

# DSM TRIPLE P REPORT 2002

PEOPLE, PLANET, PROFIT

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## UNLIMITED



The publication of this first Triple P Report represents a new step on a road on which we embarked a long time ago. An integrated Triple P policy, based on a clearly defined set of principles and transparently implemented throughout the Group, is part and parcel of the way we work and has been so for many years. Even before we formally adopted a Triple P policy, we already had a tradition of issuing reports, for a range of target groups and through a variety of channels both local and national, on our financial performance, sustainability, safety, environmental protection and community issues. The Responsible Care Progress Report, which we have been publishing since 1994, has been integrated into this new report.

Looking back on the first one hundred years of our existence, it is clear that DSM has not at any stage of its evolution betrayed its character as a socially committed, responsible company. And with regard to developments such as globalization, changes in legislation, the emergence of new technologies and the social issues raised by such trends, we want to be an open and transparent company, a company that is willing to enter into a dialogue and that is constantly seeking to improve its performance.

Although we are making steady progress in terms of the 3 Ps, there still remains plenty to do. At the beginning of 2002, senior executives from all over the group came together for their regular, annual meeting that this year took the Triple P concept as its keynote theme. Despite all the successes on display, the meeting agreed that the mere fact that a company has formulated an integrated, long-term policy on the 3 Ps does not mean there are no longer any short-term dilemmas and difficult choices. We have decided to share a number of these with our stakeholders by discussing them in this report.

We believe in the value of reputation and good corporate citizenship. The strength of our reputation springs from our ability to adhere to our corporate values, achieve sustainable progress and embrace innovation. It's all about creating value for our customers, our employees, our shareholders and other stakeholders. This first Triple P Report is intended to provide insight into our performance in this field. It begins by setting out our group strategy, organization, management systems and modes of operation, before discussing a number of specific Triple P-related issues, detailing the results achieved in 2002 and the areas in which there is clearly room for improvement.

Our slogan *Unlimited.DSM* means that we are focused on progress and improvement. The same applies to this publication. It is a first attempt, one that has taught us that there is still work to be done. That's why we welcome any critical comments and suggestions. We hope that, by publishing reports that are both clear and useful, we can demonstrate that we are worthy of your confidence.

Peter Elverding  
Chairman of the Managing Board of Directors

 [PETER.ELVERDING@DSM.COM](mailto:PETER.ELVERDING@DSM.COM)

## KEY FIGURES 2002\*

### PEOPLE

Number of employees (year-end)	18,375
Number of employees by country/region	
Netherlands	8,302
Rest of Europe	4,289
North America (USA and Canada)	3,130
South and Central America	885
Asia	1,346
Rest of the world	423
Female/male ratio (%)	20/80
Salaries and wages (€ million)	915
Number of accidents	48
Frequency Index (lost workday cases per 100 employees)	0.24

### PLANET

Energy consumption in PetaJoules	68
Non-reusable waste (x 1,000 tonnes)	41.8
Greenhouse gas emissions in million tonnes of CO <sub>2</sub> equivalent	9.4
Airborne emissions of volatile substances (x 1,000 tonnes)	8.9
Emissions to water (chemical oxygen demand x 1,000 tonnes)	39.5
Environmental incidents	639
Environmental complaints	432

### PROFIT

(Ongoing activities, € million)	
Net sales	5,636
Operating profit plus depreciation and amortization (EBITDA)	767
Capital expenditure incl. acquisitions	496
R&D expenditure	271
Taxes	84
Net profit	1,188
Cash flow	1,630
Return on investment (ROI, %)	8.7
Net earnings per ordinary share (€ )	12.08
Dividend per ordinary share (€ )	1.75
Total Shareholder Return (TSR, %):	6.14
DSM share vs AEX index (price return in %)	58.55
DSM share vs Dow Jones Chemical Stoxx (price return in %)	33.00

\* The effects of changes in consolidation are detailed in the relevant chapters.

## A CENTURY OF GOOD CORPORATE CITIZENSHIP

In its centennial year DSM organized numerous celebratory events, including a worldwide centennial breakfast on 29 May. On that day DSM was given the title 'Royal'. During the breakfast DSM launched the Dream Action, in which it invited employees to present initiatives that would benefit the many communities of which DSM is a part. Out of more than 700 entries from more than 1100 employees in 30 countries, twenty were nominated to be carried out. DSM is providing € 5 million in cash, know-how and expertise to help turn these twenty dreams into reality. An example of sustainable entrepreneurship, we think. Here are the nominated dreams:

### MEDICINE AGAINST MALARIA\*

Drugs to combat malaria, one of the most devastating tropical diseases at the moment, are losing their effectiveness. Wolfgang Schiek and Thomas Zich, both of whom work at DSM Fine Chemicals in Linz, Austria, launched a study as part of an anti-malaria project in Burkina Faso in Africa. The intention is that DSM will produce and purify pharmaceutical-grade methylene blue for the project (free of charge). On completion of the project, the World Health Organization might continue the programme, which should ultimately lead to an affordable, effective therapy. *'We are dreamers, not illusionists. We feel we are primus inter pares, with all that talent we see around us. And we are going to speed up the project. We have embedded it in the regular R&D structure in Linz; we want to be able to produce pharmaceutical-grade methylene blue towards the end of 2003.'*

### STRAW\*

More than 1.2 billion people have no clean drinking water. Alex Vrinzen and Paul Vergossen of DSM Research in Geleen are working on a system of ultrafiltration using a cheap-to-produce straw with a membrane. The straw could be made from paper, equipped with special filters and some iodine to kill particular viruses. An organization like the United Nations could take over the project when the prototype is ready. *'It's not just a question of the straw. We need to find a permanent solution for cheap drinking water to reduce the mortality figure of three million people a year. We are also thinking of drinking water units for families or villages. In Bangladesh thousands of ground water wells have been dug because the surface water is polluted. But the ground water contains arsenic. We are going to try and solve that problem at the source.'*

### MOSCOW'S ELDERLY\*

Elderly people in more than 30 nursing homes in Moscow are living on the edge of poverty. They lack practically everything. Hub Maris of DSM Agro in Beek, his wife and the staff of the DSM Eastern Europe office in Moscow plan to provide material assistance (including raw materials for local production of supportive means and equipment) and organize training courses. *'We had to convince various parties. There are cultural differences and we have to supply the raw materials as cheaply as possible. I am proud to work for DSM.'*

### BICYCLE RECYCLE

Ship bicycles to other countries where they can be used again. For children going to school. Provide maintenance and repair. Convert them into vehicles for goods transport or as bicycle taxis. Italian and Dutch dreams from Luca Negri, DSM Bakery Ingredients in Capua, Italy, Rob Dirix of Corporate Communications in Heerlen, the Netherlands and Wim Kurvers of the Utility Support Group in Urmond, the Netherlands. *'We started collecting bicycles and parts in the Netherlands and Italy at the end of 2002 to send to countries like Malawi, Burkina Faso, Ghana, Afghanistan and Brazil. The scale of the project will now increase. We couldn't get this project off the ground without the help of volunteers, the government and DSM.'*

### HOPE

Bao Chen Jiang of DSM Engineering Plastics in Zhouzhuang, China, helps with child rearing and educational projects in his home town. This project may lead to the creation of a new Hope school. *'If you want 10 years of prosperity, grow trees. If you want 100 years of prosperity, grow people. Royal DSM deserves respect as a good corporate citizen. And my homeland needs the investments.'*

### SCIENCE FOR CHILDREN

Who's afraid of the exact sciences? Provide young people with the once so familiar and popular chemistry sets. Teach them the many possibilities of the natural sciences and perhaps provide additional courses and training. These are the dreams of Arnold Schaafsma (DSM Research, Geleen, the Netherlands), William B. Shackelford (DSM Pharmaceuticals Inc., Greenville, US), Carla Bolt, Herm Hendriks, Ben Moust and Ilona Smeets (Human Resources Services, Geleen, the Netherlands). *'We have meanwhile converted our dream into a business project. We have made contact with schools and others who can help.'*

### HOMEWORK, ENVIRONMENT

Kathy Malloy of DSM Pharmaceuticals Inc. (Greenville, US) wants to provide schools in the vicinity of the plant with mentors to help children with their homework and other tasks. Emma Rout (DSM Chemicals North America, Augusta, US) wants to adopt schools and start a programme with children to tackle the growing mountain of waste, for example by increasing their awareness of the importance of recycling. *'We are proud to work for a company that gives us the opportunity and provides financial support for our commitments. In Augusta hundreds of composters are already being used and various educational programmes have started to make children more aware of the environment.'*

## THE TORCH

Stephan Dusault and Luigi Pignotti of DSM Composite Resins came up with the idea of the Torch. The Torch links DSM sites around the world in a virtual chain as they take it in turns to carry out initiatives that will directly benefit their local communities. The aim is that this 'global relay of commitment' will contribute to a cleaner, safer, healthier and better life for people living in the vicinity of DSM's sites. The torch began its journey in December 2002 at DSM Composite Resins in Filago in northern Italy. Together with representatives of the local authority, the Red Cross and the church, twenty employees of the facility spent a weekend in Ururi, a village in central Italy which had been struck by an earthquake earlier in the year killing 26 people and devastating most of the village. The team distributed gifts, organized programmes for the hundreds of children, made a donation of € 20,000 to rebuild the school and prepared a dinner for the entire village.



In early 2003 the Torch was passed to the DSM Elastomers site in Leominster (USA) and then to the DSM site in the south of the Netherlands, where a number of dreams will be turned into reality.

## SANTA ROSA DE LOS PATOS GRANDE...

...a village at 4000 metres above sea level in Argentina has been adopted by Lucas Rodriguez, Luis Ayala and Gloria Marengo, all of them working for DSM Bakery Ingredients' Argentinian branch in Cerillas. They are implementing plans to stop the deforestation and promote sources of renewable energy such as solar energy. Edward Kuijsten in Zwolle (Netherlands) and Ben Drogth in Schaffhausen (Switzerland) both working with DSM Composite Resins, are building a 'solar cooker' that can reach temperatures of up to 170 degrees centigrade and in which water can be boiled, bread can be baked, meat cooked and instruments sterilized.

## SEPARATION

Fabio Pepe Lucas and Diego Fernandes Cardoso of DSM Elastomers in the Brazilian town of Triunfo are establishing a system for the separation of household waste. It will start with schools and later be extended to neighbourhoods and ultimately the whole village of Sapucaia do Sul. *'Teachers, students and residents were slightly surprised that a company like DSM was supporting a project like this. Now there is great and widespread enthusiasm and the local authority is fully supportive. The project will start in March 2003 at the latest.'*

## LIGHT

K.P Singh, Neeraj Tewari and R.K Jain of DSM Anti-Infectives in Chandigarh, India, want to make the roads in their community safer. DSM will help to install lighting and place road signs along the road from Chandigarh to Amritsar, the scene of many accidents.

## MAKING KNOWLEDGE WORK

Harry Fortuin of DSM Elastomers in Sittard, the Netherlands would like DSM specialists to sign up with the Netherlands Management Cooperation Programme (NMCP), an organization that sends retired Dutch managers to help companies in developing countries. This would allow the wealth of knowledge within DSM to be used for countries or companies that request it.

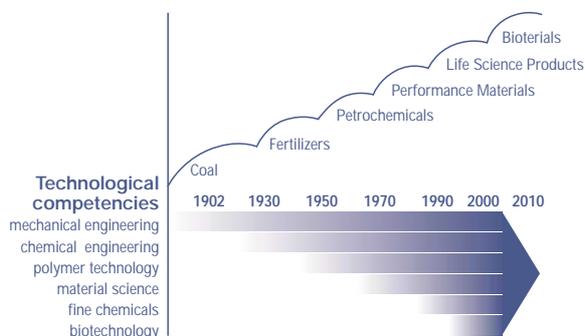
*'An organization like NMCP can do even better work with the expertise and support provided by DSM. And so make a greater contribution to real sustainable development in the Third World.'*

## FIRE AND DEFORESTATION

Deforestation threatens at many different places in the world. For instance, in Kalimantan in Indonesia, where DSM is involved because it uses wood for the transport pallets of DSM Kaltim. Sri Mukartingsih of DSM Melamine in Kaltim wants to plant 50 hectares of grassland with many different types of tree.

## SOLID AND RESPONSIBLE: YESTERDAY, TODAY AND TOMORROW

### A CENTURY OF SUCCESSFUL TRANSFORMATION



### TRANSFORMATION, STRATEGY AND GROWTH

DSM evolved first from a mining company into a manufacturer of base chemicals, then into a supplier of petrochemical products and finally, since the mid-1980s, into a producer of chemical specialties. We will continue to seek to become a world market leader in high-value added activities offering strong growth and more stable profit levels. DSM is gradually transforming itself into a specialty company, producing high value added life science products (including biotech-based products), performance materials and industrial chemicals. The key words in this respect are customer awareness, innovation in products and production technology, brand building and open communication with stakeholders.

For a number of years now, we have used 'Corporate Strategy Dialogues' (CSD) as a means of determining our future strategy. This means using the results of an in-depth, internal dialogue to analyze and set out the long-term strategy for the group as a whole. The strategy embodied in our policy document entitled *Vision 2005: Focus and Value* was the result of a CSD which we completed at the end of 2000. The business groups also regularly conduct Business Strategy Dialogues (BSDs) of their own.

From 2003 onwards, we will systematically integrate the Triple P concept into the entire strategy development process, including the CSDs and BSDs.

As a manufacturer, we seek to create value for our customers and their end users by being both socially responsible and receptive to topical trends and issues.

Our direct and indirect contribution to society is reflected in the way in which our products help to foster a healthier, more sustainable, more pleasant and more efficient way of living and working. We are increasingly making efforts to ensure that our activities help to strengthen all three Ps, i.e. people, planet and profit, at the same time. Sustainable development depends on our ability to perform well in financial, ecological and social terms, both separately and in conjunction with each other.

Respect for and the integrity of our staff form the cornerstone of our human resources policy, and we do our utmost to ensure that maximum account is taken of this when undertaking reorganizations and when redeploying staff or announcing redundancies.

In some cases in 2002, we were unable to avoid compulsory redundancies as a result of reorganizations. Where divestments involve the transfer of staff to a new owner, we seek to operate in accordance with both the letter and the spirit of our human resources policy. The sale of DSM Petrochemicals to SABIC in 2002 included a broad package of measures and arrangements covering the employees affected by the deal. These helped to ensure that the transfer proceeded smoothly.

In September 2002 we announced our intention to take over Roche's vitamins, carotenoids and fine chemicals business. The sale and purchase agreement was signed in February 2003.



### GROWTH

DSM's ambition is to realize profitable, sustainable growth. In 2002 we increased capacity for the production of food ingredients, anti-infectives, biopharmaceuticals, caprolactam, melamine, Dyneema and EPDM rubber. The market for high-performance fibres in general expanded by just under 10% in 2002, while the market for Dyneema grew more than twice as fast and DSM has already announced plans to increase output even further. Our R&D expenditure amounts to 5% of our sales. We also invested in partnerships with other companies, for example with Crucell for the production of proteins and antibodies, with CreAgri for the development of antioxidants for use in baby food, nutritional products for athletes and dairy and baking products, with Agennix for the manufacture of proteins for pharmaceutical purposes, and with Optiva Inc., a Californian company whose technology is used, among other things, in flat panel displays. With the US company Nanocarbon Technologies Inc. we are exploring the possibility of using nanotechnology in the development of high-performance materials.

We have devised a special 'fast-track integration programme' for our acquisitions. New members of the group are required to adopt our methods and standards within a predefined period of time. Newcomers are expected both to be familiar with and to uphold our corporate values within a period of two years. We have defined global standards for health, safety and environmental management. New group units are to comply with these within four years. DSM companies that are based in countries whose national standards are not as strict as those in force in Western Europe or the US are required to meet highly ambitious targets.

All our acquisitions have succeeded in substantially improving their safety records since joining the DSM group. Gist-brocades, for example, which we bought in 1998, has achieved an improvement of over 60% in its safety record over the past few years.

Valuable growth is also a feature of our partnerships with other firms and research institutes. A number of examples of these are given in this report.

## ORGANIZATION AND MANAGEMENT SYSTEMS

DSM is a listed company, managed by a Managing Board operating under the supervision of an independent Supervisory Board. Our organization has a decentralized structure, with each of our business groups carrying responsibility for all aspects of business in its own particular domain. This allows the group to respond quickly and efficiently to changes. At a corporate level, the Managing Board and the business groups are supported by a number of corporate support departments in areas such as SHE (safety, health and environmental management), manufacturing, finance, internal audit, human resource management and communications. Core processes such as financial reporting, investment decisions and the enforcement of regulations on health, safety and environmental protection are all managed and controlled from our head office.

We have established a system of management reporting that requires every business group director to submit regular reports on the performance of his or her group. These reports contain, alongside strategic, operational and financial indicators, figures illustrating the progress made in relation to social policy, health, safety and environmental management. These reports form the topic of regular discussions with the Managing Board of Directors.

We make use of management systems as a means of safeguarding our commitment to sustainable business practices and implementing our Responsible Care Programme. Our management system for health, safety and environmental protection includes a number of strict requirements which were raised even higher in 2002. The new requirements will come into force on 1 January 2004 following the completion of a comprehensive programme of training and communication in 2003. The relevant training courses have been reviewed and now contain training in various new management tools as well as a number of items relating to behavioural change. All the courses are designed for senior and middle managers, as well as supervisory and operational staff. As from 2003, management development courses will include components dealing with health, safety and environmental protection.

As regards risk control, not only do the business groups and business units conduct their own audits, but the Corporate Operational Audit Department also assesses their procedures. The main focus lies on the systems used for managing the various activities, including the systems used for ensuring compliance with our corporate values. On average, each business group or unit is audited once every three years. The Corporate Operational Audit Department discusses the findings with the management of the business group or unit in question and with the Managing Board. In addition it regularly discusses the main conclusions with the Supervisory Board.

Every year, the director of every business group and every corporate staff department issues a document known as a Letter of Representation. In doing so, he confirms that the business risks affecting his unit are subjected to regular, systematic analysis and that the results of this analysis have demonstrated that both the risk management system and the way risks are actually managed in practice are in order. As from 2003, this document also includes a statement to the effect that the DSM Values have been upheld.

*How do you measure corporate success? It is becoming increasingly clear that the long-term future of an enterprise depends on much more than just economic ratios. Public acceptance of the company's conduct as a corporate citizen is a major precondition for 'sustainable continuity'. DSM is effectively showing itself to be a good corporate citizen by acknowledging its responsibility in the field of environmental management and by showing respect for human integrity. As such, the company is making a major contribution to a more sustainable community.*

J. E. Jansen  
Managing Board, ASN Bank.

## CONSTRUCTIVE DIALOGUE

A company cannot operate in a changing social context without pursuing a constant dialogue with its stakeholders. Our business groups are engaged in permanent communication with all parties directly involved in the value chain, such as suppliers, customers and research institutes, and also with pressure groups, local residents and other interested parties. At a corporate level, the group is in regular contact with a wide range of stakeholders.

## THE DSM VALUES

Respect for people, valuable partnerships and good corporate citizenship are our three core values. They are what we stand for, and serve as guiding principles in policy development, in making choices and in evaluating the conduct of our company and its individual employees. In 2002 we formally adopted the DSM Values, published them in a booklet and made a start on implementing them at all levels of the organization. You can find them with this report.

## REPORTING POLICY AND JUSTIFICATION OF CHOICES MADE

In this report we explain our vision and policy regarding responsible and sustainable entrepreneurship and report on our performance in this field. The structure of the report is based on the Triple P approach (people, planet and profit).

Alongside our annual financial reports, we have published Responsible Care Progress Reports for a number of years in which we reported on our performance in the fields of safety, health and the environment. In this our first Triple P Report, the aspects of people, planet and profit have been integrated. This is in fact the first time we report on the 'people' aspect in this way.

For this reason and because of the transformation we are undergoing, it has proved to be impossible to make a meaningful comparison with 2001 for a number of data. This will be specifically mentioned where relevant

This report includes the data of manufacturing sites in which DSM has a majority stake or over which the company has management control. The data on acquired companies are reported in the year following the acquisition. Units that have been divested are no longer included in the report from the year of divestment onwards.

The data from the various sites were obtained on the basis of our own measurements and calculations, which in turn were based on the definitions, methods and procedures officially adopted by the Group. The comparability of data for different years can be influenced by portfolio changes or improvements in the measurement and recording systems of the various sites. This will be mentioned where relevant. Detailed reports for the various sites are published on the DSM website, along with an explanation of the definitions used.

In the following chapters we will discuss our performance on each of the three Ps. The chapters are structured as follows: first, we give an overview of our objectives for the 'P' concerned, then we report on our performance in 2002 and finally we discuss one or more general issues relating to that particular P.

This Triple P Report for 2002 includes a considerable part of the reporting elements and performance indicators formulated by the GRI (Global Reporting Initiative). We fully endorse the GRI's objective of further improving the international comparability of reporting outcomes. We also attach great importance to the GRI's desire to achieve greater flexibility.

In the past, the DSM Responsible Care Progress Report was verified by KPMG Sustainability B.V. We have requested this organization to verify this DSM Triple P Report. You will find the verifiers' report on page 38.

### A DEAL INVOLVING CLOSE CONSULTATION

The sale of DSM Petrochemicals to Saudi Arabia's SABIC was an exceptional project, as 2300 people changed employer and particularly in Geleen, the Netherlands the activities had to be demerged from those of the rest of the organization. In Gelsenkirchen, Germany the hand-over was less complicated since that unit had remained an autonomous unit after DSM acquired it in 1997.

In Geleen, a unique programme was organized to prepare and carry out the transfer of activities. At the end of 2000, shortly after we finalized the new strategy, Vision 2005: *Focus and Value*, management informed the staff of the plans to transfer DSM Petrochemicals to a partner or find a buyer for it. This allowed DSM to prepare the separation of the petrochemicals business from the other DSM activities properly and openly. The preparations for consultation with the works councils and trade unions and the internal and external communications could also be arranged in good time.



In the last quarter of 2001, well before the sale, a working group was set up with representatives from the Central Works Council, the Works Council of DSM Limburg BV and the trade unions. This working group was asked to identify the areas they felt called for particular attention in the recommendation for a takeover. These points were then discussed at an early stage of the talks with potential buyers. The social aspects also received a lot of attention, as they had to since the interested parties were non-Dutch companies and therefore had to learn about the Dutch approach. The result of these negotiations was a draft of a Social Agreement.

When DSM and SABIC were close to reaching agreement, the working group, now supplemented with an external adviser, was informed. As the proposed decision to sell DSM Petrochemicals was being finalized a request for an opinion was submitted to the Central Works Council. That also marked the start of an intensive internal and external communications programme. The working group was given the opportunity to hold talks with a delegation from SABIC management. The two sides agreed the terms of the Social Agreement, which was later signed by all the parties. Once the various works councils and trade unions had given a positive advice, the formal legal transfer took place on 28 June 2002, with observance of the Social Agreement. In Gelsenkirchen the regulations laid down in German law provided the framework. The Betriebsrat was very closely involved in the process there.



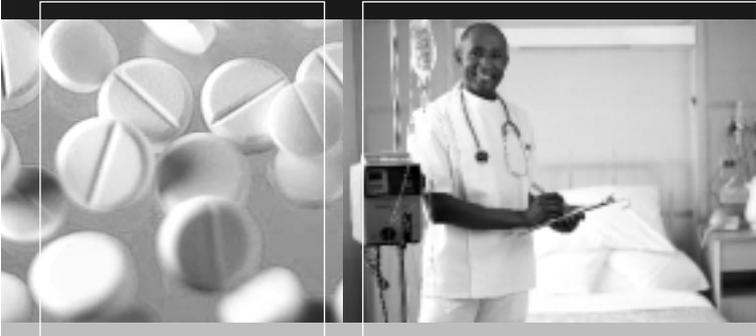
## SUSTAINABLE AND PROFITABLE

Biotechnology, both conventional and modern, is a source of safe, sustainable and profitable production routes. Our plant in Delft (the Netherlands) for the production of 7-ADCA (an intermediate for antibiotics), which we opened in 2001, is a good example of how modern biotechnology can successfully replace traditional chemical production routes. The new process consumes much less energy, produces much lower waste volumes, comprises only a few steps and yields extremely pure products of a very high quality.

Besides the production of pharmaceuticals, biotechnology offers great potential for adding value to existing food products because it can be used for the production of food enrichment products, functional foods and food supplements. In a number of countries, the market for functional foods is currently growing at a rate of between 15% and 20% per annum.

## LIFE SCIENCE PRODUCTS

THE LIFE SCIENCE PRODUCTS CLUSTER COMPRISES THE FOLLOWING BUSINESS GROUPS: DSM PHARMACEUTICAL PRODUCTS, DSM FINE CHEMICALS, DSM ANTI-INFECTIVES, DSM FOOD SPECIALTIES AND DSM BAKERY INGREDIENTS. THE CLUSTER'S ACTIVITIES ARE TARGETED AT THE PHARMACEUTICAL AND FOOD INDUSTRIES. OVER THE PAST FEW YEARS, PHARMACEUTICALS HAVE BECOME DSM'S BIGGEST END-USE MARKET. THANKS TO A COMBINATION OF BIOTECHNOLOGY (INCLUDING FERMENTATION AND BIOCATALYSIS) AND ORGANIC CHEMISTRY, DSM CAN OFFER ITS CUSTOMERS A WIDE RANGE OF TECHNOLOGIES COUPLED WITH A CONSTANT FLOW OF INNOVATIONS. DSM IS THE WORLD'S BIGGEST SUPPLIER TO THE PHARMACEUTICAL INDUSTRY.



## PEOPLE MATTER(S)

### SAFE AND HEALTHY WORK PRACTICES

The aims of our policy in the field of safety, health and the environment are:

- To create an injury- and incident-free work environment (by 'incident' we mean 'environmental incident').
- To prevent the occurrence of occupational illnesses or health problems attributable to DSM activities.
- To evaluate and improve our working methods, processes, products and services on an ongoing basis in order to ensure that they are safe and acceptable to our employees, customers, the communities in which we operate and the environment.

DSM wants to rank among the top 25% in its industry when it comes to safe and healthy work practices.

### OUR SAFETY TARGET:

- A 20% reduction per year in the number of lost-workday cases among DSM employees (FI<sub>LWC</sub>).

The individual business groups translate this overall group target into unit-specific targets, taking into account their performance in the previous year.

### INJURY FREE

We are convinced that all accidents can be prevented. This topic provided the theme for workshops for DSM employees held in Barcelona, Spain, and Greenville, US, in 2002. Various programmes were launched during the course of the year in order to assist the sites in further reducing the number of accidents. We also set up a special website on our corporate Intranet to enable our employees to exchange information, knowledge and experience.

### ACCIDENTS\*

In 2002, 48 of our employees were involved in accidents that led to their absence from work. This figure is significantly lower than the comparable figure for 2001, which was 81. Expressed in terms of the number of lost-workday cases per 100 employees per annum (known as the frequency index, or FI), this represented a reduction from 0.37 in 2001 to 0.24 last year. This means that we amply achieved our target of reducing this FI by at least 20% in the year under review. There was also a decline in the number of accidents affecting the staff of contractors, among whom 32 lost workday cases were recorded in 2002, compared with 62 in 2001.

In Triunfo (Brazil), a DSM employee was killed in a road accident while he was on his way to work. Although this was not a work-related accident, we are conducting an investigation and will take measures to minimize the risk of accidents of this kind if possible.



\* Figures for 2002: excluding the petrochemicals business (DSM Petrochemicals) and including the former Catalytica.

The Frequency Index for Recordable-Injury Cases (FI<sub>RC</sub>) reflects the number of accidents that led to employees being partially unavailable for work or requiring medical treatment plus the above-mentioned lost-workday cases. This safety indicator improved from 1.88 in 2000 and 1.65 in 2001 to 1.28 in 2002. The index covers DSM's own staff as well as the employees of contractors performing work at DSM sites.

**MEASURING SAFETY**

The frequency index (FI) is a unit that is used to measure safety at work. It indicates the number of lost workday cases or recordable cases per 100 employees per annum. A 'lost workday case' is defined as an accident leading to the absence of the employee concerned from work for more than one day.

*Example: If, in a given year, a company with a workforce of 1,000 records five lost workday cases, its FI<sub>LWC</sub> in that year is  $5 \times 100/1,000 = 0.5$ .*

DSM uses the following indicators:

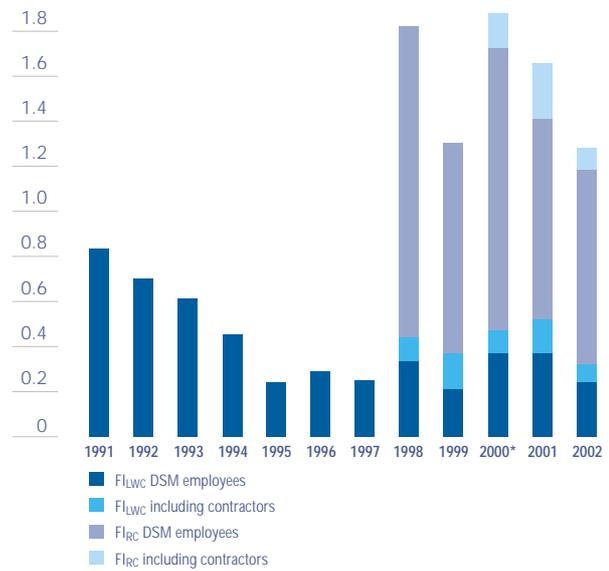
- FI<sub>LWC</sub> for DSM employees
- FI<sub>LWC</sub> for DSM employees and contractors' employees combined
- FI<sub>RC</sub> for DSM employees
- FI<sub>RC</sub> for DSM employees and contractors' employees combined



**LIVING IN NANJING**

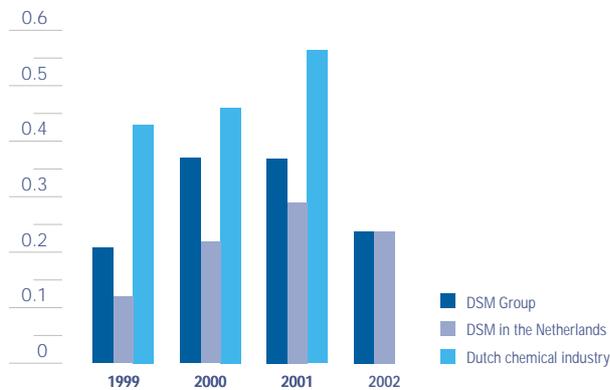
In August 2002 DSM announced it was forming a joint venture with Sinopec for the production of caprolactam at a plant near Nanjing. The facility has existed since 1993, and the target is to more than double its output. China is the fastest-growing market for caprolactam in the world. However, the plant is situated very close to a residential district and in a number of respects failed to DSM's safety standards. In collaboration with the local authorities we studied a number of alternatives before deciding that DSM would make additional investments in safety in and around the facility.

**FREQUENCY INDEX (FI<sub>LWC</sub> AND FI<sub>RC</sub>), DSM TOTAL \***

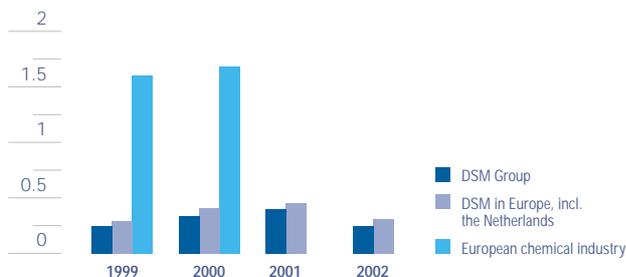


\* In all graphs:  
 From 2000: including Gist-brocades  
 From 2002: excluding the petrochemicals business (DSM Petrochemicals) and including the former Catalytica

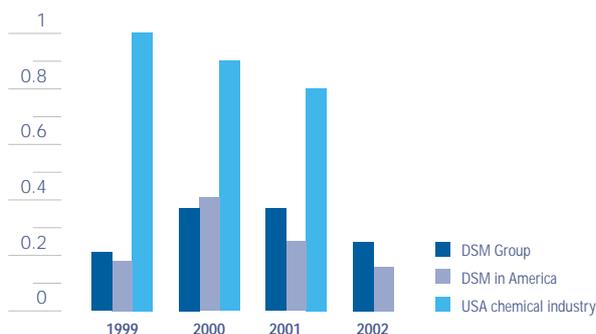
### LOST-WORKDAY-CASE FREQUENCY INDEX (FI<sub>LWC</sub>) IN THE NETHERLANDS



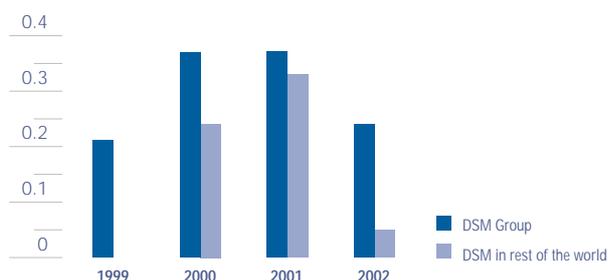
### LOST-WORKDAY CASE FREQUENCY INDEX (FI<sub>LWC</sub>) IN EUROPE



### LOST-WORKDAY-CASE FREQUENCY INDEX (FI<sub>LWC</sub>) IN NORTH AMERICA



### LOST-WORKDAY-CASE FREQUENCY INDEX (FI<sub>LWC</sub>) IN THE REST OF THE WORLD



### INCIDENT FREE

The Internet-based ARIA system went into operation in 2002. The idea is for the sites to use the system, which was developed in collaboration with Cap Gemini Ernst & Young, to report all health, safety and environmental incidents. The system allows a description of the nature and causes of an incident to be entered straight from the shop floor and automatically monitors any remedial action that is taken. For the analysis of serious incidents we use the Tripod method, which enables us to find structural solutions that help prevent recurrence. Combining the data provided by the two systems, i.e. ARIA and Tripod, will enable us to rapidly enhance our management information system in relation to health, safety and environmental protection.

### FROM SAFETY TO SHE

The DSM Safety Award is presented each year to a unit that has performed exceptionally well in the field of safety. In 2002, the prize was awarded to DSM Resins US Inc, based in Augusta, Georgia. In addition to constantly improving its safety record, this business group has also succeeded in creating a safety culture that can serve as a model for the rest of the group. The DSM Safety Award includes a € 10,000 cash prize, which DSM Resins chose to spend on an educational project in the region.

We have set ourselves the target of raising our standards in the fields of health and environmental management to the same high level as the standards we apply to safety. For this reason, we have decided to broaden the scope of the Safety Award, which will henceforth be styled the SHE Award. The more extensive criteria applying to the award were published at the beginning of 2003 and the first SHE Award will be presented in that same year.

### OCCUPATIONAL ILLNESS

At a number of sites whose health records were examined in 2002 (notably by analyzing the level of risk, the degree of exposure to noise and hazardous substances and the activities undertaken to promote the health of staff), the researchers found that there was scope for improvement. These findings led to the compilation of a Health Practice document, which has been put to the test at DSM sites in both Europe and the US. In 2003 all sites will carry out a self assessment. On the basis of the outcome, the programme will be implemented in 2004.

### CONTRIBUTIONS TO LOCAL COMMUNITIES

We support activities that strengthen the social and cultural infrastructure of the regions in which we operate. Our main interest lies in projects relating to education, welfare, sports, healthcare, leisure and culture, for which annual budgets are set aside not only at a corporate level, but also per site and business group. The corporate expenses for this kind of activity in 2002 were approximately € 400,000.-.

As part of our centennial celebrations, and also because of our close historical links with the southern Limburg region of the Netherlands, we made extra donations worth a total of € 2.5 million for new facilities for sports and cultural events in the region and for the renovation of historic sites and buildings.

In addition, a sum of € 5 million was set aside to enable the winners of the Dream Action (i.e. DSM staff from all over the world) to undertake a range of social, educational and health-related projects (see page 5-6). In addition to making donations, we also sponsor sporting and cultural events at which our name is publicized in some way or another; these activities are part of our sponsorship policy, which is aimed at strengthening our corporate image, and are therefore not donations in the strict sense. We also encourage our employees to make a meaningful contribution to their community, for example by joining socially relevant organizations, whether or not in a governing capacity.



#### JET-NET

DSM has taken numerous initiatives to get young people interested in science and technology. One project that has been running since 1994 is Kids & Chemistry, which is targeted at primary schools in the Netherlands. In October 2002 we welcomed the 10,000th participant in the programme. Last year DSM also launched programmes for secondary schools. Since the end of 2002 DSM has been involved in Jet-Net, a project run in association with Akzo Nobel, Philips, Shell, Unilever, support organizations and the government designed to encourage more students to choose technical subjects at higher professional education and university level. For more information see → [www.jet-net.nl](http://www.jet-net.nl).

## HUMAN RESOURCES

### OUR HRM OBJECTIVES

- DSM Values implemented before the end of 2003
- Competence based appraisals from 2003 onwards
- Competence based management development and employee empowerment from 2003 onwards
- Internationalization of DSM recruitment from 2003 onwards
- Introduction of web-based recruitment in Europe and the USA in 2003
- Working climate analyses conducted at all business groups before the end of 2006
- More attractive career prospects for women
- Development of a learning organization

### HR STRATEGY FOR THE PERIOD TO 2006

At the end of 2001 DSM formulated its human resources strategy for the period up to 2006. This strategy set out DSM's policy with respect to the progressive globalization of the company, safeguarding its position as an attractive employer, creating opportunities for the personal development of employees and new management styles and skills.

In 2002, we finalized a new management development method and performed a number of trials to see how it works in practice. The new method, which centres on the introduction of competence management, will be implemented by all the various business groups in 2003. Competence management is set to play a key role in areas such as recruitment and selection, staff development and appraisal.

### DSM VALUES

Respect for people and their integrity is a core element of the DSM Values, which we introduced in 2002. A company that offers its employees a challenging environment that fosters trust and responsibility will perform well in terms of profitable growth, quality and responsible entrepreneurship. To create and maintain such an environment, we have to communicate our corporate values so that all our employees, present and future, as well as DSM's external stakeholders are aware of them.

The extent to which our staff behave in accordance with our corporate values is taken into account during the interviews in which their performance is assessed. Given that these values form the framework in which we enter into business transactions, they also help to define our relationships with suppliers and customers. Newcomers to our group are expected to undertake a special programme to ensure full adoption of our corporate values within two years of the date of the takeover.

### RECRUITMENT OF TALENT

DSM's success now and in the future depends on its continuing to attract talent even as the labour market becomes tighter. The growing globalization of DSM, the declining numbers of graduates in technical subjects, the growing number of households in which both partners have careers, the individualization in society; all of these factors call for a personalized approach to recruitment. With the introduction of e-recruitment via the internet in Europe and the US, we will be able to pursue a consistent and effective approach to recruitment. E-recruitment allows the organization to

share information about supply and demand on the labour market quickly and effectively between the various sites, monitor progress in the recruitment process and adjust where necessary. Specific competences are sought during the selection process and, later, the initial phases of the management development programme. This helps to ensure that newly recruited employees get off to a flying start.

In promoting itself in the labour market DSM stresses its changing and innovative character. The business courses TIME (The Industrial Marketing Experience) and MATCH (Manufacturing And Technology in CHEMistry) are also a useful tool for communicating this message. In 2002 we amalgamated the two courses to form TIME2MATCH under the motto  $1+1=3$  to mark our 100th anniversary. The course introduced more than 70 students from eight European countries to the company.

#### THE DEVELOPMENT OF EMPLOYEES

DSM tries to ensure that its employees are constantly developing. An important aspect of this effort is a personal development plan in which every employee makes agreements with DSM about their personal progress. DSM has a management development process for professionals and managers. In 2003 DSM will be introducing competence management in the management development process. We will use 15 competences, including leadership, entrepreneurship, focus on results, coaching and customer orientation. Apart from the personal development of individual employees, DSM also devotes a lot of energy to the development of disciplines such as marketing, R&D, SHE, manufacturing, finance, ICT and Human Resources. In the field of marketing, for example, each year we organize the WorldWide Marketing Web for 150 talented DSM marketers from around the world. The theme in 2002 was Global Marketing of Specialties.

#### REMUNERATION AND MOTIVATION

The development and motivation of employees rests in part on a competitive remuneration system. An employee's salary progression in DSM is linked to individual and/or group performance. In our performance-based appraisal system, agreements are made with the employee about development targets to be achieved, including targets relating to the three Ps of People, Planet and Profit. We have gained a great deal of experience with agreements in the field of Profit and Planet. We also have a clear-cut safety policy. However, we will need to pay more attention to a number of aspects relating to the People element. In 2002 a new appraisal method was introduced for senior management, which relates increases in the employee's remuneration more closely to his or her performance. An important aspect of the new system is establishing and assessing the competences the employee needs for his or her position or role. In this way, we can stimulate the development of precisely those competences that will contribute most to realizing DSM's objectives. This method will be applied more widely in DSM from 2003.

#### WORKING CLIMATE ANALYSIS

Our aim in introducing 'working climate analyses' is to foster a pleasant and productive working atmosphere that will encourage our staff to put the DSM Values into practice. We made the necessary preparations for implementing these analyses in 2002 and the idea now is for each individual business group to start performing them in the period commencing in the year 2003. The questionnaires completed by the staff of each business group will be used to trigger an open dialogue between staff and management. The first four business groups will be carrying out their working climate analyses in 2003; the remainder will be expected to have completed their analyses by the end of 2006.



#### NEW JOBS FOUND

The new DSM People Award was awarded in October 2002 to the management of the ABS plant in Geleen. DSM sold its ABS business to BASF in 1999, phased out the plant and successfully transferred the 240 employees there. Almost all of the employees now have a new job, in DSM or elsewhere.

**DIVERSITY AND FLEXIBILITY**

DSM commenced a project in 2002 to stimulate the promotion of women in the Netherlands to middle management and senior management positions and – for DSM worldwide – to executive positions. At the end of 2002 only six of our 275 executive positions were held by women.

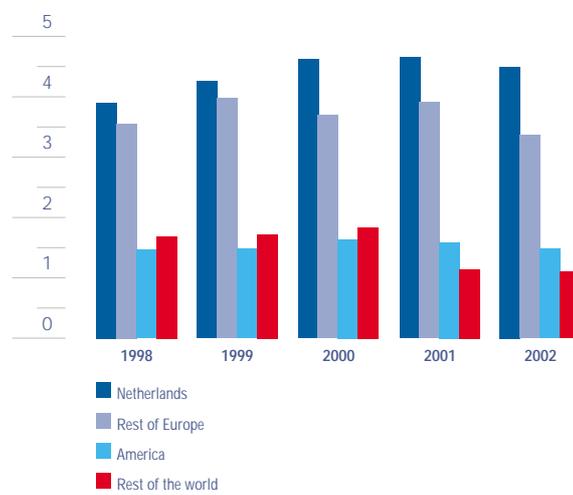
DSM has set itself the goal of powerfully stimulating diversity and flexibility. In particular, this will involve the promotion of women from middle management to senior management and executive level and a more even distribution of women among the different business groups and corporate support departments. The corporate target is for the number of women in senior management positions to have doubled by 2005 compared with 2002 and for more women to be in management positions in business groups. In the recruitment process special attention is given to the hiring of women in disciplines such as finance and accounting. To realize these goals, an action plan will be carried out by a team with representatives from the business groups and HR officials, supervised by a member of the Managing Board.

**KEY HR DATA 2002**

Within the framework provided by the HR principles, which apply group-wide, the various business groups and units are free to develop their own HR policies, which they can tailor to suit local labour markets and labour relations. This explains why few local or regional HR data are collected at corporate level.

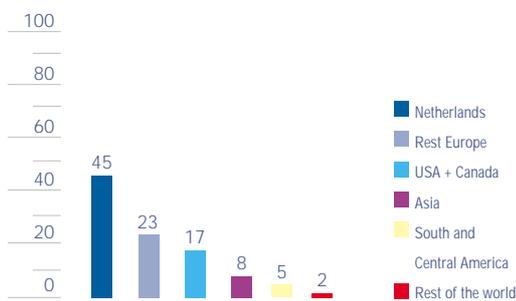
In this report we are for the first time providing a limited number of key HR data that relate to the whole DSM group. Over the next few years we will collect more such data in order to make our company more transparent to the outside world and improve our management practices. In addition, we will provide more qualitative information on the basis of the results of the Working Climate Analysis that we will introduce.

**SICKNESS ABSENCE in % \***



\* Definitions vary per region

**DSM EMPLOYEES BY REGION, YEAR-END 2002 in %**



## BIOTECHNOLOGY AND CONSUMER CONFIDENCE

The strategy at the heart of *Vision 2005: Focus and Value* involves strengthening our position in the specialty chemicals market, in which biotechnology plays a key role. In other words, our transformation strategy is much more than just a question of rearranging our product portfolio. Vision 2005 also has a direct impact on issues such as technological innovation, sustainable production and consumer confidence.

DSM is the largest biotechnology company in the Netherlands and is also one of the biggest in Europe. Over the past 20 years, modern biotechnology has become a prominent element of our manufacturing practices. Our expertise lies in the field of micro-organisms such as bacteria, fungi, yeasts and other cell lines.

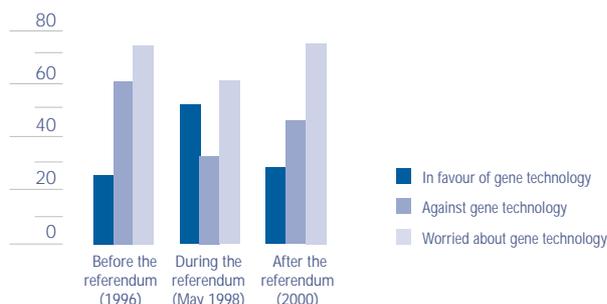
We were the first company in the world to produce a food ingredient with the aid of genetic modification, the ingredient in question being an enzyme known as chymosin, which is used in cheese-making. According to statistics published in 2002 we filed the largest number of biotech-related patents in Europe in 2001, and some 20% of our sales are biotech-related. These and other facts clearly show where our interests lie. However, an issue such as biotechnology has wider ramifications and we need to do our utmost to remove any scientific doubts and minimize the potential risks. Transparency and an open dialogue are necessary conditions for confidence-building.

## CLEAR COMMITMENT

Public views about biotechnology vary from country to country and from region to region. Surveys of public attitudes towards biotechnology have been held in a number of European countries in recent years and these have revealed a high level of concern about biotechnology (see graphs on page 17 and 18). Public debates, such as have been held in the Netherlands and Switzerland, for example, have succeeded in dispelling some of these fears. The concerns expressed mostly relate to the application of biotechnology to human beings, animals and plants and hardly ever to its application to micro-organisms. The fact that national and international laws have generally failed to keep pace with advances in biotechnology may also influence public opinion.

## PUBLIC OPINION IN SWITZERLAND ABOUT GENE TECHNOLOGY

in %



## VEGETARIAN PROTEINS

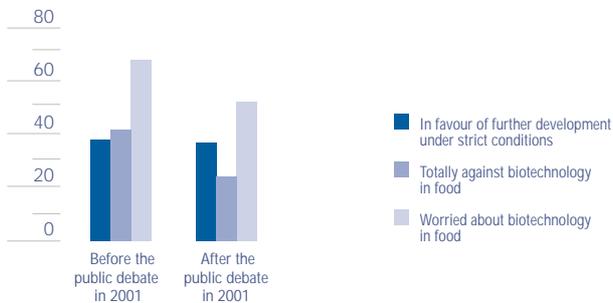
We are developing a new source of proteins that can help meet human protein needs. The consumption of meat as a protein source continues to increase, due among other things to the increasing standard of living in a number of countries. However, the conversion of cattle feed into meat is an inefficient process. In the European Union, for example, this has led to a major shortage of feed proteins and an increase in imports of for example soybeans and soy flour from the USA and Brazil. The use of proteins produced by microorganisms will result in a major reduction in environmental impact compared with the use of, say, pork as a protein source. The environmental impact of meat production is very high because the plants used in animal feed need crop protection agents, while fertilizers and animal manure lead to acidification and the whole process requires large quantities of fossil fuels. Western consumers increasingly turn to alternative vegetable or microbial protein sources. The texture ("bite") of the product we are developing fills the need for greater variation and



juicier products. It should be noted that the product is based on a micro-organism that has been used for human consumption for many centuries, the same organism that is found in tempeh. Obviously, before we introduce this new product (trade name TREVO) on the market, we need to test its safety. We expect to be able to submit the results of these tests to the authorities in 2003. For more information about this project see

→ [www.dto-kov.nl](http://www.dto-kov.nl).

## PUBLIC OPINION IN THE NETHERLANDS ABOUT THE USE OF BIOTECHNOLOGY IN THE FOOD INDUSTRY in %



### PRODUCT STEWARDSHIP IN PARTNERSHIP

DSM Coating Resins has concentrated for a number of years now on improving its processes in order to reduce emissions and cut down on energy consumption. The company has now widened its focus to product stewardship and was recently involved in developing a special product stewardship toolbox for marketeers. It has produced a new model for selecting product/market combinations and partners which lend themselves to activities relating to product stewardship. The model is based on current market developments and enables marketeers and management to properly identify the opportunities and pitfalls connected with product stewardship. After a three-month trial, the results were presented to representatives of the Dutch chemical industry. On the basis of that trial, in 2003 DSM Coating Resins will be starting a new project with a supplier and a customer intended to show how the entire chain can be improved from the perspective of product stewardship.

As a company, we are clearly committed to modern biotechnology. This means that we also have an obligation to provide information about biotechnology in all its facets and to explain how we are using it. By participating in national and international fora, we can contribute to the dissemination of information and promote an open dialogue on the issue. We allow the public access to our plants and laboratories. We are firm believers in clear, regulated product information for the consumer.

### SAFE AND SOUND

Our design and production methods take account of the potential impact of the technology we use. The safety of both consumers and our own staff, environmental protection and quality are our prime considerations. It is also essential that we gain the confidence of our customers if we are to extend our technological knowledge. We apply stringent quality controls and conduct extensive testing to determine whether our products meet both our own and government safety standards and are hence safe to use for their envisaged purpose. More information on this aspect is provided in the section entitled Product stewardship from the cradle.

### REDEFINING THE LIMITS

The fact that we are a long way from reaching the limits of scientific endeavour and new applications not only means new business opportunities for us, but also underlines the need for constant consultation with our suppliers and customers about solutions and improvements. We regard modern biotechnology as a tool that can bring about genuine innovation. Aware as we are of the need to make a meaningful contribution to society, of our own ethical limits (as defined in the DSM Values) and of the constraints imposed by domestic and international legislation, we continue to seek to redefine the limits.

### WHAT WE DON'T DO

We are not involved in the genetic modification of mammals, let alone humans. We do not conduct tests on animals and instead use the services of a certified contractor that only carries out such tests either if they are required by law or if there is no suitable alternative. We are monitoring developments in plant-related biotechnology and do not rule out the possibility of our becoming active in this area in the future. We think that modern biotechnology offers major potential benefits to society, for example in the field of sustainable development and healthcare. However, there are certain applications of biotechnology that we regard as being totally unacceptable, such as biological weapons. There are no circumstances in which we will engage in the application of modern biotechnology for the development or production of biological weapons.

For more details about our biotechnology policy see

→ [WWW.DSM.COM](http://WWW.DSM.COM).

## PRODUCT STEWARDSHIP FROM THE CRADLE

Our plants all over the world produce hundreds of ingredients for foods and drugs, as well as materials. These are used by manufacturers in thousands of different end products, which are then used by millions of consumers throughout the world, day in, day out. They are produced in response to trends such as the increase in the world's population, the increasing demand for functional foods and health foods, the growing use of biomaterials and the increasingly urgent need to find suitable alternatives for natural materials that are growing ever more scarce. It is against this background that we regard product stewardship as one of the crucial aspects of our commitment to Responsible Care and also as forming a vital contribution to sustainable development.

### A SHARED RESPONSIBILITY

Whilst pharmaceutical products have traditionally been subject to extremely detailed and stringent regulations, human foods and animal feeds have been something of a poor relation in this respect. Today, however, regulations for the food and feed industries are being tightened up. Complying with statutory requirements is more than simply a matter of being aware of one's individual responsibility; it is much more a question of setting up a system of operational control encompassing all stages of manufacture from research and development to production, storage, distribution and sale, in accordance with ISO or comparable standards. In the US, the Food and Drug Administration (FDA) is responsible for enforcing government standards and regulations for pharmaceutical products from the initial design stage right up to the commercialization. In Europe, this role is performed by the European Medicines Evaluation Agency (EMA), which operates in parallel with the various national registration and inspection agencies in each individual country. The main international programme for monitoring the safety of food ingredients is known as Hazard Analysis & Critical Control Points (HACCP).

### VITAL LINK

Product stewardship is critical, forming as it does a vital link with our suppliers, customers and end consumers. Multidisciplinary teams of DSM staff have been performing 'product stewardship analyses' since 1997. Teams of experts in the fields of purchasing, production, marketing, research and development, logistics and safety, health and environmental protection regularly inspect dozens of different products at whatever stage of the life cycle the products happen to have reached at the time.

We regularly publish publicly available reports on both policy and new initiatives in this connection. We will perform product stewardship analyses for alle major DSM product groups by the end of 2004.

In addition to complying with domestic regulations and international laws, we use various methods for monitoring the safety of our products and production processes. These include ISO 9001 certification and the cGMP (current Good Manufacturing Practice) standard. The latter incorporates a range of individual standards relating to organization, training, hygiene, equipment, processes, quality control, storage and distribution. All these aspects are regularly examined by national authorities such as the FDA, customers and ourselves.

Governments are enacting more and more regulations in the field of food safety. We welcome the creation of an effective regulatory organization in Europe: the European Food Safety Authority could be modelled after the US FDA.

### LIFE CYCLE PHASES

It is virtually impossible to control all our products at every single point in their life cycles after delivery to the customer. After all, they are used in thousands of consumer products made by manufacturers operating all over the world. What we can do is to work together with as many actors as possible in our quest to constantly improve our performance in areas such as transport, the use of improved development and production methods and sustainable product use and recycling.

### GREATER PRIORITY FOR PRODUCT STEWARDSHIP

We have achieved considerable progress, particularly during the period since 1995. Research studies have been performed and improvements in for example product applications, communication and training, packaging, customer support and transport. Aspects such as safety, health and environmental protection all play a prominent role in our research efforts. Collaboration with customers has resulted in improvements in both processes and production methods. We have also forged close partnerships with a number of research institutes. For example, the closing months of 2002 saw the launch of our partnership with the Nutrition and Toxicology Research Institute Maastricht (the Netherlands), with whom we shall be undertaking a joint research project into the use of food ingredients with a positive health impact. These ingredients could in future be used in foods that help to prevent obesity, old-age diabetes and cardiovascular diseases.

*I applaud DSM in their commitment to publish a Triple P Report and to build their future direction aligned with sustainable development. I attended the Coating Resins Sustainable Entrepreneurship workshop in the Fall of 2002 and was impressed by the participation and commitment by the business leadership, and by their willingness to listen to external stakeholders.*

Paul V. Tebo, PhD  
Corporate Vice President  
Safety, Health & Environment  
DuPont

## DSM MELAMINE

MELAMINE IS A POLYMER USED IN IMPREGNATING RESINS AND ADHESIVES FOR THE WOOD-PROCESSING INDUSTRY. IT MAKES WOOD PRODUCTS SCRATCH-RESISTANT, AS WELL AS MOISTURE- AND HEAT-RESISTANT. FAST-GROWING SOFTWOOD CAN BE COMBINED WITH MELAMINE TO PRODUCE HIGH-QUALITY PANELS AS A REPLACEMENT FOR HARDWOOD. MELAMINE IS ALSO USED IN CAR PAINTS, DURABLE PLASTIC TABLEWARE, BANKNOTES, BOWLINGALLEYS AND FLAME RETARDANTS. WITH A MARKET SHARE OF 25%, DSM MELAMINE IS THE GLOBAL MARKET LEADER. ITS MODERN PRODUCTION PLANTS ON THREE CONTINENTS, BACKED BY HIGH-QUALITY CUSTOMER SUPPORT SERVICES, PROVIDE IT WITH A FIRM PLATFORM FOR FUTURE GROWTH.



## SUSTAINABLE AND ENVIRONMENT-FRIENDLY

The demand for wood continues to grow in all regions of the world, a prime example being China with its 1.2 billion inhabitants. Melamine has great potential as an alternative to hardwood in the construction sector. It can be used as a coating or as a durable glue in particle-board or chipboard.

DSM Melamine will be starting up a new plant in Geleen (the Netherlands) early in 2003, based on a new liquid-phase process developed in-house. The new process involves far fewer steps, thus enabling DSM Melamine to achieve major savings on energy and other costs. The new melamine plant can consume much less energy per tonne of product than the current global benchmark.

## PLANET MATTERS

### DSM'S ENVIRONMENTAL OBJECTIVES\*

(to be achieved by the end of 2006, with 2000 as reference year)

#### Reduction in emissions to air:

Sulphur dioxide	30%
Nitrous oxide	10%
Volatile organic compounds	50%
Priority substances	60%

#### Reduction in emissions to water:

Chemical oxygen demand	50%
Nitrogen	40%
Phosphorus	25%
Organic halogen compounds	90%
Priority substances	90%

Reduction in groundwater and mains water consumption:	10%
Reduction in energy consumption:	5%
Reduction in the landfilling of non-hazardous waste**:	20%
Reduction in the landfilling of hazardous waste ***:	100%

### ENERGY EFFICIENCY

By 2006 all DSM companies outside the Netherlands are to improve the energy efficiency of their production activities by 5% compared with 2000. For its Dutch units DSM has committed itself, by signing the Energy Efficiency Benchmarking Covenant in 1999, to be among the best 10% worldwide, in 2012.

### RESPONSIBLE CARE

For all major product groups product stewardship analyses should be completed by 2004.

Summaries of the DSM Responsible Care Progress Reports published in the years 1995 - 2001 can be found at [www.dsm.com](http://www.dsm.com). The themes of these reports were:

- 1995: Product Stewardship
- 1996: Waste, a valuable challenge
- 1997: Managing risks
- 1998: Doing more with less energy
- 1999: Contractor safety
- 2000: Logistics
- 2001: Managing safety: a matter of conviction

\* corrected for production volumes and product types

\*\* excluding sludge from wastewater treatment

\*\*\* excluding waste that can only be landfilled (such as asbestos)



## INTRODUCTION

With effect from this Triple P Report, the environmental section of our report will contain only general information relating to the group as a whole. Details concerning individual sites will be posted on our website (→ [WWW.DSM.COM](http://www.DSM.COM)). There may be a slight discrepancy between the final figures (which will be available for inspection on our website as from the end of March) and the information provided here, given that a small number of the data incorporated in this report are necessarily based on estimates.

The environmental section of our report includes all sites in which we have had a majority stake for at least one year or over which we have management control. For a number of emissions our performance curve over time is influenced by acquisitions and divestments. The acquisition of Gist-brocades had a major impact on our emission figures for the year 2000. The acquisition of Catalytica and the sale of DSM Petrochemicals had an impact for 2002.

## DEVELOPMENTS IN 2002

From 2002 onwards all DSM sites are required to provide detailed reports not only about accidents but also about potential or actual environmental incidents, classified into serious and minor incidents. The aim is to gain insight into the causes of incidents, so that they can be prevented in the future. A total of 639 environmental incidents were reported in 2002.

## ENERGY EFFICIENCY IMPROVED

In 2002, we used 68 PetaJoules (PJ) worldwide in the form of primary energy for electricity and heat, of which 33 PJ was accounted for by our sites in the Netherlands. The total figure of 68 PJ corresponds to 1.6 million tonnes of oil equivalents.

Our sites in the Netherlands, which account for half our total energy consumption, recorded a 27% improvement in their energy efficiency (i.e. energy consumption per unit of product) during the period from 1989 to the end of 2002.

The graphs on page 23 illustrate the changes in the Energy Efficiency Index (EEI) for DSM in the Netherlands during the period since 1989, DSM's total global energy consumption, DSM's global CO<sub>2</sub> emissions and energy consumption by region. The CO<sub>2</sub> emissions include process-related emissions, known as non-energy-related CO<sub>2</sub> emissions.

*In China, Western companies are often thought to have a strong focus on profit. DSM does not only focus on profit making. The company cares just as much about people. DSM abides by the three Ps: People, Planet & Profit. That's a good balance and it instills a lot of confidence in the workforce, who see DSM as the 'new mother.'*

Ed Sheu  
General Manager of new caprolactam joint venture in Nanjing, China

## CALCULATION OF NET CONSUMPTION

Net energy consumption is defined as follows:

$$\text{Net energy consumption} = \text{energy generated} + \text{energy purchased} - \text{energy sold}$$

The energy content of the fuels used is calculated on the basis of the net calorific value. The conversion factor for the conversion of electricity consumption depends on the efficiency of energy generation (e.g. the electricity supplier's energy efficiency). If the efficiency is 40%, the conversion factor is 9.0 TJ/GWh. Other secondary energy carriers, such as steam, are converted on the basis of the amount of fuel (net calorific value) needed for their production. Since 2001 net energy consumption and the type of energy used have formed the basis for the calculation of CO<sub>2</sub> emissions for all DSM units worldwide. Before 2001 this calculation was only used for Dutch sites. We calculated the CO<sub>2</sub> emissions of non-Dutch sites using the same CO<sub>2</sub> /energy ratio as for the Dutch sites.

## THE BEST IN THE WORLD

In 1999, we signed an 'Energy Efficiency Benchmarking Covenant' on behalf of all our production sites in the Netherlands, which commits us to becoming one of the top 10% companies in the world in terms of energy efficiency by the year 2012. Our progress in meeting this target is assessed by independent consultants working under the supervision of a certified body. In this framework, we analyzed 40 of our production processes in 2001 and 2002 and also compiled an Energy Efficiency Plan describing future studies and follow-up activities.

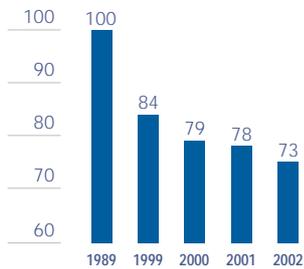
## LESS...

A new production plant for the manufacture of nylon (polyamide-6) was brought on stream in Emmen, the Netherlands. This cut energy consumption per unit of product by 50%. In 2002, construction work started on a new melamine plant (known as Melaf 4) in Geleen, the Netherlands. Melaf 4 will be notably more energy efficient than the existing plant, which is already considerably more efficient than the average worldwide plant in this industry.

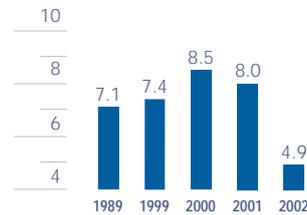
## ...IS BETTER.

The indicator used for measuring a company's energy efficiency is known as the energy efficiency index (EEI). The EEI for a given year is calculated as the actual energy consumption in that year, divided by the amount of energy that would have been used in the reference year (in our case 1989) for the same production output. The EEI for our Dutch production sites was 73% at the end of 2002, which is 5% better than in the previous year. This was due mainly to the sale of the Geleen-based petrochemicals business.

## ENERGY EFFICIENCY INDEX (EEI) OF DSM'S DUTCH SITES in %



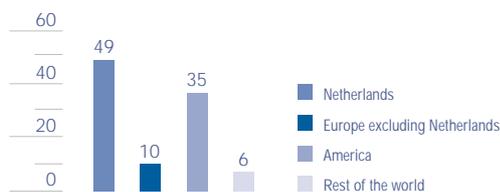
## CARBON DIOXIDE EMISSIONS TO AIR in million tonnes



## ENERGY CONSUMPTION in PJ



## ENERGY CONSUMPTION BY REGION in %



## ENERGY CONSUMPTION IN 2002, BROKEN DOWN BY ENERGY CARRIER:

Energy carrier	Unit	Amount	In Primary Energy Equivalents (PJ)
Electricity	Billion kWh	1.8	16
Natural gas and other gases (including recycled waste gases)	Billion m <sup>3</sup>	1.3	43
Coal	ktonne	40	1
Liquid fuels (including fuel oil)	ktonne	100	4
Steam supplied by third parties	ktonne	1,400	4
<b>Total</b>			<b>68</b>



## TRANSPORT

Incidents occurring during the transport of goods underline the importance of dealing carefully with potential risks. DSM transports its products with care and naturally observes all the prevailing standards and legal rules.

DSM has been producing fertilizer in Geleen and IJmuiden, the Netherlands for years now. Ammonia is used in the production of fertilizer. Some of the ammonia used for the production of fertilizer in IJmuiden is delivered by rail. DSM has carefully evaluated the risks of this form of transport. The safety of the loading, transporting and unloading processes is managed with the aid of an integrated management system certified under the ISO 9001-2000 standard. The safeguards are and will continue to be assessed by an independent outside expert. The ISO certificate was awarded in 2001. The activities at the sites in Geleen and IJmuiden and those of Railion (Netherlands Railways) are also reviewed by an independent expert using the SQAS method. These measures have all led DSM to tighten up the safety requirements for the transporters and impose even stricter rules for the suppliers of the railway carriages. DSM has thus found a good balance between economic interests and a socially responsible attitude towards the risks of transport.

\* In all graphs:

From 2000: including Gist-brocades

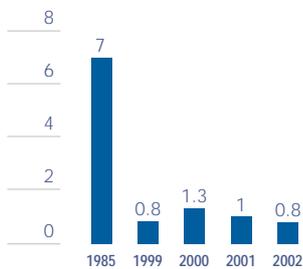
From 2002: excluding the petrochemicals business (DSM Petrochemicals) and including the former Catalytica

## EMISSIONS AND WASTE

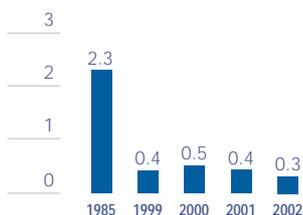
### LOWER EMISSIONS TO AIR

Emissions to air in 2002 were the same or less, in absolute terms, than in 2001. Reductions were achieved for SO<sub>2</sub>, N<sub>2</sub>O, NH<sub>3</sub>, VOC and PS (apart from the effects of the sale of the petrochemicals business and the consolidation of the results of Catalytica). The reduction in sulphur dioxide (SO<sub>2</sub>) emissions was due mainly to the coming on stream of a new gas scrubber in Iquique in Chile in 2001. The relatively strong reduction in nitrogen oxide (NO<sub>x</sub>) emissions was due to the fact that NO<sub>x</sub> emissions from the power generation plant at the Geleen site (Netherlands) are no longer allocated to DSM but are reported by the operator of the plant. At the IJmuiden site (Netherlands), technical adjustments resulted in a structural decrease in dinitrogen oxide (N<sub>2</sub>O) emissions. The reduction in ammonia emissions mainly relates to the Geleen site. The reduction in emissions of Volatile Organic Components (VOC) was mainly a result of the sale of the petrochemicals business, the introduction of a new biotechnological production process for penicillin in Delft (Netherlands) and process adjustments in Ramos Arizpe (Mexico), Zhangjiakou (China) and Triunfo (Brazil). These adjustments were also responsible for a decrease in emissions of Priority Substances (PS). Emissions of heavy metals showed a slight increase due to problems with a fly ash filter in Rotterdam (Netherlands). The problem has been solved and we expect these emissions to be back to normal levels in 2003.

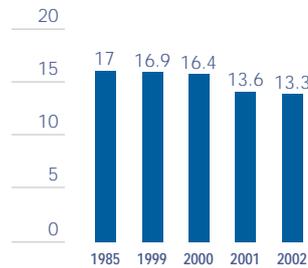
### SULPHUR DIOXIDE EMISSIONS TO AIR in ktonnes



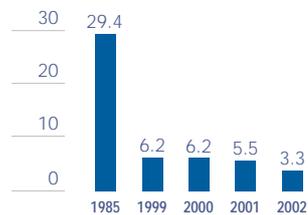
### DUST EMISSIONS TO AIR in ktonnes



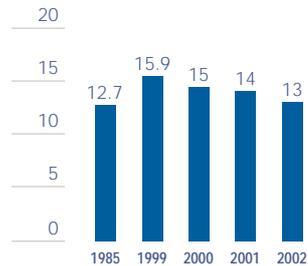
### DINITROGEN OXYDE EMISSIONS TO AIR in ktonnes



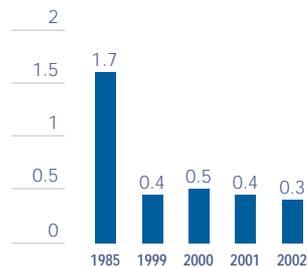
### NITROGEN OXIDE EMISSIONS TO AIR in ktonnes



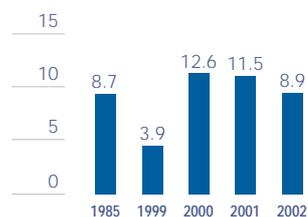
### CARBON MONOXIDE EMISSIONS TO AIR in ktonnes



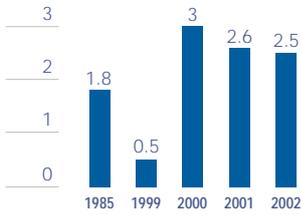
### AMMONIA EMISSIONS TO AIR in ktonnes



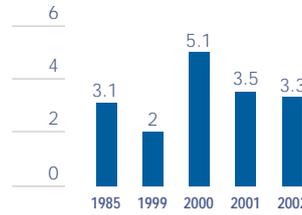
### EMISSIONS OF VOLATILE ORGANIC COMPONENTS TO AIR in ktonnes



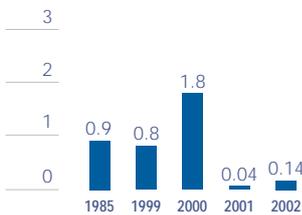
**EMISSIONS OF PRIORITY SUBSTANCES TO AIR** in ktonnes



**NITROGEN EMISSIONS TO WATER** in ktonnes



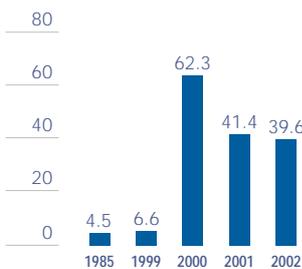
**EMISSIONS OF HEAVY METALS TO AIR** in tonnes



**LOWER EMISSIONS TO WATER**

Practically all emissions to water were lower than in 2001. All aqueous emissions of the Geleen site (Netherlands) were allocated to DSM because it was impossible to allocate the emissions to individual plants (including the petrochemical plants sold in 2002) discharging their waste water to DSM's waste water treatment plant. The improvement in Chemical Oxygen Demand (COD) emissions and nitrogen (N) emissions was due mainly to the start-up of new waste water treatment plants in Ramos Arizpe (Mexico) and Capua (Italy). Reductions in emissions of halogenated hydrocarbons (AOX) and Priority Substances (PS) were mainly attributable to technical adjustments and optimized operating procedures in Venlo and Geleen (Netherlands), Almería (Spain) and Ramos Arizpe (Mexico). The main sites responsible for the decrease in emissions of heavy metals to water were Delft (Netherlands), Addis (USA) and Triunfo (Brazil). A malfunctioning stripping column at DCNA in Augusta (USA) was responsible for an increase in phosphorus emissions. The problems will be solved during the plant turnaround scheduled for September 2003.

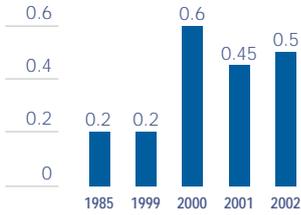
**CHEMICAL OXYGEN DEMAND EMISSIONS TO WATER** in ktonnes



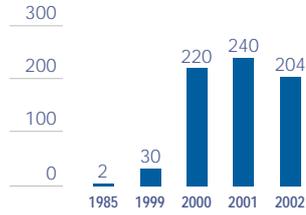
**ENVIRONMENT AND MARKET**

DSM has a joint venture with Honeywell in Augusta in the US for the recycling of nylon-6. The company is called Evergreen Recycling. The recycling plant started operations at the beginning of 2000. It was regarded as a good example of an integrated Triple P approach and won the title Recycler of the Year in the US. However, it has been out of operation since the end of 2001 because market conditions proved very disappointing, the technology needed to be further developed and production costs were higher than expected. Technical improvements, which will require considerable additional investment, and a more favourable market will be needed to justify a resumption of operations at Evergreen.

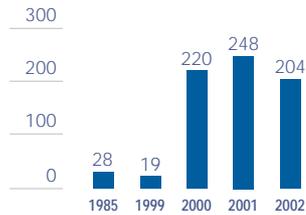
**PHOSPHORUS EMISSIONS TO WATER** in ktonnes



**HALOGENATED HYDROCARBON EMISSIONS TO WATER** in tonnes



**PRIORITY SUBSTANCE EMISSIONS TO WATER** in tonnes



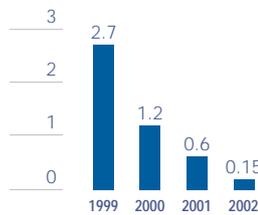

**THE DOORS ARE OPEN**

Around 30% of DSM's production sites with more than 100 employees publish an annual report on safety, health and the environment. Around half of all sites regularly organize open days for local residents and anyone else who is interested. One in four of the facilities publish an information bulletin and take part in public debates. The sites in Delft and Geleen publish reports of any environmental incident that occurs on their websites. In 2003 we will be reviewing our entire communication effort with a view to improving it.

**HAZARDOUS WASTE**

In 2002 we landfilled 146 tonnes of hazardous waste. Apart from asbestos-containing waste and contaminated soil, which cannot be disposed of in any other way, this included 60 tonnes of hazardous waste from a site in the UK. The landfilling of hazardous waste from this site will be stopped in 2003.

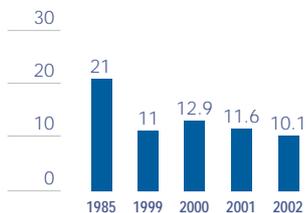
**HAZARDOUS WASTE** in ktonnes



**DSM TOTAL SOLID WASTE VOLUME**

The entire solid waste volume of the Geleen site (Netherlands) was allocated to DSM because it proved impossible to allocate parts of this volume to the individual plants (including the petrochemical plants sold in 2002) that send their waste to DSM's central solid-waste processing unit.

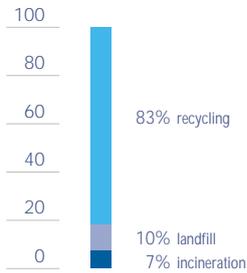
**HEAVY METAL EMISSIONS TO WATER** in tonnes



**SOLID WASTE** in ktonnes



### SOLID WASTE VOLUMES BY DISPOSAL METHOD



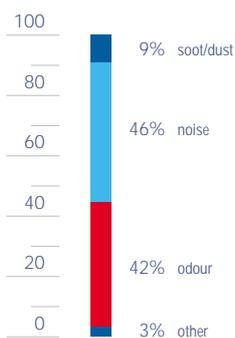
### ENVIRONMENTAL COMPLAINTS

Environmental complaints are complaints received from nearby residents on the grounds of nuisance caused by activities at a DSM site.

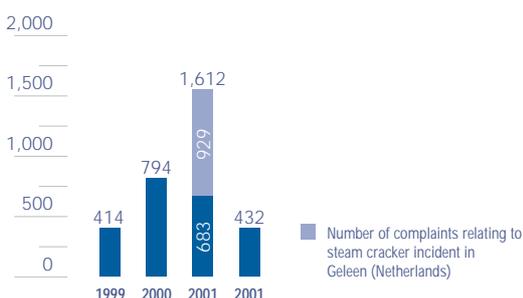
In 2002 we received a total of 432 environmental complaints worldwide, almost 75% less than in 2001. The decrease was particularly strong at the Geleen site in the Netherlands (which no longer includes the petrochemicals business). At this site, an incident in a steam cracker in 2001 led to more than 900 complaints. Noise was the main cause of complaints in 2002 (46%), followed by odour (42%).

All instances of non-compliance with SHE permit conditions or statutory SHE requirements and all fines imposed on DSM sites as a consequence of such non-compliance are published in the site reports on the DSM website (from the end of March 2003).

### ENVIRONMENTAL COMPLAINTS BY CAUSE



### NUMBER OF ENVIRONMENTAL COMPLAINTS



### CLIMATE CHANGE

There are strong indications that emissions of gases such as CO<sub>2</sub> lead to global warming – hence the term greenhouse gases. With both the world population and levels of prosperity set to grow in the coming decades, energy consumption – and hence CO<sub>2</sub> emissions – is likely to rise even further. Whereas emissions of most environmentally detrimental substances have tended to decline as economic output around the world has risen, this has not been the case with CO<sub>2</sub>. Besides CO<sub>2</sub> emissions, emissions of dinitrogen oxide (i.e. N<sub>2</sub>O, also known as laughing gas) are also important to DSM. One kg of N<sub>2</sub>O has a greenhouse effect equivalent to 310 kg of CO<sub>2</sub>. N<sub>2</sub>O is a gas that is produced during the manufacture of caprolactam and nitric acid. In recent years, we have been studying ways and means of reducing emissions both by improving our production processes and by the use of end-of-pipe technologies. We expect to see an increase in the technical opportunities for reducing emission levels in the coming years.



### A FERTILE INITIATIVE

DSM Agro is a market leader in the production and sale of fertilizers. Holding on to that position requires more than simply selling nitrogen compounds. DSM Agro offers added value by providing advice to all our partners in the chain: wholesalers, retailers, sellers and farmers. Some time ago DSM Agro created a website, [www.nutrinorm.nl](http://www.nutrinorm.nl), to provide farmers and sellers with a clear picture of all the options available to them. The website contains practical tips and information about the use of fertilizers for grassland, arable farming, feed crops, field-grown vegetables, leguminous green fertilizers and flower bulbs. Fertilizers are objectively compared and there are tips for the use of organic fertilizers, which are important for soil fertility because they improve the structure of the soil and increase its ability to retain moisture. Good fertilization is necessary for a high yield of good quality crops and to avoid unnecessary damage to the land and the environment. This is why DSM Agro offers a fertilizer spreader testing service via its website.

## WHERE IT STILL WENT WRONG

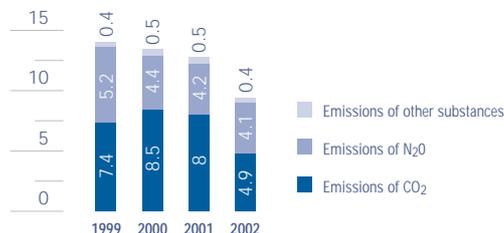
In Chile an employee broke a rib when he got hit by a runaway car. A sales employee of DSM Euroresins in France was involved in a car accident that left him paralyzed in both legs.

Two employees in Almeria in Spain inhaled chlorine gas when a connector in a glass flowmeter broke due to overpressure. In Compiègne (France) a fire broke out after an oil pump had started to leak. The fire sprinkler system failed: the fire was extinguished by the local fire brigade. In Greenville (North America) dimethylformamide and toluene were released from the site's wastewater treatment plant. In Jingling in China more than 40 employees contracted food poisoning. In Fersina, Mexico, an explosion was caused by static electricity. In Delft, the Netherlands, a rail tanker carrying ammonia water was damaged when a vacuum was created inside the tank during unloading. No ammonia was released. Also in Delft, 600 litres of synthetic oil leaked into the surface water due to a leak in an oil cooler. In IJmuiden in the Netherlands 850 kilograms of ammonia escaped because of a



defective safety system. In Venlo (Netherlands), 1,400 litres of cooling and heating liquid escaped, briefly creating the risk of an explosion. A truck driver in Venlo lost the tip of his right forefinger when he jumped from a loading platform while holding a railing. An employee in Geleen (Netherlands) injured his foot during cleaning operations involving a high-pressure jet. Also in Geleen, SO<sub>3</sub> was released and a small amount of sulphuric acid leaked into the soil.

## EMISSION OF GREENHOUSE GASES IN MILLION TONNES OF CO<sub>2</sub> EQUIVALENTS



## ENERGY EFFICIENCY AND EMISSIONS TRADING

Changing to alternative sources of energy such as solar power, hydroelectricity and wind power, as well as renewable sources of both energy and materials, is a time-consuming process. For the time being, our processes and products will remain dependent on fossil fuels. For this reason, our main priority lies in designing more efficient production processes, i.e. processes that require less energy and fewer solvents and also produce fewer by-products, as well as improving cooperation with customers and suppliers.

At a European level, we have adopted a standpoint on the emission trading system that is currently under preparation. We are in favour of a system of tradable rights provided that the emission rights are granted on the basis of CO<sub>2</sub> emissions per unit of product, which translates into energy consumption per unit of product. That is why DSM's CO<sub>2</sub> reduction policy is mainly focused on improving the energy efficiency of its manufacturing processes. DSM is moreover of the opinion that all European companies should ultimately be subject to the same standards. A transition period should be allowed during which the individual member states of the European Union can adjust their policies.

## HOW TO DEAL WITH SUBSTANCES

The chemical industry works with all sorts of different substances. A number of them are toxic, flammable or explosive. The need to improve our knowledge of chemical substances has been a recurring feature of the chemical industry's Responsible Care Programme ever since the early 1980s. An international project was launched in 2000 the aim of which was to classify the available information – and plug any information gaps – on all substances that are produced in quantities of at least 1,000 tonnes all around the world. We ourselves are actively involved in the provision of data about 32 of these substances. The idea is for this 'High Production Volume Chemicals Programme' to be completed by the end of 2004. We are also involved in the international Long-Range Research Initiative (LRI), which is studying the effects of chemical substances, for example, whether they can be absorbed into the human body via the skin.

In Europe, a system for the Registration, Evaluation and Authorization of Chemicals (REACH) is being set up. We support the introduction of a system that is both efficient and practical and launched a database called WorldWide in 2002. This contains details on all substances used and produced by DSM plants. The idea is for WorldWide to be ready by the end of 2003 and for both

our own operators and customers to have access to the system (in the latter case, access will be via our website).

## SUSTAINABLE PRODUCTION

Companies like us are constantly seeking to improve their development and production processes. In addition to enhancing existing processes, we are also entering previously uncharted territory by attempting to integrate chemistry and biology. We are in the process of devising development and production methods for the decade commencing in the year 2010. This technical transformation offers a host of benefits, some of which we are already reaping: less waste production, lower energy consumption, cleaner and safer processes, higher yields and better product quality. The use of biotechnology means both environmental benefits and lower costs.

### NEW PROCESSES BASED ON ENZYMES

In the fine chemicals industry, enzymes have been used for a long time. Thanks to the use of enzymes, DSM has been able to come up with new methods for synthesizing optically pure ingredients for medicinal drugs. Compared with conventional methods of obtaining optically pure products, based on the resolution of racemic mixtures, which generally produced a maximum yield of 50% of the desired end product, the new methods are capable of producing a yield of up to 100%. The result is a significant decline in the amount of waste produced, as well as process time and energy consumption.

In 2001, we started using fermentation as a means of producing 7-ADCA, a building block for cephalosporins (antibiotics). We reached a further milestone last year when we started the enzymatic production of Amoxicillin, the most important antibiotic in the world. New enzymes derived from our genomics project centring on a fungus known as *Aspergillus Niger* are also likely to help us further improve our production processes in the near future, as well as make them more sustainable.

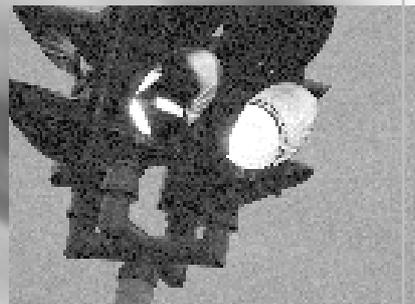
### SPEEDING UP DEVELOPMENTS

We have built up a high level of expertise in recent years in modern techniques for parallel experimentation. These techniques, known as high and medium-throughput experimentation and screening, have enabled us to speed up the development time for new products by a factor of at least five. For example, when a request comes in for new enzymatic products, we can simply search through a number of gene databases and compile a list of genes that are potentially suitable for use in manufacturing the product in question within the space of just 24 hours. This approach not only drastically reduces the amount of laboratory work that used to be required, but also enables time-consuming conventional programmes for strain improvement to be replaced by a much simpler series of experiments.

In 2002, we adopted a technique of our own for chemical synthesis and catalyst development. This involves conducting a series of low-volume experiments, generally in batches of several dozen, thus saving a lot of time. As an additional bonus, the resultant processes are safer, more efficient and cheaper to put into practice, as the new technique means simplified testing and improved quality control.

## GREEN LIGHT

DSM Special Products produces benzoic acid (Purox B) and ultra-pure sodium benzoate (Purox S). For Purox S, which is used in food, soft drinks and pharmaceutical products, DSM has built the world's first sodium benzoate plant to operate according to GMP standards, which are the strictest in our industry. The plant is based at our site in Rotterdam and has a capacity of 200,000 tonnes, making it the largest plant of its type in the world. Since 1999 we have invested large sums in modernizing and updating the technology. Energy efficiency at the plant was assessed in 2002 in light of the emission-reduction agreements reached in Kyoto. Our plant ranks in the top 10% in the world in terms of energy efficiency. The plant uses surface water for cooling purposes. Thanks to the new water cooling plant the quality of the cooling water that is discharged is better than that of the water that enters the plant. The aquatic environment will certainly benefit from this.



DSM has also developed a special type of benzoic acid, known as VevoVital®. This is an active ingredient in pig feed which reduces the ammonia emissions from pig farming by up to 30%. Consequently the product makes a positive contribution to reducing the environmental costs of agriculture. The European Union's scientific advisory committee issued a positive recommendation on the use of VevoVital® in pig feed.

### TECHNICALLY SPEAKING, AT DSM COATING RESINS

DSM has banned the use of highly flammable and aggressive substances that were needed for the production of acrylate resins. Lead-based catalysts have been largely replaced by lithium and calcium based alternatives. Potentially hormone-disrupting emulsifiers used in the production of certain resin emulsions in water have been almost entirely replaced by safe alternatives. We have started a programme to develop water-based resins. In the near future we want to replace resins containing solvents used for decorative coatings with eco-friendly systems using water. Products thinned with aromatic solvents are being replaced where possible with systems based on aliphatic solvents. DSM is one of the world's leading producers of polyester resins for use in powder coatings. Powder coatings are eco-friendly coatings that do not require solvents. The resin is mixed with a crosslinker, which causes the final layer of paint to harden. In 2002 we developed an alternative crosslinker based on renewable raw materials.



DSM Coating Resins increasingly uses tankers, tank containers and IBCs (Intermediate Bulk Containers with a capacity of 1000 litres) for storage and transport. This reduces the labour-intensive use of barrels, generates savings on packaging materials and simplifies the storage and transport of bulk materials. Over longer distance we use intermodal transport, including transport by train or by water. It is better for the environment and cheaper. Tanker trucks can only be cleaned with flammable solvents such as acetone at certified cleaning stations. The carrier may not use solvents anywhere else. Where formerly it used around 25 different transport companies, DSM Coating Resins has now selected a pan-European transporter to carry all packaged products. This has significantly reduced the number of transport kilometres. The drivers are regularly tested to ensure their driving, loading and unloading practices are safe. DSM Coating Resins is also working to reduce the number of transport movements and cut costs by increasing the volume of the orders of each customer. Customers and transporters can find the product safety information they need 24 hours a day at a special site on the Internet.

### BIOTECH IN BULK AND BULK IN BIOTECH

Our position on the market for life-science products is also helping us to gain a larger share of the markets in performance materials and industrial chemicals. By bringing together our strengths in biology, chemistry and materials, we can create potential applications for biotransformation in the production of base chemicals, resins and polymers. Enzymatic catalysis offers opportunities for enhancing product quality and opening up new applications. Our knowledge of biotechnology and commodity products is combining to create an interesting synergy in the Industrial Chemicals cluster. The findings of a number of feasibility studies have underscored the sustainable nature of fermentation processes for commodity chemicals such as caprolactam (the basic ingredient used in the production of nylon-6). We have translated the process technology for our semi-synthetic antibiotics into the high-volume production of commodities and this has already led to a number of projects involving the biosynthesis of such materials. Conversely, the experience gained in the production of commodity chemicals can be used to improve large-scale manufacturing processes for a number of life science products.

### GENOMICS

As far as genomics research is concerned, we either have most of the relevant technologies already in our own possession or have access to them thanks to our partnerships with leading players and institutes in the industry. In 2002, for example, we entered into a long-term alliance with a German firm called Biomax, who are experts in bioinformatics. We were also involved in the foundation of the Kluyver Centre for Genomics of Industrial Fermentations. This is a centre of excellence bringing together the expertise in genomics research possessed by research institutes in the Netherlands and various large companies.

Genomics research acts as a stimulus for the development of all sorts of new products. Many of the 14,000 genes of *Aspergillus Niger*, a fungus that plays a key role in the production of a large number of DSM products, probably contain the code for the production of new enzymes that could be used in foods and in the biocatalytic synthesis of all sorts of chemicals. We have now set up a separate company to concentrate on developing these new enzyme applications as quickly as possible.

In the longer term, genomics research will also result in a completely new approach to the production of enzymes. By around 2010, it should be possible to extract from an examination of a fermentation process information on the behaviour of genes and the role performed by proteins in a micro-organism, thus enabling us to take direct control of the process. This, in turn, will result in cleaner production processes using less energy and causing less damage to the environment.

### PROCESS INTENSIFICATION – A BLUEPRINT

Process intensification is one of the pillars of sustainable production. This young branch of modern process technology is trying to force breakthroughs in chemical and biochemical processes by making use of advanced equipment and processing methods and integrating these. It embraces many of the technologies we have already discussed and seeks to achieve a number of ambitious objectives, i.e. a much lower level of cost, smaller equipment and plants, safer processes, a reduced consumption of energy and raw materials, a lower level of emissions and waste production and shorter lead times thanks to improved development and production techniques.

Process intensification is an area in which we have already achieved a number of tangible results. The new urea process (known as Urea 2000plus™) takes place in an integrated plant that is one third the size of a conventional urea plant. Our new high-pressure melamine technology not only generates considerable energy savings, but also simplifies production processes. In 2002, we opened a process intensification centre known as bluePRINT, whose job it will be to assist the business groups in designing sustainable technologies.

We intend to do our utmost to promote the benefits of process intensification, both within the chemical industry and in a wider arena. This is a theme on which we have produced a large number of publications, in addition to organizing seminars and taking part in research networks both in the Netherlands and abroad. We also provide training courses in process intensification for other companies.

Process intensification is also likely to play a role of considerable significance in fields such as biopharmaceuticals and bioterials. Close forms of multidisciplinary partnership, coupled with an integrated approach to both existing and new processes, will help to shape our reputation as an exponent of technologically sophisticated and sustainable business practices.

### COOPERATION WORKS

DSM Research is a member of various Dutch and European programmes aimed at promoting sustainability in chemistry and biotechnology. In the Netherlands we collaborate with a number of Centres of Excellence, for example in the field of polymers and food. DSM is also a member of a long-term Dutch programme for genomics research, and it is against this background that industrial biotechnology forms one of the key aspects of our partnership with Delft University of Technology. At a European level, we are one of the two founding members, together with a Dutch organization known as Advanced Catalysis and Technology for Sustainability (ACTS), of the European Network of Excellence on Catalysis. ACTS undertakes a range of activities aimed at promoting sustainable development and involving universities working in close cooperation with the private sector. The IBOS programme, which seeks to integrate biosynthesis with organic synthesis, should play a particularly important role in boosting our competitiveness by integrating chemistry and biology.

On a national scale, we are currently developing a 'sustainability test' for R&D programmes and projects. This involves comparing R&D proposals with alternatives and with the continued use of existing technology, both at the start and during the development of a given project.



### HEROES

The *DSM Awards for Chemistry and Technology 2002* were awarded to Richard van Delden from Veendam (Netherlands) and Dominique de Seny from Liege (Belgium). Richard van Delden conducted research into photo-active materials, whose molecular chirality and mobility can be regulated with the help of light. Dominique de Seny studied metallo-beta-lactamases and their role in the growing resistance of bacteria to antibiotics based on beta-lactam. Three of our scientists, Koos Mencke, René Steeman and Jean Beugels, were awarded the title *Heroes of Chemistry* by the prestigious American Chemical Society in Boston in 2002, for their groundbreaking work in developing improved processes and finding new protective applications for the Dyneema fibre.

## DSM COATING RESINS

DSM COATING RESINS DEVELOPS AND PRODUCES RESINS FOR COATING SYSTEMS. DSM IS THE GLOBAL LEADER IN POWDER COATING RESINS, WITH A MARKET SHARE OF 25%. THESE RESINS ARE USED IN COATINGS FOR WASHING MACHINES, RADIATORS, CAR PARTS AND BICYCLES, AMONG OTHERS. DSM COATING RESINS IS NOW FOCUSING MORE AND MORE ON THE DEVELOPMENT AND PRODUCTION OF ENVIRONMENT-FRIENDLY, WATER-BASED COATING RESIN SYSTEMS. THE BUSINESS GROUP HAS PRODUCTION FACILITIES IN THE NETHERLANDS, SPAIN, THE USA, GERMANY, SWEDEN, CHINA AND TAIWAN.



## SUSTAINABLE BUSINESS IN ACTION

DSM Coating Resins organized a five-day workshop on sustainable business practices at the end of 2002. The workshop was designed to present best practices, raise awareness and formulate proposals for projects to foster concrete action. Delegates from organizations such as DuPont, BP Amoco, Procter & Gamble, KLM, BASF, Akzo Nobel, Philips, Greenpeace, the Worldwide Fund for Nature and the Dutch government shared knowledge, exchanged experiences and identified a number of areas in which the coatings industry could adopt sustainable business practices.

The delegates generated a wealth of new ideas and stressed the need for closer cooperation in the production chain. DSM Coating Resins will be launching a number of projects in 2003 that will help it to continue the process of converting its ideas on sustainable business into practical action.

## PROFIT MATTERS

### FINANCIAL OBJECTIVES

- Sales of about € 10 billion in 2005
- By 2005 at least 80% of sales should be generated by specialties (Life Science Products and Performance Materials)
- Net debt less than 40% of group equity plus net debt
- Average return on investment at least 15%
- Operating profit before depreciation and amortization (EBITDA) should be at least 8.5 times the balance of financial income and expense
- DSM aims to offer its shareholders a stable and preferably rising dividend. The dividend is calculated as a percentage of the cash flow.

### REVIEW OF FINANCIALS IN 2002

For a proper assessment of DSM's financial performance in 2002, the balance sheet presented here should be read in conjunction with the full Financial Statements from which it has been derived and the Auditor's Report that accompanies them. See also the DSM Annual Report for 2002.

### GENERAL

DSM's operating profit from ongoing activities in 2002 was € 383 million, up 14% from 2001 on a comparable basis. Selling prices were under some pressure on average, but raw-material prices were on average lower and sales volumes were 6% higher, despite a further economic decline.

On 28 June 2002 we sold DSM Petrochemicals, comprising our petrochemical activities in Geleen (Netherlands) en Gelsenkirchen (Germany), to Saudi Basic Industries Corporation (SABIC). The sales, profits and cash flow changes of DSM Petrochemicals for the period until 28 June have been included in the overall DSM figures.

At € 349 million, the profit on ordinary activities after taxation was only 5% lower than in 2001, even though the contribution from the petrochemical activities covered a period of only six months.

The *Life Science Products* cluster posted 3% lower sales and a slight increase in operating profit for the whole of 2002. The weakening of the US dollar had a negative effect on profits. DSM Pharmaceutical Products felt the effect of delays in the introduction of new products in the pharmaceutical industry. Aspartame margins were under pressure.

The *Performance Materials* cluster posted a clear decrease in sales due to lower sales volumes at DSM Desotech. However, the operating profit for the cluster remained at the 2001 level as all other units posted higher profits.

The *Industrial Chemicals* cluster recorded a slight decrease in sales but a substantial increase in operating profit, which was due to lower costs and on average higher margins. The effect of the higher operating profit of DSM Fibre Intermediates was partly offset by lower sales volumes and margins for DSM Agro and a lower output for DSM Energy. DSM Melamine performed at the same good level as in 2001.



## FINANCIAL RESULTS FOR 2002

Due to the sale of our interest in EBN at the end of 2001 and the divestment of our petrochemicals business in mid-2002, the financial results for 2002 cannot simply be compared with those for 2001. Therefore, the results for ongoing activities (excluding DSM Petrochemicals and Energie Beheer Nederland) will be separately compared where possible. The analyses of the results for 2002 compared with those for 2001 mainly relate to ongoing activities.

## STATEMENT OF INCOME

x € million	year	
	2002	2001
<b>ongoing activities:</b>		
net sales	5,636	5,751
other operating income	-141	-31
total operating income	5,495	5,720
total operating costs	-5,112	-5,384
operating profit (EBIT)	383	336
<b>DSM total:</b>		
net sales	6,665	7,970
operating profit	450	521
balance of financial income and expense	-14	-97
taxation	-84	-69
profit from non-consolidated companies	-3	14
<b>profit on ordinary activities after taxation</b>	<b>349</b>	<b>369</b>
extraordinary profit after taxation	840	1,045
minority interests' share	-1	1
<b>net profit</b>	<b>1,188</b>	<b>1,415</b>

### Net sales

At € 5.6 billion, sales of ongoing activities were 2% lower than in 2001. Autonomous volume growth amounted to 6%. Selling prices were down 4% on average. Sales decreased by 2% due to deconsolidations and by another 2% due to exchange rate developments (in particular for the US dollar).

### Operating costs

The operating costs of ongoing activities decreased compared with 2001 and stood at € 5.1 billion. The main component of these costs, the costs of raw materials and consumables, decreased by € 309 million. Expressed as a percentage of net sales, the costs of raw materials and consumables decreased from 47% in 2001 to 43% in 2002.

Due in part to the Operational Excellence programme, there was no autonomous increase in fixed out-of-pocket costs for our ongoing activities, in spite of a 7% increase in average labour costs per employee. Overall labour costs increased by 1% and stood at € 1,156 million in 2002 (2001: € 1,139 million)

Amortization and depreciation for the ongoing activities decreased from € 405 million in 2001 to € 384 million in 2002, mainly because of impairments at the end of 2001.

### Operating profit

The operating profit on ongoing activities increased by € 47 million (14%), from € 336 million in 2001 to € 383 million in 2002, mainly as a result of higher sales volumes. The sales margin (operating profit as a percentage of net sales) increased from 5.8% in 2001 to 6.8% in 2002.

Margins (selling prices per unit of product less variable costs) were on average significantly below the 2001 level.

### Net profit

Financial income and expense on balance resulted in an interest charge of € 14 million compared with € 97 million in 2001. This decrease was related to the increase in financial income due to the investment of the revenues from the sale of DSM Petrochemicals and our stake in Energie Beheer Nederland and to a lower interest rate.

At 19%, the effective tax rate in 2002 was higher than in 2001 (16%). The main reason for this was that our profits no longer included tax-exempt income from Energie Beheer Nederland.

The profit from non-consolidated companies decreased from € 14 million in 2001 to -€ 3 million in 2002 due to the lower result of Methanor and a few other, smaller participations and the sale of Energie Beheer Nederland.

The profit on ordinary activities after taxation decreased by € 20 million and stood at € 349 million. The decrease was due mainly to the sale of DSM Petrochemicals and the depository receipts of Energie Beheer Nederland.

The extraordinary profit for the full year 2002 amounted to € 840 million (2001: € 1,045 million). The extraordinary profit of € 840 million mainly represents the book profit on the sale of DSM Petrochemicals (€ 936 million) less an amount of € 96 million relating to the finalization within DSM of the demerger of DSM Petrochemicals and anticipated post-demerger expenses and to the impairment of DSM's share in Evergreen Nylon Recycling in the USA, in view of a decline in the short-term and medium-term commercial and technological prospects for this business.

The net profit decreased from € 1,415 million in 2001 to € 1,188 million in 2002, mainly as a result of the decrease in extraordinary profit. Expressed per ordinary share, the net profit decreased from € 14.50 in 2001 to € 12.08 in 2002.

### CAPITAL EXPENDITURE AND FINANCING

Capital expenditure on tangible and intangible fixed assets for ongoing activities amounted to € 463 million in 2002 and exceeded amortization and depreciation by a margin of € 79 million. In addition, an investment of € 33 million was made in the establishment of the DSM Nanjing Chemical Company joint venture for the production of caprolactam in China.

Net debt as a percentage of group equity plus net debt, which amounted to 17% at the end of 2001, changed into a surplus of 25% at year-end 2002. This was due mainly to the sale of DSM Petrochemicals.

### CONSOLIDATED BALANCE SHEET

x € million	year-end 2002	year-end 2001
<b>fixed assets</b>		
intangible fixed assets	462	594
tangible fixed assets	2,885	3,607
financial fixed assets	292	241
	<u>3,639</u>	<u>4,442</u>
<b>current assets</b>		
inventories	944	1,171
receivables	1,439	1,814
cash / marketable securities	2,974	1,148
	<u>5,357</u>	<u>4,133</u>
Total	<u>8,996</u>	<u>8,575</u>

x € million	year-end 2002	year-end 2001
<b>group equity</b>		
shareholders' equity	5,142	4,239
minority interests' share	44	59
	<u>5,186</u>	<u>4,298</u>
equalization account	32	30
provisions	682	809
long-term liabilities	1,337	1,533
current liabilities		
- interest-bearing	599	482
- non-interest-bearing	1,160	1,423
	<u>1,759</u>	<u>1,905</u>
Total	<u>8,996</u>	<u>8,575</u>
capital employed	4,570	5,763
net debt	-1,038	867
group equity / total assets	0.58	0.50
net debt / group equity plus net debt	-0.25	0.17

### REVIEW BY CLUSTER

DSM's activities are grouped into three clusters. The tables below present the financials of the ongoing activities in these clusters.

net sales and supplies x € million	net sales		supplies	
	2002	2001	2002	2001
Life Science Products	2,168	2,237	2,240	2,304
Performance Materials	1,767	1,855	1,795	1,935
Industrial Chemicals	1,268	1,302	1,389	1,460
Other activities	433	357	437	373
intra-group supplies	-	-	-225	-321
total	<u>5,636</u>	<u>5,751</u>	<u>5,636</u>	<u>5,751</u>

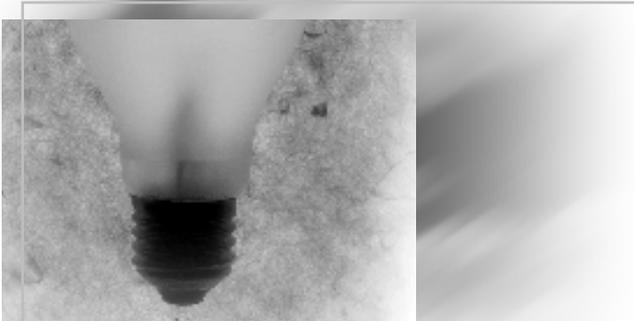
operating profit (EBIT) x € million	2002	2001
	Life Science Products	232
Performance Materials	113	112
Industrial Chemicals	77	64
Other activities	-12	-41
operating profit before amortization of goodwill	<u>410</u>	<u>365</u>
amortization of goodwill	-27	-29
total	<u>383</u>	<u>336</u>

## VALUE-BASED BUSINESS STEERING

In 2001 we introduced a new financial-management system known as 'value-based business steering' (VBBS) and implemented this on a worldwide basis. On the surface, it is a method for financial planning, performance measurement, reporting and control. However, our primary reason for introducing it was to initiate a process of behavioural and cultural change aimed at ensuring that the commitments our business units make with regard to their financial performance will be met.

## THE FIGURES TELL THE STORY

The transformation process which DSM is undergoing at present is one of the main reasons for introducing the VBBS system. During our time as a basically cyclical company, our profitability was largely at the mercy of market trends. Now that we are evolving into a specialty company, however, VBBS can help to boost the effectiveness of our management and give real meaning to the concept of pro-active enterprise by providing clear long-term financial targets for each business group and a standard system for measuring and reporting financial performance. This will create a context in which the Managing Board and the business groups can conclude performance contracts and evaluate the fulfilment of these contracts in a businesslike manner. Our new financial toolbox includes indicators such as the cash-flow return on investment (CFROI), cash value added (CVA) and delta CVA.



### SOUND ENTREPRENEURSHIP

In 2002 Wim Steenbakkers and Nico Grootjen of DSM Venturing & Business Development won an award for their business plan for the PuriSoil soil remediation technology. This DSM invention had already won an innovation award in 2001. PuriSoil cleans contaminated soil by blowing air through it, which is then passed through a bioactive layer in which all contaminants are converted into harmless substances. This method is far cheaper than other techniques for soil remediation and can be used without having to demolish existing buildings. Soil remediation is not among DSM's core activities so at the end of 2002 a new company, Terreco, was formed to commercialize PuriSoil.



### CORK AND PLASTIC

Corks for wine bottles have traditionally been made from natural cork, most of which comes from Portugal. Good quality natural cork is becoming harder to find: a cork tree has to grow for 30 to 40 years before the first cork can be harvested. The best cork is produced from the 2nd or 3rd harvest and there is almost 10 years between them. Producing natural cork is very labour intensive and the cork can be easily contaminated. The most common contaminant is TCA (trichloroanisole), a chemical produced by a fungus that gives wine an unpalatable flavour. The plastic cork has many advantages: the chance of TCA being emitted by the cork is practically nil and the production process is controlled from start to finish, guaranteeing consistent quality. DEXPlastomers (a joint venture between DSM and Exxon-Mobil) has discovered a plastomer (marketed under the trade name Exact) which is a highly suitable material for plastic corks. This became one of DEX's core activities in 2002. The Exact plastomer is absolutely taste- and odour-free and has the right mechanical properties. No waste is produced in the production process, and the Exact cork can be fully recycled.

### LOGICAL DIALOGUE

VBBS is all about creating business value, i.e. increasing the company's value on an ongoing basis. Business value is more than just shareholder value. Profit should be earned in close partnership with satisfied suppliers and customers. Our profitability should be such as to give our staff plenty of opportunities for developing their talents and also allow us to invest across the broad gamut of sustainable activities that makes a company a fully-fledged, responsible organization. An absolute precondition for growth is that our activities are accepted by the communities in which we operate.

The effectiveness of VBBS is guaranteed by a logical and stringent process of planning, reporting and assessment. Once the strategy for a given activity has been determined on the basis of a 'Business Strategy Dialogue', the next step is to draw up a 'Strategic Value Contract'. This is a document setting out the future strategy, including the anticipated profits, for a period of three years (normally speaking) in the form of a binding agreement between the Managing Board and the management of the business group concerned. This will make the annual budgeting rounds a lot simpler; they will be replaced by progress reports on the implementation of the contract. The management reports on the financial results every quarter. The system includes various management incentives linked to the realization of the contract.



### INTERNET MAKES BUSINESS BOOM

In our efforts to improve our performance as regards People, Planet and Profit we are clearly benefiting from ICT developments. For example in the areas of communication, the sharing of information and experience and collaboration with others both inside and outside the company, and in the use of the electronic superhighway in purchasing and sales processes.

Last year we started using Webex, a system of electronic conferencing. The system was used more than 2000 times and helped to increase productivity and reduce costs.

In so-called DSM Team Rooms, digital connections allow groups of employees to work with DSM colleagues and with suppliers, customers and partners at different locations. There were more than 150 of these Team Rooms in use at the end of 2002.

Our e-business infrastructure allows us to collaborate quickly, effectively and transparently with everyone we need to. There is far less time, money and energy spent on travelling and performing various transactions.

Thanks to the Aurora project, practically all DSM employees worldwide are now connected to the DSM network. This means they all have access to the information we provide on our Intranet.

## VERIFIERS' REPORT

### INTRODUCTION

The Managing Board of DSM N.V. asked us to verify the DSM Triple P Report 2002 (3P Report). The 3P Report is the responsibility of DSM's management. Our responsibility is to issue a Verifiers' Report on the 3P Report.

### SCOPE

The object of the verification was the complete report, including the data and the text. In the chapter 'Reporting policy and justification of choices made' on page 9 DSM provides an explanation of the contents of the report and the reporting principles. Our verification was focused on the question to what extent the Managing Board of DSM N.V. has drawn up the information included in the 3P Report with due care, as well as a review of the reliability of this information. This verification provides a moderate level of assurance.

### ACTIVITIES UNDERTAKEN

The verification was planned and conducted by a multidisciplinary team. Our verification approach was based on the International Standard for Assurance Engagements of the International Federation of Accountants.

In the context of verification we recognise that non-financial data are, in general, subject to more inherent limitations than financial data due to their nature and the methods used for determining, calculating or estimating such data.

Our activities, aimed at providing a moderate level of assurance, included:

- a review of the underlying systems and procedures used to collect and process the reported information, including the aggregation of data from the sites into the aggregated information at corporate level;
- a review of the underlying principles of management information and reporting used in drawing up the 3P Report;
- an evaluation of the reliability and other quality criteria of the reported information, including a review of important estimates, based on, among others, the Sustainability Reporting Guidelines of the Global Reporting Initiative (part B);
- random visits to a limited number of sites, based on an annual rotation;
- an evaluation of the general picture presented in the 3P Report based on underlying internal information and official external publications such as research and media reports.
- checking whether the financial information in the 3P Report has been correctly derived from the audited annual accounts for 2002 of DSM N.V.

### OPINION

Based on our verification we conclude that Managing Board of DSM N.V. has drawn up the information included in the 3P Report with due care. Nothing has come to our attention that causes us to believe this information is not reliable.

Amstelveen (The Netherlands), March 2003

KPMG Sustainability B.V.

Prof. Dr. George C. Molenkamp, Director

## GLOSSARY

### AOX

Adsorbable organic halogen compounds, for instance chlorinated solvents.

### ARIA

Application for Recording of Incidents and Actions

### Audit

Systematic investigation into the organization, processes and procedures.

### Base year

Year used as a reference date to measure progress made. The base year for measuring energy efficiency improvements in the Netherlands, for example, is 1989.

### BMP

Dutch abbreviation for Site Environmental Plan; plan in which the companies which have signed the Chemicals Covenant state what efforts they intend to make over the next few years regarding the environment.

### CEFIC

Conseil Européen de l'Industrie Chimique (European Chemical Industry Council). The European sector organization for the chemical industry.

### cGMP

Current Good Manufacturing Practice: the basic principles, procedures and resources required to ensure an environment suitable for manufacturing products of an acceptable quality.

### CO<sub>2</sub>

Carbon dioxide. A gas produced when fossil fuels are burned; carbon dioxide contributes to the greenhouse effect.

### Contractor

Non-DSM company that carries out work at a DSM site on a contract basis under its own authority and supervision.

### COD

Chemical oxygen demand; indicates the degree of contamination of waste water by organic compounds.

### Dust

Dust emission data relate to 'inhalable dust'. This is dust that can penetrate into a person's lungs. This dust fraction is described and defined in international legislation (the so-called PM10 fraction).

### FI

Frequency index, unit of measurement for safety: the number of lost-workday cases per 100 employees per year.

### HACCP

Hazard Analysis Critical Control Point: the systematic identification and management of risks associated with the manufacture, distribution and use of food ingredients.

### Heavy metals

Group of metals, including mercury, zinc, copper, cadmium, vanadium and lead. Harmful if spread in the environment.

### N Nitrogen.

An excess of nitrogen compounds in surface water gives rise to eutrophication and algal bloom.

### NO<sub>x</sub>

Nitrogen oxides, gases which are released mainly during incineration and which result in acidification.

### N<sub>2</sub>O Dinitrogen oxide.

A gas formed in various processes. On a weight-for-weight basis, the contribution of N<sub>2</sub>O to the greenhouse effect is 310 times greater than that of carbon dioxide.

### P Phosphorus.

An excess of phosphorus compounds in surface water gives rise to eutrophication and algal bloom.

### PS

Priority Substances: the Black List substances according to EU Council Directive 76/464 EEG.

### Responsible Care

Name of a programme which the chemical industry uses worldwide on a voluntary basis to work on (and communicate about) ongoing improvement in SHE performance.

### SHE

Safety, Health and the Environment.

### SHE&M

Safety, Health, Environment & Manufacturing

### SO<sub>x</sub>

Sulphur dioxide and other sulphur oxides. These are formed during the combustion of fossil fuels and lead to acidification.

### VNCI

Association of the Dutch Chemical Industry.

### VOC

Volatile organic compound. This is a broad category of chemical compounds, some of which pose a health hazard. The presence of VOCs in the atmosphere can lead to acidification.

