinforcement plays an integral role in the production of these composites. The heavy-duty reinforcement mat's glass fibres are oriented multi-directionally, rather than in the two planes of conventional mats.

This imparts the strength needed for poles and pilings to be driven into the ground or sea floor and, in the case of pilings, to be filled with reinforced concrete.

In addition, the maintenance-free composites emit no chemicals into the environment and should survive indefinitely even in harsh salt-water or industrial environments. They are also economical alternatives to concrete and steel units, which can degrade and corrode quickly.

EH&S SUCCESSES AND RECOGNITION

Since production of glass fibres must continue without interruption during product changeovers, take-up spool replacement and many routine maintenance activities, substantial amounts of material are generated over time that do not meet product specifications. PPG recycles such material as far as possible. For instance, in 1997, the firm's Lexington plant in North Carolina (US), recycled more than 45 per cent of



this material by selling it for such uses as air conditioning ducts, high-temperature insulation and acoustical ceiling tiles. Sales of material that would otherwise have been landfilled exceeded US\$ 4.5 million. Furthermore, PPG expects its new thermostatic switches for exhaust fans to save nearly US\$ 2,000 a year in electricity costs at the firm's Chester glass plant in South Carolina, US. The devices turn off fans that exhaust excess heat when ambient air temperatures are low enough to provide natural cooling, especially during winter. Other benefits regard PPG's fibre glass plant in Wigan, UK, which should save more than US\$ 100,000 annually with an ionization system that increases combustion efficiency of natural gas fuel. This is useful, for example, for applications on boilers, drying ovens and glass melting furnaces.

A number of PPG units have received recognition for EH&S performance. The following are some of the firm's recent achievements in relation to glass and glass fibre plants:

- the fibre glass plant in Hoogezand, Netherlands, received "The Silent Revolution" recognition for voluntarily meeting aggressive environmental targets. At this plant, the oxygen-fuel technology in melting furnaces has reduced nitrogen oxide emissions by about 80 per cent;
- the Chillicothe, Ohio (US) automotive replacement glass distribution centre received three safety awards from the Ohio Division of Safety & Hygiene: for safety performance, incident rate reduction and operating without a lost-time incident. The centre was also presented with the Ohio (US) Joint Solid Waste District Waste Minimization Award for three consecutive years, for its continuous efforts to reduce landfilled waste and to recycle or reuse waste material;
- the fibre glass plant in Wigan, UK was given the Tidy Business Standard award for achievements in on-site housekeeping and waste management.

*Source: PPG Industries Inc.,
Environment, Health & Safety, Sept. 1998*