The walls of our company are becoming increasingly transparent. We are opening up more and more to engage with our stakeholders in order to understand their needs and concerns. We see no contradiction between being profitable and being transparent and ethical. On the contrary, we believe it is important to listen to the issues raised by society in order for us to maintain our licence to operate and innovate. Embracing new ideas could also open up new opportunities for us.

Novo Nordisk is an international biotechnology and pharmaceutical company with headquarters in Denmark. We have production facilities in eight countries and affiliates or offices in 68 countries. At the end of 1999, 15,184 people were employed by our company. Our business is divided into two units – Health Care and Enzyme Business.

Today, our Health Care business accounts for more than 75% of Novo Nordisk's total sales. Health Care develops, manufactures and markets pharmaceutical products and services that provide significant benefits to patients, the medical profession and society. Health Care is the world leader in diabetes care and commands a strong position within other areas such as hormone replacement therapy (HRT), coagulation disorders (NovoSeven®) and human growth hormone.

Our Enzyme Business develops, manufactures and markets enzymes that provide biological solutions to industrial problems. Enzyme Business is the world leader in industrial enzymes with customers in a large variety of industries, the largest sectors being the detergent, starch and baking industries.

As you can read in the foreword, our corporate structure will change around the turn of the year 2000. Even so, our core values will remain the same. We will continue to engage with our stakeholders – and we will continue to demonstrate how we put values into action.
INTRODUCTION

This Environmental and Social Report 1999 covers the significant environmental, ethical and social aspects of our activities. It is targeted at all stakeholder groups wishing to follow our performance in these areas. We aim to provide information in a form that can be appreciated by a wide audience, and we welcome feedback and suggestions that can help us improve the report.

This report was published in March 2000 and is also available on Novo Nordisk’s web site at http://www.novo.dk. The Annual Report 1999 is also featured on Novo Nordisk’s web site. Copies of these reports can be ordered from our Stakeholder Relations department (please see the back of the report for contact information).

SCOPE OF THE REPORT

The report covers the environmental performance of all our production facilities worldwide. The report also covers social issues and ethical issues having a wider societal impact and which are of importance to the sustainable development agenda and public perception of the technologies we employ. Our understanding of these issues is evolving and the development of specific indicators to measure our performance in these areas is still in its infancy.

Data for our site in Suzhou, China, is presented on the web site along with the rest of our smaller production sites, but not included in the corporate totals. The plant in Suzhou is a joint venture in which we hold a 62% share.

ENVIRONMENTAL DATA COLLECTION

The environmental data presented in the report is based on quarterly data reports from each site, which are collected and processed centrally. We have adopted a standardised procedure for data collection and we are continually working to refine our data control systems. More detailed information is available on our web site.

SOCIAL DATA COLLECTION

Data and input for the social articles are based on interviews as well as relevant statistical sources and report documentation. Interviews have been conducted primarily with the managers responsible but where employees are the stakeholder in focus, interviews with employees and/or union representatives have also been carried out.

Data for the social indicators on page 68 has been collected partly via Novo Nordisk’s international centralised reporting system, and partly by requesting reports from each production site. As noted on page 18, this latter method of data collection needs further development.

PERFORMANCE HIGHLIGHTS

<table>
<thead>
<tr>
<th>FINANCIAL</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>Change %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net turnover</td>
<td>16,032</td>
<td>17,911</td>
<td>20,924</td>
<td>16.8%</td>
</tr>
<tr>
<td>Operating profit</td>
<td>3,041</td>
<td>3,356</td>
<td>4,214</td>
<td>19.2%</td>
</tr>
<tr>
<td>Profit before tax</td>
<td>3,298</td>
<td>3,740</td>
<td>3,951</td>
<td>5.6%</td>
</tr>
<tr>
<td>Net profit</td>
<td>2,097</td>
<td>2,409</td>
<td>2,411</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>Change %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water consumption (1,000 m³)</td>
<td>5,210</td>
<td>4,963</td>
<td>5,019</td>
<td>1.1%</td>
</tr>
<tr>
<td>Energy consumption (1,000 GJ)</td>
<td>4,151</td>
<td>4,063</td>
<td>4,096</td>
<td>0.8%</td>
</tr>
<tr>
<td>EPIS for water1)</td>
<td>-</td>
<td>100</td>
<td>109</td>
<td>9.0%</td>
</tr>
<tr>
<td>EPIS for energy2)</td>
<td>-</td>
<td>100</td>
<td>109</td>
<td>9.0%</td>
</tr>
<tr>
<td>Recycled liquid waste (1,000 m³)</td>
<td>1,801</td>
<td>1,231</td>
<td>1,144</td>
<td>-7.1%</td>
</tr>
<tr>
<td>Discharged liquid waste (1,000 m³)</td>
<td>2,807</td>
<td>3,011</td>
<td>3,244</td>
<td>7.7%</td>
</tr>
</tbody>
</table>

SOCIAL

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>Change %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no of employees</td>
<td>14,175</td>
<td>14,857</td>
<td>15,184</td>
<td>2.2%</td>
</tr>
<tr>
<td>Frequency of occupational injuries3)</td>
<td>9.5</td>
<td>10.8</td>
<td>9.1</td>
<td>-16.1%</td>
</tr>
<tr>
<td>Frequency of occupational diseases3)</td>
<td>-</td>
<td>2.1</td>
<td>1.9</td>
<td>-10.0%</td>
</tr>
</tbody>
</table>

1) See definition of EPIS (Eco-productivity Index) on the inside of the back cover. Increases in EPIS indicate improvement in the utilisation of water or energy respectively.
2) Per million working hours (based on the assumption that a full-time employee works 1,600 hours a year).
3) International data for occupational diseases in 1997 is not available.

ICONS USED IN THIS REPORT

Indicates a Novo Nordisk contact person and an invitation to enter into a dialogue about the issue in question.

Indicates a target relating to the issue in question and a time frame is given.

Gives references to additional and more detailed information on our web site. To access this information, first go to the Internet version of this report at http://www.novo.dk/sr99 and then click on the appropriate reference in the list of ‘related information’ on the relevant web page.
Towards the end of the 20th century a well-known business executive, Albert Dunlop, stated: “Shareholders are the No 1 constituency. Show me an annual report that lists six or seven constituencies, and I’ll show you a mismanaged company.”

In that sense I am happy to say that you might consider Novo Nordisk to be a mismanaged company. This report, for one, lists a whole range of ‘constituencies’ (or stakeholders) for our company.

Over the years, we have moved from an emphasis on customers, employees and shareholders to a more complex understanding of who our stakeholders are and how they interact – not only with us, but also with each other. Shareholders, non-governmental organisations (NGOs), authorities, the media and other stakeholders increasingly exchange views and information; and more and more often stakeholders wear several caps. A good example is our own employees most of whom are also shareholders in the company, but who may also be neighbours to our sites, socially active in community groups, etc.

THE NEED TO ENGAGE
The increasing attention from stakeholders raises the need for private companies to be transparent and accountable – often within areas that have not previously received boardroom attention. Furthermore, it raises the need for an inclusive approach. Stakeholders today not only expect to be informed about what we do but also require us to demonstrate that we do what we say. Stakeholders demand to be involved in a dialogue about issues that matter to them. In other words, we are moving from an era where it was sufficient to simply keep our stakeholders informed into an era where stakeholders ask us to ‘show me’ and ultimately ‘involve me’.

Companies that fail to engage with their stakeholders may ultimately be forced into submission and perhaps even lose their licence to operate. In our case, we prefer to see this dialogue as an opportunity to learn, an opportunity to avoid mistakes and to develop our business in a sustainable way.

Engaging with stakeholders is not new to us at Novo Nordisk. As an example, we have had yearly meetings with NGOs for the last ten years. To begin with, the focus of these meetings was on our environmental impact. Today, we see a much broader agenda that incorporates social, bioethical as well as environmental issues. We begin to realise that we cannot separate one element of sustainable development from another. This is reflected in our decision to merge our social reporting with our environmental and bioethical reports as from this year.

A COMBINED PERSPECTIVE
Novo Nordisk is an active participant in the Global Reporting Initiative (GRI). With this report, we have made an attempt to apply the guidelines provided by the GRI.

We believe that we have taken a step forward in our understanding of what sustainable development means for Novo Nordisk. We also realise, however, that there is still a long way to go before all aspects of sustainable development have become integrated into our businesses.

In the first section of this report, we attempt to describe our status and approach regarding sustainable development. We outline the mechanisms we have in place for governing our social and environmental performance, and the challenges we see ahead of us in terms of governance. We consider some of the sustainability dilemmas that Novo Nordisk and the biotechnology industry face in relation to genetic engineering, which is a core technology for us. In an attempt to combine environmental, social and economic dimensions into one overall perspective, we analyse the activities and impact of our largest production site in Kalundborg, Denmark, in relation to our stakeholders in the local community.

In the social section, we report on the steps we have taken towards a systematic approach to stakeholder engagement. Our employees are the starting point when we consider our social responsibility but this year we have taken a first step towards systematically considering social responsibility as part of our relations to suppliers and customers. Finally, we describe our social responsibility from a stakeholder perspective in connection with our Indian and French operations.

In the environmental and bioethics sections, we report on our performance based on dilemmas and challenges in relation to sustainable development. These issues have surfaced through our dialogue with NGOs and other stakeholders over the past decade. We present statistics on environmental compliance, inputs, outputs, eco-efficiency and environmental costs. In terms of bioethics, we examine some key issues including animal testing, the recycling of waste biomass, antibiotic resistance, the application of gene technology in foods, and biodiversity.
ACCOUNTABLE
Each of us shall be accountable – to the company, ourselves and society – for the quality of our efforts, for contributing to our goals and for developing our culture and shared values.

From the Charter for companies in the Novo Group

Finally, in the reports from our ten largest production sites, we describe how environmental and social responsibility is managed at the local level. Here we describe activities and priorities in the communities of which they are part.

Many of the activities we report on are linked with specific international targets that we have summarised on page 14. We believe that setting targets and following up on them year after year through a systematic accounting process is a precondition for continuous improvement and true integration into our daily management processes.

ACTIONS ANCHORED IN VALUES
The common starting point for all activities described in this report is our core values. These have been shaped in a process lasting many years and are now a part of what we call ‘The Novo Nordisk Way of Management’. You will find our core values stated along with the introductions to each of the sections in this report.

The real meaning of our core values cannot only be grasped by reading ‘The Novo Nordisk Way of Management’, however. As such they are not much different from the core values stated by many other companies. Their significance is determined by the fact that we consciously apply our values as the driving force behind our behaviour at Novo Nordisk. For example, we apply them for recruitment, training and performance appraisal.

We strive to ensure that core values are more than just words on a piece of paper – that they are in fact lived and put into action by our employees each and every day. With this in mind we initiated an internal project called ‘Values in Action’ in 1997. We asked 40 people from all over our organisation to spend one day a week for six months looking at the environmental, bioethical, social and economic responsibilities of our company, and how we performed against our values.

The conclusions of the ‘Values in Action’ project were not to revise our values or draw up new policies but to initiate new follow-up and reporting procedures on our bioethical and social performance. As a result of this, in 1998 we integrated bioethical issues into our Environment and Bioethics Report and in 1999 we published our first Social Report.

A NEW CORPORATE STRUCTURE
1999 was an eventful year for us. In February 1999 we announced the formation of two independently listed companies from Novo Nordisk’s Health Care and Enzyme Business. This new corporate structure is expected to be approved around the turn of the year 2000/2001. Moreover, we plan to list our US-based discovery company, ZymoGenetics, independently at a later date. The new corporate structure is intended to increase the operational freedom of the three companies as much as possible.

The future companies in the Novo Group will build on the same basic beliefs and values that today characterise Novo Nordisk. As part of the restructuring process, we have reassessed ‘The Novo Nordisk Way of Management’. As a result of this work, we have prepared a ‘Charter for companies in the Novo Group’ that incorporates ‘The Novo Way of Management’. The Charter includes our core values which remain basically unchanged. The Charter also describes our commitment to economic, environmental and social responsibility. On each of these three bottom lines, we will strive to improve our performance continuously and we will report annually on this work.

A SIGN OF COMMITMENT
In closing, I ask you to consider this statement: “Social and environmental performance is as important as financial performance.” Do you agree or not?

When we asked the same question to our employees in 1999, 74% agreed with this statement. This is gratifying for me because it shows that social and environmental thinking is now well established throughout our organisation.

I hope you find this report interesting and thought-provoking. We look forward to hearing your comments and if you wish to discuss a specific subject raised, you are welcome to contact the people named in the report. We have made a special point of trying to present both the pluses and minuses of our performance; only then can we engage in an open and honest dialogue.

This report is all about values and how we put them into action. When making decisions, we have to constantly ask ourselves: “Is this the right thing to do?” Without values, you can never know what is right or wrong for you.
Sustainable development is leading companies in new directions.
There is no doubt that industry has a central role in the pursuit of sustainable development. Companies will have to think and act in new ways – now and in the future. So, what does this mean for a company such as Novo Nordisk?

We apply biotechnology to develop a healthy long-term business, but not at any cost. We aim to be not only economically viable but also environmentally and socially responsible. These three criteria form the ‘Triple Bottom Line’, which is an essential component for managing the company and reporting on our performance. This is also a way of showing how we strive to live up to our values.

EXPLORING THE ROUTE TO SUSTAINABLE DEVELOPMENT

READY FOR CHANGE
We must foresee change and use it to our advantage. Innovation is key to our business and therefore we will encourage a learning culture for the continuous development and improved employability of our people.

From the Charter for companies in the Novo Group

Identifying a company’s values is one thing but putting these values into action is another. That’s where corporate governance comes in – how we make decisions and manage our affairs. For us, this is a key factor in the sustainable development equation.

No company can ignore the need for sustainable development. Society and business need to investigate how to adjust their many activities to optimise human welfare, ensure social equity and, at the same time, maintain the balance of nature.

Novo Nordisk adopts the definition of sustainable development as it was defined in the 1987 Brundtland report ‘Our Common Future’. Sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their needs”. It calls for business and industry to acknowledge and take responsibility for their impact on society and the environment.

This section of the report looks at our values and management practices, our products and technologies in relation to sustainable development. We also attempt to examine the impact of our largest production site in Kalundborg from a social, environmental and economic point of view.

How far we have come in our understanding of sustainable development varies from issue to issue, as you can see in the diagram on the next page. For Novo Nordisk, approaching sustainable development is an ongoing learning process where reaching one target means that we move on to an even more demanding target; advancing in new directions and broadening the basis for how to conduct business.
A NEW DIRECTION FOR GOVERNING COMPANIES

Corporate governance is the system or process by which companies are directed and controlled. It is based on the principle that companies are accountable for their actions and therefore broad-based systems of accountability need to be built into the governance structures of companies. The principles of corporate governance can also be applied to the concept of sustainable development. We are exploring how to do this at Novo Nordisk.

Traditionally, corporate governance and corporate control were considered a branch of corporate finance. However, sound governance needs to be applied not only to the financial aspects of a company but also to the social, environmental and broader economic aspects of performance. A good system of corporate governance should enable responsibility to be clearly defined.

RETHINKING RESPONSIBILITIES

In today’s business environment, financial figures are not the only criteria for measuring the performance of a company. Investors are no longer seen as the only key stakeholder but as one of a broader range of stakeholders, all of whom take an interest and influence in the operations of a company. Stakeholders need to be taken into account in the governance structures of corporations and their interests need to be appropriately reflected.

Many organisations are now fundamentally rethinking their approach, Novo Nordisk for one. How, for example, should a biotechnology company like Novo Nordisk address this new agenda? How should we balance the interests of all our different groups of stakeholders so that everyone benefits?

To be successful in the longer term, companies will need to understand the needs and aspirations of all their stakeholders, be they employees, shareholders, customers, suppliers, the media, regulators, neighbours or the public at large.

We believe in a broad stakeholder focus. We have identified a whole range of stakeholders, as shown in the diagram on page 18. Many of them are not new to us. For example, we have been in dialogue with non-governmental organisations (NGOs) on a regular basis for more than ten years. Engaging with stakeholders over the years has given us a major input to our strategy for sustainable development. However, we need to ask ourselves which stakeholders are not adequately consulted in our governance structures.

THE IMPLICATIONS

The main elements of our governance of the triple bottom line are:
• Organisational structures
• Target setting, reporting and reviewing
• Stakeholder engagement

The diagram above gives an overview of how topics become integrated into our governance structures and how we learn as a company. For example, the environment is now well integrated into our decision-making processes. An example is our Corporate Committee on Environment and Bioethics, described on the opposite page, which was formed eight years ago for dealing with issues and policies within these two fields. Our first environmental department was started 25 years ago.

In contrast, on an issue such as human rights, we are still at an early stage in learning about its practical relevance to running our businesses.

New issues are also being brought to our attention by stakeholders, and these issues should also be incorporated in our learning processes. Therefore we will need to extend elements of governance to key areas of our activities that are not already covered or are not adequately covered.

Around the end of 2000 our corporate structure will change with the formation of the separately listed businesses. A major part of our work with governance during 1999 has been looking at our future requirements in relation to the triple bottom line, to which the separate listed businesses will be committed. On the opposite page, we outline the primary governance mechanisms that are in place at Novo Nordisk today.

TARGET 2000
• Develop a strategy for our future reporting activities in order to establish an integrated accounting and reporting framework for 2001.
OUR CORE VALUES AND GOVERNANCE STRUCTURES

Novo Nordisk's business and values are based on 'The Novo Nordisk Way of Management'. This builds on what we might call our 'constitution' – our Vision21, Fundamentals, Corporate Policies and Quality Manual. Our core values, which define who we are and how we operate, are contained within this framework, and we consider them essential to the long-term success of our businesses. Furthermore, our values ultimately form the 'cement' that binds the Group together.

'The Novo Nordisk Way of Management' reflects the strategic thinking of Novo Nordisk. Achieving the highest standards, reaching challenging goals and experiencing quality achievements are characteristic of our approach and essential to our continued progress. Our management approach is also based on 'The Novo Nordisk Way of Management'.

VISION21 AND FUNDAMENTALS

Vision21 sets out our purpose, mission and core values. Quite simply, our business is "to discover and market products that satisfy real needs, improving the way people live and work". Our core values are to be accountable, ambitious, open and honest, engaged with stakeholders, ready for change and a responsible neighbour.

Our ten 'Fundamentals' serve as the ground rules for all management and they apply at all levels within Novo Nordisk. The Fundamentals make reference to the 13 Novo Nordisk policies.

We deploy a team of 'facilitators' to assist with ensuring that the Fundamentals and our policies are applied throughout the businesses. They provide support for Novo Nordisk units and staff in reaching this essential goal.

The facilitator team is made up of 13 highly experienced directors with diverse backgrounds, covering all geographical areas and relevant business areas of our operations.

BOARD OF DIRECTORS

This is the body where the ultimate responsibility lies for the overall management of Novo Nordisk. The Board has significant legal responsibilities, and consists of seven directors appointed by the shareholders, four employee representatives, appointed by Novo Nordisk's staff, and finally, the president and CEO.

CORPORATE MANAGEMENT

This is Novo Nordisk's overall executive body which is made up of corporate executive vice presidents who are responsible for the businesses, corporate staffs and services. It is chaired by the president and chief executive officer of the company and is the executive decision-making body in the organisation with regard to corporate strategy and policy. Corporate Management delegates responsibility for social, environmental and bioethical affairs to the various corporate committees.

CORPORATE COMMITTEE ON ENVIRONMENT AND BIOETHICS

This is the company's highest authority dealing with environmental and bioethical affairs and it is responsible for Novo Nordisk's overall policies, requirements and strategies in these areas. Reporting to it are the Novo Nordisk International Environmental Network composed of managers with environmental responsibility from the major sites worldwide, the Health Care Environment and Bioethics Group, and the Enzyme Business Environment and Bioethics Group.

EMPLOYEES' COMMITTEE

The Novo Nordisk Human Resources (HR) Policy is made operational at the local level through the Employers' Committee, and in Denmark it is responsible for Novo Nordisk's policies, requirements and strategies in the HR area. HR policies and procedures are discussed and decided upon by the Employers' Committee in close consultation with local unions at Novo Nordisk.

THE HEALTH AND SAFETY COMMITTEE

In Denmark it is mandatory to have a health and safety committee with both employee and management representatives. It is the responsibility of the committee to plan, manage and coordinate the occupational health and safety work in Novo Nordisk in Denmark. The committee takes decisions regarding health and safety in general, policies and standards, projects, activities and targets.

At all our sites in the rest of the world, the health and safety work is organised according to local regulations.

CONSISTENT WORLDWIDE PRINCIPLES

In addition to the above, the individual affiliates and production sites around the world have local committees and management systems. These ensure that Novo Nordisk carries out its local operations not only in compliance with local regulations and requirements but also consistent with the overall framework laid down in the company's own values and requirements. Our aim is to achieve consistent principles of operation wherever we do business.

INTERNET

- 'The Novo Nordisk Way of Management, including the Fundamentals and a list of global policies.'
BIOTECHNOLOGY AND SUSTAINABLE DEVELOPMENT

The introduction of any new technology is likely to be controversial but there has been particular concern about genetic engineering. Many people, especially in Europe, are concerned about the way these new technologies are being applied — the ethical and socio-economic aspects and the effect that genetically modified organisms (GMOs) may have on the environment in the longer term. Many people are also asking who benefits and who carries the real — and perceived — risks of the application of genetic engineering. Undoubtedly the issues arising from the many different applications of genetic engineering need to be more openly and effectively addressed.

At Novo Nordisk, we believe that our applications of fermentation technology and genetic engineering make a positive contribution towards a more sustainable future and we welcome the chance to participate in the debate.

It is now widely recognised that, as a society, we have to use natural resources more efficiently. We have to reduce wastes to a minimum to avoid pollution and, in essence, we have to do ‘more with less’. As businesses we need to improve all aspects of our performance continuously so that we can provide the products and services that best meet the needs of our customers — and other stakeholders — in every respect. If we add value for our customers, we will create value for ourselves. However, economics and environmental responsibility on their own will not be enough in the future — ‘sustainability’ is the new challenge facing business.

Today, sustainable development is often defined in terms of a ‘triple bottom line’, focusing on economic prosperity, environmental quality and social responsibility. This is a complex equation and as a business we are trying to explore the real implications.

WHAT ARE THE BENEFITS?

Our purpose is to develop and produce products that satisfy real needs, not only for our individual customers but also for society at large. Many of our enzymes, for example, directly improve the environmental performance of industrial and household processes, and likewise our pharmaceutical products directly improve the quality of life for people with diabetes and other medical problems.

Our core technology is microbial fermentation, which enables us to produce useful proteins. We use mainly agricultural raw materials to grow harmless and carefully selected microorganisms under ‘contained use’ in fermenters, and then we extract and purify the proteins we want from the broth. Our main products are biologically active proteins — a wide variety of enzymes for industrial use and various types of insulin for the treatment of diabetes, other hormones and blood-clotting factors for the treatment of haemophilia.

We apply the techniques of genetic engineering to help us increase the yields of the proteins we want and to enable us to produce these proteins in suitable fermentation organisms. Genetic engineering is an enabling technology for us. It allows us to make many enzymes and pharmaceutical products commercially available.

Without genetic engineering it would be difficult, if not impossible, to provide a sufficient and stable supply of high quality insulin to the global market. The traditional method is to extract insulin from the pancreas of pigs and cows. If we did not apply genetic engineering, we would not be able to produce many of our pharmaceutical products in sufficient quantity — and we would instead need a very large supply of animal glands to produce them. Using genetically modified microorganisms to produce our pharmaceutical proteins also avoids the risks of transmitting animal diseases to humans.

Likewise for the production of enzymes, we would be dependent on wild-type microorganisms with very low production yields, demanding increased amounts of raw materials, water and energy in production. In many cases, this would prevent the enzymes from being commercially feasible. For example, it would never have been commercially viable to produce phytases, which reduce the impact of animal excrement on the environment and enable the animals to make better use of the nutrients in their feedstuffs.

Novo Nordisk’s products do not contain any GMOs, as these are separated from the final products in the recovery process. The biomass wastes we produce, like the proteins themselves, are totally biodegradable. The treated, non-viable, spent biomass is rich in minerals and other nutrients and can be used productively as a fertiliser on agricultural land or forested land.

On pages 50-51, in the bioethics section of this report, we address some of the main issues of the gene debate in relation to Novo Nordisk’s activities.

THE RIGHT TO KNOW

Much of the controversy surrounding the use of genetic engineering in relation to food processing and agriculture concerns the right to know. People want to know how and when the technology has been applied. Consumers want to be able to make informed choices.

At Novo Nordisk, we have a policy of stating openly which of our products are made by the fermentation of GMOs. This allows food manufacturers and others to label their products accordingly.
ASSESSING PRODUCT BENEFITS

One of Novo Nordisk’s stated aims is to improve the way people live and work. This is reflected in our range of products – from industrial enzymes to pharmaceuticals.

Many of our enzymes offer significant environmental benefits since they can often be used as an alternative to harsh chemicals that are harmful to the environment.

We acknowledge, however, that environmental benefits alone will not be a sufficient incentive for customers to substitute traditional chemicals with enzymes. Enzymes also need to be as cost-effective as the chemicals they replace and this is usually the case (see the example on page 47). However, in the future we will need to document product performance in an integrated way, accounting for potential savings in terms of raw materials, energy, water, etc.

PARTNERSHIPS FOR THE BENEFIT OF SOCIETY

Whereas benefits from industrial enzymes are often related to improved environmental performance, our pharmaceutical products provide significant social benefits – for patients in terms of an improved quality of life, and for society in terms of more cost-effective treatment options.

Through improved control of blood sugar, our insulin products reduce long-term complications of diabetes such as eye or heart diseases. This was recently documented in the landmark United Kingdom Prospective Diabetes Study (UKPDS) published at the beginning of 1999.

Alarmingly, due to its explosive growth, diabetes is becoming a substantial challenge to societies all over the world. We have realised that it will require a joint effort to address the need for education of those at risk of contracting diabetes and to treat those who already have the disease. Novo Nordisk is a driving force behind a range of partnerships aimed at preventing diabetes or improving treatment. The latest example is the Oxford Centre for Diabetes, Endocrinology and Metabolism in the UK, established at the beginning of 1999 as a joint venture between Oxford University, the National Health Service in the UK and Novo Nordisk.

We are convinced that this type of partnership and close dialogue with key stakeholder groups will be a prerequisite for ensuring that the full social and environmental potential of our products is realised. In the social section on pages 17-33, we describe some of the collaborative initiatives Novo Nordisk has taken to establish such a dialogue with customers and other stakeholders.

In the environmental field, the issue of accountability is central to the biotechnology debate. Biotechnology will have to prove its role in sustainable development by delivering products that meet society’s needs.

THE BIOLOGICAL LOOP

Our basic production, involving fermentation and recovery processes, consumes large amounts of water, energy and raw materials. The main raw materials we use in our fermentation processes come from renewable sources and include nutrient salts and agricultural products such as soya beans, sugar and potato starch.

Through continuous optimisation of our production processes and recycling, we work to develop new ways of reducing our consumption of energy, water and raw materials. The environmental section on pages 35-47 of this report contains a summary of how we have performed over the past years in terms of our consumption of raw materials, energy and water.

Novo Nordisk’s production generates significant amounts of waste of which by far the largest part consists of organic material – biomass – and process water. Since the biomass waste contains high levels of nutrients, farmers around Novo Nordisk’s production facilities benefit from the recycling of the waste as fertiliser. Page 42 of the environmental report contains a more detailed description of Novo Nordisk’s production process while the environmental bioethics section on pages 50-51 describes issues related to the disposal of our biomass waste from the fermentation process.
CASE STUDY ON NOVO NORDISK’S LARGEST PRODUCTION SITE
TRIPLE SPOTLIGHT ON KALUNDBORG

What is the impact of a Novo Nordisk site on the community seen from a social, environmental and economic point of view? Do we live up to our own goals and the communities’ expectations, and what are the issues and dilemmas facing us when working towards sustainable development in all our activities? These are issues we want to map, and this pilot study is our first attempt.

Kalundborg is our largest production site in the world and forms the basis for this pilot study. Our aim is to use the experience gained from this study to begin to develop measures to record the socio-economic, social and environmental impact of our other sites in relation to their local communities. We have applied a stakeholder-based approach in so far as we have asked selected local representatives from our stakeholders to define the issues and dilemmas they consider to be most important.

In addition we have performed an analysis of the economic impact of our activities on the local community and an equal opportunities study to identify possible discrepancies between Novo Nordisk policies and real-life experience.

Kalundborg is a provincial town situated on the west coast of Zealand, approximately 100 km from Copenhagen. With around 19,500 inhabitants and an area of 12,404 hectares (approximately 30,600 acres), it is one of the largest towns in the region. The biggest employers in Kalundborg are industrial – notably process industry – and the public and private service sectors.

With its location in a rural area and being the main centre for the region, Kalundborg has been prone to the negative impacts of fluctuations in the employment situation. If local employment opportunities are reduced, the redundant workforce has limited alternatives in the region and will have to rely on unemployment benefits or accept long-distance commuting.

During our study, a strong desire was expressed by the local authorities for the local enterprises to become active ‘citizens’ and participate in the day-to-day life of the community. Kalundborg’s industrial enterprises are much more than just employers: they are the livelihood of the community.

It is Novo Nordisk’s policy to be a good corporate citizen and play an active role in the local community. While there seems to be a general acknowledgement among external stakeholders that the company indeed acts openly when it comes to explaining its activities, it is equally clear that there is a strong desire for Novo Nordisk to play a much more proactive role in the daily life of the community. "Novo Nordisk is too ‘invisible’ in the local community. You should engage more actively in the town’s cultural and social life," says Søren Jensen, a local Agenda 21 coordinator.

THE FACTORY AND THE COMMUNITY

The factory in Kalundborg was established in 1969 and today ranks as Novo Nordisk’s biggest production site both in terms of volume and workforce. A detailed site report is given on page 56 of this report.
CIRCULATION OF MONEY IN THE LOCAL COMMUNITY
This figure illustrates how activities at Novo Nordisk influence the circulation of money in Kalundborg. The company pays its employees (households) and it pays taxes. The households, in turn, spend money on consumption and taxes, and the local authorities spend money on social contributions and other public spending.

The close ties between the local enterprises and the municipality are exemplified in the Kalundborg industrial symbiosis project, in which several companies and the local municipality have joined forces to use each other’s waste products, water and surplus energy. This innovative project has attracted much interest internationally (see page 13 for more information).

A LARGE CORPORATE CITIZEN
The presence of a big employer such as Novo Nordisk is of great importance to a small community like Kalundborg. For example, it influences the employment structure as 60% of the factory’s 1,657 employees reside here. In fact, Novo Nordisk employs one in ten of the working population of the Municipality of Kalundborg, and is thereby the community’s largest private employer.

Obviously this dominant position implies a strong contribution to the local economy. The total gross salaries paid to the households by Novo Nordisk amount to 10% of the total income in the community. The municipality’s budget also benefits from the tax revenues generated by the activities at Novo Nordisk.

For 1999 the estimated company tax to be paid by Novo Nordisk to the municipality amounts to DKK 26 million. In addition, the contribution of income tax of Novo Nordisk employees to the municipality is valued at DKK 58 million, which amounts to 6% of the municipality’s total tax revenues. On the other hand, Novo Nordisk received around DKK 3.5 million in 1999 as reimbursements for wage costs to employees on maternity leave and during periods of sickness.

Since its establishment, the plant has been constantly expanding, which is regarded as positive by the Kalundborg community as the expansion is followed by increases in the workforce. A number of stakeholders noted, however, that there may be an upper size limit that the company should not exceed in order to be able to handle the feared scenario of a complete or even partial shutdown.

Furthermore, problems with groundwater supply in the area have caused some people to voice concern that Novo Nordisk must not grow too big. “Since clean groundwater of drinking water quality is a scarce resource, it is understandable that both authorities and the general public view the biggest consumer with a certain amount of anxiety,” says Holger Prehnun, director, Technical Department, Kalundborg Municipality.

Most supplies for the Kalundborg plant are purchased from main national suppliers at prices which local suppliers most often cannot match. However, the company contributes to the local economy when doing business directly or indirectly with local suppliers.
AGENDA 21

Like many other municipalities, Kalundborg has an Agenda 21 organisation. This group stems from the worldwide Agenda 21 initiative for sustainable development adopted at the Earth Summit in Rio de Janeiro in 1992. The Kalundborg Agenda 21 initiative was established in 1997 and is coordinated by and receives economic support from the municipality.

From the outset it has been the goal of the local Agenda 21 group to set realistic goals and to handle issues with broad appeal that require limited resources. Examples of this are water-saving projects in schools and day nurseries, and a project to plant a new tree for every baby born in Kalundborg. The long term goal, however, is to gradually increase the scope and to involve the local industry in the work.

In spite of the general acknowledgement of Novo Nordisk’s openness about its activities, statements suggest that there is always room for improvement when it comes to information about certain sensitive issues. This is particularly true for the company’s use of genetic engineering and the possible presence of genes coding for antibiotic resistance in the biomass, which is used as fertiliser.

“The company says that the biomass does not constitute a risk to the environment or to humans while others - including some experts - argue that it may be dangerous for the environment. Furthermore, as a principle we oppose the transportation of waste from one place to another,” says a member of the local Agenda 21 group, referring to the fact that biomass and waste water from Novo Nordisk's Copenhagen plant is brought to Kalundborg for treatment at the company's own treatment plant. (For the company view on the recycling of biomass, see page 50.)

EMPLOYMENT ISSUES

According to an employee survey (see pages 22-23), Novo Nordisk employees at the Kalundborg site are generally satisfied with their workplace and act as good ambassadors who are proud of what they do.

The good working conditions and the fact that Novo Nordisk pays better than many other local employers makes it easy to attract hourly-paid labour. In fact some local companies have blamed Novo Nordisk for pushing up the price of labour and for ‘stealing’ workers by offering remuneration and other benefits with which they cannot compete.

On the other hand it can be difficult to attract and retain engineers and other graduates. This is a general problem for the region because it is considered to be “far away from everything”. In addition, production work is perceived as being less prestigious than research work for many qualified scientists and engineers. The Novo Nordisk factory in Kalundborg is solely a production site with no research activities.

In relation to hourly-paid employees some concerns about job security were mentioned. “In daily life the employees feel safe about their jobs, but top-down decisions create insecurity. In particular, some of the elderly employees have started to wonder whether they are sufficiently skilled or if there is a risk that they will lose their jobs,” says Arne Hansen, shop steward for the hourly-paid employees.

RESULTS FROM THE EMPLOYEE SURVEY, KALUNDBOG

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am proud to tell people I work for Novo Nordisk</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I think the social and environmental performance of Novo Nordisk is as important as its financial performance</td>
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<td></td>
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<tr>
<td>I believe my health and safety is taken seriously by Novo Nordisk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel secure in my job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My company takes active steps to make its business more environmentally responsible</td>
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</table>

Other issues that have led to internal debate have been the creation of self-managing teams, an industrial operator course, and the implementation in Health Care of reading and arithmetic skill tests.

With the purpose of establishing a pool of temporary staff during peak situations, Novo Nordisk Kalundborg offers, together with the local employment office, a 14 to 30 weeks training course including four weeks at Novo Nordisk. As well as giving the company access to new, well-qualified and flexible employees, this initiative is also seen as a positive contribution towards the unemployed in the community. “So far three courses have been completed, resulting in permanent employment of two-thirds of the participants,” states Henrik Risedahl, director, Diabetes Pharmaceutical.

An equal opportunities study performed by an external consultant reveals a number of issues that could be considered with regard to the company becoming a truly equal opportunity employer. One example is the demand for certain educational qualifications in the case of hourly-paid jobs and another example is how job vacancies are not always advertised externally.
“It has been suggested that Novo Nordisk could do more to provide special jobs for people who cannot fulfil the demands of an ordinary job. However, the company does provide these jobs for its own employees,” says Alice Faber, director, Social and Health Department, Kalundborg Municipality.

COOPERATION WITH LOCAL AUTHORITIES
Novo Nordisk’s consumption of water, heating and other services and the approvals needed to run the operations at the facility are handled by both municipal, county and government authorities.

The fact that responsibility is divided between local and regional authorities constitutes a potential risk of creating bureaucracy. While this has previously been a problem, according to Kurt Haag, a municipal representative, this is not the case today, partly because of a good working relationship between county and municipal authorities, and partly because of Novo Nordisk’s responsible way of handling environmental issues.

Novo Nordisk wishes to collaborate with authorities and others with an interest in reducing the environmental impact of the company’s activities. According to Kurt Haag, this collaboration is characterised by trust and constructive dialogue.

A number of issues are handled in close collaboration between the parties. These include the reduction of water consumption, the elimination of nitrogen from the waste water and the continued attempts to reduce the odour nuisance from the stacks of the fermentation and enzyme granulation plants.

It is generally acknowledged that Novo Nordisk is willing to go further than statutory requirements. Nevertheless, there is still a strong wish for the company to find a solution to the odour problem, which is most often quoted as the biggest nuisance.

We believe the input received during this study will provide a good basis for our continuing dialogue with our stakeholders in Kalundborg.

DIALOGUE

Thomas Nagy, director, site manager
Tel. (+45) 4643 5270, e-mail: thn@novonordisk.dk

INDUSTRIAL SYMBIOSIS
Kalundborg is the site of an industrial symbiosis project that has won several awards and attracted visitors from all over the world. Local industry and the local authority have been working together for the past 25 years to make effective use of each other’s waste products including water and energy.

The industrial symbiosis consists of a cooperation between several of the largest industrial enterprises on the site and the municipality of Kalundborg. The companies involved are the Asnaes Power Station, the plasterboard manufacturer Gyproc A/S, Novo Nordisk A/S, the soil remediation company A/S Bioteknik Jordrenes and the Statoil Refinery A/S.

The use of waste materials as raw materials is, in itself, not a new idea. What is unique about this project is that the partners have a deliberate policy of cooperation, actively seeking out opportunities to use each other’s waste products. Reuse of water is one example, and this is particularly significant for the Kalundborg district with its limited groundwater resources. Other examples include surplus heat from the Asnaes Power Station being used in the municipality’s district heating network, surplus gas from the Statoil Refinery being used by Gyproc, and yeast slurry and biomass from Novo Nordisk being used by local farmers. With the exception of biomass from Novo Nordisk, which is given away free of charge, all the waste streams at Kalundborg are traded on sound commercial principles. All deals are negotiated independently with the emphasis on mutual economic benefit.

As well as the financial benefits, the industrial symbiosis project improves the environment by reducing resource consumption, waste and air emissions.

Visit the internet website www.symbiosis.dk for more information.
# Summary of International Targets

The setting of targets and following up on the progress made is a key part of our reporting. Here is a complete list of existing international targets plus new targets. Note that targets set in the Social Report 1998 that relate to local units or specific countries are not included here. However, a follow-up on these local targets is available in the Internet version of this report.

<table>
<thead>
<tr>
<th>TARGETS</th>
<th>Page</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sustainable Development</strong></td>
<td></td>
<td></td>
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<tr>
<td>1999 Conduct a workshop on triple bottom line reporting with key stakeholders.</td>
<td>26</td>
<td></td>
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<tr>
<td>1999-2001 Explore our impact on key stakeholders through a systematic dialogue.</td>
<td>18</td>
<td></td>
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<tr>
<td>1999-2001 Investigate the relation between our triple bottom lines: the financial, the social and the environmental.</td>
<td>10-13</td>
<td></td>
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<tr>
<td>2000 Develop a strategy for our future reporting activities in order to establish an integrated accounting and reporting framework for 2001.</td>
<td>5-6 New</td>
<td></td>
</tr>
<tr>
<td>2000 Identify a minimal set of key performance indicators for rivals reporting.</td>
<td>17-19, 66-68</td>
<td></td>
</tr>
<tr>
<td><strong>Overall Social Responsibility</strong></td>
<td></td>
<td></td>
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<tr>
<td>1999-2001 Expand the international coverage of social performance by reporting on Novo Nordisk’s activities in countries beyond those covered in the 1998 cycle.</td>
<td>30-33</td>
<td></td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td></td>
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<tr>
<td>2000 Employee survey: The business to follow up on the survey and initiate necessary actions.</td>
<td>22-23 New</td>
<td></td>
</tr>
<tr>
<td>2001 Employee survey: Next employee survey to be carried out by the future companies in the Novo Group.</td>
<td>22-23 New</td>
<td></td>
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<tr>
<td><strong>Health &amp; Safety</strong></td>
<td></td>
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<tr>
<td>2000 Develop tools for setting health and safety targets at international top management level and common guidelines for reporting.</td>
<td>WWWW</td>
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<tr>
<td>2000 Draw up global allergy monitoring programmes, which are all based on the same principles for screening and medical evaluation.¹</td>
<td>WWWW</td>
<td></td>
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<tr>
<td>2000-2001 Review health and safety data collection outside Denmark and explore an appropriate set of global indicators.</td>
<td>24-25 New</td>
<td></td>
</tr>
<tr>
<td><strong>Human Rights</strong></td>
<td></td>
<td></td>
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<tr>
<td>1999 Define the issues and scope of a human rights strategy.</td>
<td>26-27</td>
<td></td>
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<tr>
<td>1999 Define a model for stakeholder dialogue and involvement.</td>
<td>26-27</td>
<td></td>
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<tr>
<td>2000-2001 Finalise the review of human rights initiated in 1999 and integrate key principles into the policies of the future companies in the Novo Group.</td>
<td>26-27 New</td>
<td></td>
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<tr>
<td><strong>Suppliers</strong></td>
<td></td>
<td></td>
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<tr>
<td>2000 Explore the prospects of introducing social considerations into supplier and contractor relationships.</td>
<td>28 New</td>
<td></td>
</tr>
<tr>
<td><strong>Environmental Management</strong></td>
<td></td>
<td></td>
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<tr>
<td>1997-99 Develop and define financial accounting systems for our environmental performance and extend them to encompass the entire Novo Nordisk Group.</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>1998-2000 Continue to assess the environmental impact of our products and processes.</td>
<td>47</td>
<td></td>
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<tr>
<td>1998-2002 Integrate environmental issues into our management systems, including auditing of environmental issues.</td>
<td>35+38</td>
<td></td>
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<tr>
<td>1999-2000 Further develop our site and corporate EPDs to include the finishing stage of production.</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td><strong>Environmental Performance</strong></td>
<td></td>
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<tr>
<td>1998-99 Start evaluating and introducing methods for calculation of fuel consumption and emissions from transport by air, rail and sea.</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>1998-99 All our plants worldwide are to adopt methods for evaluating the fuel consumption and emissions from road transport used for export and import.</td>
<td>46</td>
<td></td>
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<tr>
<td>1999 Increase the basic production eco-productivity (EP₉₀) for energy by 4 percentage points.</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>1999 Increase the basic production eco-productivity (EP₉₀) for water by 5 percentage points.</td>
<td>40</td>
<td></td>
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<tr>
<td>1999 No repeated breaches of regulatory limit values in 1999.</td>
<td>36</td>
<td></td>
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<tr>
<td>1999 No accidental releases of genetically modified microorganisms in 1999.</td>
<td>36</td>
<td></td>
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<tr>
<td>1999-2000 Improve the methods for reporting transport emissions and use the results to reduce the environmental impact in cooperation with our transport suppliers.</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>2000 Increase the eco-productivity for energy by 4 percentage points.</td>
<td>46 New</td>
<td></td>
</tr>
<tr>
<td>2000 Increase the eco-productivity for water by 5 percentage points.</td>
<td>46 New</td>
<td></td>
</tr>
<tr>
<td><strong>Bioethics</strong></td>
<td></td>
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<tr>
<td>1999-2000 Develop procedures for monitoring the implementation of our corporate requirements for the use of and access to genetic resources.</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>1999 All relevant patent applications and publications submitted in 1999 and onwards will state the country of origin of genetic material covered by the Convention on Biological Diversity.</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>2000 Further develop our ethical code of conduct in relation to the care and use of animals for experimental purposes.</td>
<td>53 New</td>
<td></td>
</tr>
<tr>
<td>2000 Continue working towards the removal and/or replacement of animal tests for the appropriate product approval and control.</td>
<td>53 New</td>
<td></td>
</tr>
<tr>
<td>2000 Implement the modifications of the yeast cream process in full-scale insulin production to ensure optimal degradation of the ampicillin resistance genes.</td>
<td>51 New</td>
<td></td>
</tr>
<tr>
<td>2000 Expand the field monitoring of microbial flora in fields treated with the fertiliser NovoGro.²</td>
<td>51 New</td>
<td></td>
</tr>
<tr>
<td>2000 Further develop our ethical code of conduct for the use of human cells and tissues in drug discovery and development.</td>
<td>51 New</td>
<td></td>
</tr>
<tr>
<td>2000 Establish an internal ethical code of conduct as regards gene therapy.</td>
<td>51 New</td>
<td></td>
</tr>
</tbody>
</table>

¹ Health Care target only
² Enzyme Business target only

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14 **Sustainable Development Report**

NOVO NORDISK
INDEPENDENT REVIEW STATEMENTS

As last year, we have adopted a dual approach to quality assurance. At one level, we have commissioned a formal external verification that focuses on the accuracy of the quantitative data. This was undertaken by Deloitte & Touche. On another level, we have commissioned a broader overview that seeks to provide stakeholders with some assurance of the relevance and completeness of the report and its underlying accounting process. This was undertaken by Simon Zadek with the assistance of a panel of experts. His statement below is shortened but the full statement is available in the Internet version of this report.

REVIEW STATEMENT

This Statement provides a perspective on the quality of the published information and the underlying accounting across the company’s social and environmental performance, including bioethics and health and safety. It takes account of the growing body of ‘good practice’ benchmarks, including the Global Reporting Initiative, AA1000, SA8000, the ICC Charter on Sustainable Development, and ISO 14000. The Review has benefited from the views of a panel of experts. The approach to the Review is detailed in the more extensive web-based Statement.

Novo Nordisk’s accounting process has advanced significantly over previous years and compared to emerging standards. Stakeholder dialogue has increased in scope and quality, especially the employee survey and site-level dialogues. On the environmental side, ISO 14000 certification has been further extended, and the ICC Charter benchmarking is well underway. The global environmental performance, the Calbourn site assessment, marks a significant methodological advance in embedding the process at the business unit level, particularly the introduction of economic social and environmental performance measures. Indicators and targets that have been further strengthened in several areas and the continuous improvement cycle clearly demonstrated.

Novo Nordisk has been a leader in reporting on environmental and more recently bioethics performance. Social reporting was initiated first in 1999. The company is this year addressing the challenge of integrated reporting as advocated by the Global Reporting Initiative by covering these aspects in a single report. The value of this is already apparent in integrating this dialogue and dilemmas that span the different dimensions of sustainable development.

The report on governance marks a further innovation in opening for inspection the company’s strategic approach to sustainable development. The inclusion of site-level reports points the way towards vertical business units to corporate level integration of reporting. Substantive performance in key areas has been closely identified. There is a high level of employee satisfaction both in Denmark and internationally, despite layoffs over the period. There has been a dramatic improvement in health and safety performance, particularly in the engines business. Human rights issues have been explored with a view to integrating them into future policies and practice. Social issues in supply chains have been acknowledged with a view to establishing criteria for future supplier selection. Further reductions have been achieved in the use of animals in R&D, and the company has demonstrated its willingness to engage in dialogue on difficult bioethical issues. Integral attention has been devoted to designing a corporate governance model that will seek to sustain and further develop the company’s practical commitment to sustainable development.

The first integrated report reflects the company’s stated policies and values, and their interpretation in practice. The underlying process has embraced the principles of AA1000, with advances achieved in deepening stakeholder dialogue. Its broad scope meets and in some areas exceeds best practice, particularly in terms of site-level economic, and bioethics. Key areas not covered by the cycle have in the main been incorporated into publicly stated commitments. This report will be a contribution in the future development of the GRI Guidelines.

Novo Nordisk affects the lives of millions of people, the environment and other species. Single report can therefore cover all issues in full depth, particularly as many are quickly developing. The company may wish to measure and report on progress in the following areas that bear on the organisational capacity to handle and substantiate aspects of (6-7) sustainable development issues. In some instances, the company has already made specific commitments that are set out in the report.

1. The impact on and environmental performance of future changes in corporate governance arrangements.
2. Embedding social and environmental policies into site, department, and personal assessments, targets and incentives.
3. Development of strategy and practice of knowledge development and management as it bears on social and environmental performance.
4. Emerging issue of access to health care" as it bears on company policies and practices.
5. Further exploration of how best to specify the company’s broader economic performance.
6. An extension of business unit and site level "three bottom line accounting and reporting.
7. Policy and practice with regard to social criteria in procurement to meet best practice in managing global supply chains.

Simon Zadek
London, 8 March 2000

STATEMENT FROM DELOITTE & TOUCHE

We have performed certain control procedures on the Novo Nordisk Environmental and Social Report 1999 (the ‘Report’). The Report is the responsibility of and has been approved by the management of the Company. The purpose of the Report, its identification intended users, scope and aspects reported on, have been decided by Company management and are described on page 1.

The Report has been prepared on the basis described on page 1.

The scope of our work and the procedures that we performed, which were agreed with the Company’s management, were as stated below. Our work has been performed according to Professional Standards applied to State Authorised Public Accountants in Denmark. We visited the Company’s corporate office and the sites in Kalundborg and Bagsvaerd. Our procedures included interviews with corporate environmental and social management and those employees at the two sites who have been responsible for compiling data for the Report, as well as analytical procedures and testing samples of supporting documentation.

- We ascertained whether the data collection procedures, as described on page 1, were used at corporate level (Environmental Affairs and Social Affairs) to collect figures from reporting units.
- We studied the Report and compared the figures reported for 1998 and 1999 with the aggregated figures that were accumulated as a result of the procedures noted above. We have assessed whether the figures reported for 1998 and 1999 are appropriately reflected in the Report.
- We reviewed the internal control procedures established on a corporate level to verify figures submitted from reporting units for inclusion in the Report. On a test basis, we compared the 1999 figures reported from a sample of four reporting units (Kalundborg, Bagsvaerd, Frankfurt and Clayton) to the source documentation supporting the submitted figures.

- We compared the figures in the Report on environmentally related investments and costs to the source documentation presented to us and assessed whether these figures are appropriately presented in the Report.

The foregoing procedures do not constitute an audit. The scope of work and the procedures performed preclude us from providing an opinion as to whether all figures in the Report are complete and accurate.

Based upon the procedures performed it is our opinion that the Company has applied detailed data collection procedures for the purpose of collecting figures from the reporting units for inclusion in the Report; and that the figures reported for 1998 and 1999, according to these data collection procedures, are appropriately reflected in the Report. Further, we find that the company has made reasonable endeavours at corporate level to verify the figures collected from reporting units for the Report; and for the four reporting units identified above submitted figures are consistent with the source documentation presented to us. In addition, the figures on environmentally related investments and costs are consistent with the source documentation presented to us and appropriately presented.

Copenhagen, 13 March 2000

DELOITTE & TOUCHE, State Authorised Public Accountants

Freden S. Sorensen
State Authorised Public Accountant (Denmark), Global Environmental Services
Meeting face-to-face with stakeholders helps us to understand the issues that matter.
Let's Talk!

Engaged with Stakeholders

We shall seek an active dialogue with our stakeholders to help us develop and strengthen our businesses.

From the Charter for companies in the Novo Group

There's only one way to narrow the distance between a company and its stakeholders. That is to get together and talk.

At Novo Nordisk, we take our relationships with our stakeholders very seriously. Although we have been producing annual environment and bioethics reports and have been involved in proactive stakeholder dialogue for years, Novo Nordisk is very much a newcomer to the field of social accounting and reporting. However, we have recognised for some time that if we are to continue to be successful in the future, we will have to continue to address the needs of our stakeholders and both be aware of, and respect, the values of society. Stakeholder engagement is a key part of our approach.

In this section, we outline the formal structures in place for ensuring a systematic dialogue with employees. During 1999, we undertook an extensive employee survey in which we examined what our values mean in practice to our employees and how they see the company. We also report on the progress we have made on employee health and safety and the fact that we had to make some lay-offs during 1999.

As part of our ongoing work on social responsibility, we are beginning to report on how we approach other important stakeholder groups – our customers and suppliers – from an overall strategic perspective.

As you can also read in this section, we illustrate how we put our strategies into practice with regard to employees and customers in two very different countries – India and France. These countries have been chosen because they represent the developed and developing world. In addition, both countries are included in the employee survey, which adds further validity to the cases. As both cases show, education and social marketing are important activities for Novo Nordisk’s Health Care business, where we try to help our customers – health care professionals and people with diabetes – understand and actively manage the disease and improve the quality of life.

During 1999 we made considerable progress in understanding human rights and what this area means for Novo Nordisk. We have engaged external consultants to perform an analysis of our position and help us define an appropriate strategy for this area, including dialogue with stakeholder groups.

During the coming year we will begin to develop further our stakeholder model for social accounting and reporting. We will keep on talking to stakeholders...and listening, of course.
STAKEHOLDERS AND SOCIAL REPORTING

Our 1998 Social Report was the first step in reporting more systematically on the social dimension of sustainable development at Novo Nordisk. We define this simply as our impact on people. We focused on our employees and we made a commitment to both broaden and deepen our social accounting and reporting in the coming years. In 1999 we have made a start in this direction. We reflect here on the challenges of developing a relevant and reliable set of social indicators.

One of the key drivers for Novo Nordisk’s reporting activities has come from our engagement with the company’s many stakeholders. The diagram below shows the stakeholders who influence and are influenced by Novo Nordisk. In the traditional view, there were only two stakeholders: investors and customers. Investors expected a return on their money and customers were the lifeblood of the company. As mentioned on page 6, the modern view is to have a broad stakeholder focus and to recognize a wider range of corporate responsibilities. Today, we recognize that our global reach carries global responsibilities. In future, companies will have to recognize that business and society are not separate, but mutually dependent. We are striving to understand what our future role should be in the global community.

Stakeholders can help us in this process and we acknowledge that a large number of groups have a legitimate interest in our business. The challenge is how to take on board the views and aspirations of all these groups. In the past, the main focus of our stakeholder dialogue has been on environmental and bioethical issues, but we are broadening the discussion to cover social issues as well.

We distinguish between stakeholder dialogue and stakeholder engagement. Engagement is a deeper relationship where we develop our thinking and practices in conjunction with key stakeholders. Examples of this are given later in this section where we describe relations with suppliers and customers.

SOCIAL INDICATORS – AN EMERGING TOOL

It is important to be able to quantify social performance but this is a very complex task. The Global Reporting Initiative (GRI) gives clear guidelines on environmental indicators but there is little guidance so far on social indicators. Novo Nordisk is participating actively in the GRI and we hope to see the further development of social indicators.

Our original ambition in 1999 was to report from all production sites on a broad set of indicators. We also hoped to be able to give local benchmarks, which provide an important frame of reference.

However, it became clear that the collection of data needs to be standardised. Take training as an example. We wanted to calculate the average amount spent per employee per year on training. However, due to the way the questionnaire was structured, some sites included on-the-job training and internal courses while others did not. Some included the cost of course material while others did not. The exact number of employees was also calculated in different ways. This made meaningful comparisons difficult. The table on page 68 gives the list of social indicators that we are able to report on this year.

SOCIAL INDICATORS AT THE SITE LEVEL

Despite the difficulties, we believe that indicators will make up an important part of our annual reporting in the future and we will work actively to solve the problems. In the first phase, we will further develop indicators in relation to our major production sites where we already report on environmental performance. At the moment, the environmental data only gives the local community a partial view of the sites, and this year we broaden the picture by giving a brief report on our activities related to social responsibility. The site reports are presented on pages 55-65.
OUR EMPLOYEES – A PRIME STAKEHOLDER GROUP

When we begin talking about stakeholders and social responsibility, we start with our own people. They are the heart of Novo Nordisk. Of course, we also acknowledge our responsibility to other parts of society but we believe that if we can manage our own people in a fair way, it is a good starting point for interacting with others as well. We describe here our system for managing our human resources.

At Novo Nordisk we recognise that our people play a prime role in our short-term and long-term success. A fundamental part of Novo Nordisk's management system is our Human Resources (HR) Policy. This reflects our aim to attract, excite, develop and retain qualified people worldwide.

It is company policy that our remuneration practices contribute dynamically to Novo Nordisk's continued progress and prosperity by attracting and retaining highly qualified people in every position, while supporting their continued development. We encourage the achievement of high performance levels for individuals and teams throughout Novo Nordisk, consistent with the company's objectives and values.

TWO DIMENSIONS OF PERFORMANCE
The normal way of measuring the performance of a particular unit in a company is according to results against targets (the horizontal axis in the diagram below). This approach focuses on what a business unit, or an individual, achieves in the short run.

The way these results are achieved is also important, especially to the long-term success of a company. In other words, the unit must also live up to a company's core values; what we call 'conduct against Fundamentals' in the diagram.

Moving continuously towards the top right of the grid is our goal and this tells us that we are making real progress.

We have developed a number of management tools and processes to help us combine the focus on business goals with living up to Novo Nordisk's core values and Fundamentals. Three of these tools are presented opposite.

ANNUAL PERFORMANCE REVIEW
All salaried employees at Novo Nordisk have an annual review – a performance review connected with salary adjustments and a planning review to establish specific business and competency targets. Business targets define areas of special or extraordinary efforts and contributions beyond the daily tasks. These targets may pertain to the department as well as to specific projects. Competency targets define a goal-oriented development of the employee's qualifications weighed against present job requirements and career wishes.

DEVELOPMENT PLANS
There must also be a mutual understanding of individual longer term development needs between the employee and the manager. Therefore all salaried employees have an individual development plan which is made in collaboration with his or her manager. The plan is linked to business objectives and is evaluated and adjusted at least once a year, generally on an individual basis. A similar plan is developed for hourly-paid employees, although these plans are frequently 'team' plans. The practice of creating teams to achieve given tasks is now well established at many of Novo Nordisk's production sites.

ORGANISATIONAL AUDIT
The Organisational Audit is another way we try to ensure that we maximise the efficiency of our businesses. If we are to integrate sustainable development into our daily work, all parts of the organisation must be accountable in terms of their own performance against the corporate goals as well as their own business-specific targets.

The annual Organisational Audit plays an important role in documenting the quality of the efforts and considerations taken in the various business units. As such, the audit is a sophisticated tool for evaluating and improving the quality of both organisational development and the sharing of better practices within Novo Nordisk. The results of the audit are formally reviewed each year by Corporate Management.
LAY-OFFS AFFECTED SOME GROUPS MORE THAN OTHERS

The job market can be turbulent. Changing market situations and changing technology put people and companies under pressure. Our values are expressed in guidelines for dealing with our employees, and we have established many channels for dialogue. From time to time, we face a tough challenge. For example, in 1999, we had to lay off 183 people in our Danish Health Care organisation and 43 in our Danish Enzyme Business organisation.

Our Novo Nordisk Way of Management requires that personal training and development activities secure the employability of our employees, preferably within Novo Nordisk.

Each employee or team must have development plans. The purpose of these is to ensure that all employees can upgrade their skills so as to take on new responsibilities in the present job or to take on a new job. When it comes to lay-offs, we feel an obligation to help anyone who loses their job to find a new job either inside or outside Novo Nordisk.

WHY THE LAY-OFFS WERE MADE

Major job cuts are not a common event at Novo Nordisk. The last time we faced a similar situation was in 1996, when 74 employees were laid off.

The lay-offs in Health Care happened at a time when Novo Nordisk reported some of its best financial results ever. However, the future financial prospects did not seem as bright at that time. A decision in September 1998 to discontinue the development of a product to treat and prevent osteoporosis, due to side effects, was one of the reasons why share prices had declined significantly in 1998. Furthermore, the company was facing a drop in royalties from 2000 and onwards from a significant product, Serostat® (antidepressant drug). Moreover, because of an extraordinarily large number of introductions of new Novo Nordisk products, management in Health Care decided to switch resources from the Danish part of the organisation to the international sales and marketing functions. Consequently, in March 1999 183 positions were cut in Health Care in Denmark.

HOW THE CUTS WERE MADE

The Health Care organisation in Denmark had to cut 5% of the white collar workforce based on the following criteria in order of priority:

- Closing of work areas or departments
- Discontinued work assignments
- Professional qualifications and competencies
- Other legitimate reasons

The representatives from the company's trade unions were involved in setting up the criteria.

WHO WAS LAID OFF?

26% of the employees laid off were professional staff, 46% were laboratory technicians or assistants and 26% worked as administrative personnel while other areas accounted for the remaining 2%.

66% were women and 34% were men compared to the total number of salaried employees for Health Care at the time of 62% female employees and 38% male employees. The reason for the higher-than-average percentage of women laid off is that most laboratory technicians/assistants and administrative personnel are women.

SUPPORT

A job advisory service was set up with five full-time staff to help the people laid off get back into employment as soon as possible or make other plans for the future (for a full list of services provided, see the Internet version of this report). Furthermore, other human resources consultants in Health Care were also involved.

The advisory service group met regularly with representatives from the trade unions. At the meetings the type of support which should be offered to the people laid-off was discussed. The unions also participated in negotiations on the terms for dismissals.

DID THE PEOPLE AFFECTED FIND JOBS?

When their period of notice had expired, approximately 70% had firm plans for the future. The rest faced involuntary unemployment.

Of the people who had firm plans, half of these found a job outside Novo Nordisk, and 17% found a job inside Novo Nordisk. The remainder chose not to look for a new job for reasons such as early retirement or planning to do further training or study.

WHAT HAPPENED AFTER THE PEOPLE LEFT NOVO NORDISK?

Three out of four in the professional group and the laboratory technicians/assistants group had firm plans compared to only two out of four in the administrative group. An explanation for this may be that the administrative group on average was older than the other groups.
Age seemed to be a factor in whether a person was laid off or not. It turned out that 37% of the people who were laid off were 50 years old or above. This compares with an average of 17% of the salaried people in this age category in Health Care at the time of the lay-offs.

It also turned out that many of those who did not get a job by the end of the period of notice were in the administrative group aged 50 years old or above.

**S E N I O R  E M P L O Y E E S**

A key area in our Danish Senior Policy is the development and maintenance of qualifications and skills of each individual employee until he or she retires from Novo Nordisk. In general, constantly upgrading the employee’s qualifications is the responsibility of both manager and employee. They must be aware of the present and future demands of a job. The Danish Senior Policy can be found in the Internet version of this report.

We have to realise that our Senior Policy did not work properly. Managers and/or the senior employees themselves have not been able to upgrade competences. In addition, administrative personnel seem to have poorer job prospects outside Novo Nordisk than other groups who tended to find another job more easily.

At future senior information meetings, where new seniors are introduced to becoming a senior worker (55 years old and upwards), we will focus on the importance of this group of employees constantly upgrading their skills so as to stay employable.

**W H A T  H A S  H A P P E N E D  S I N C E ?**

After March 1999, Health Care’s sales were better than expected. Moreover, some of the areas affected by the cuts reported a high level of work pressure, as confirmed in our employee survey (see page 22). To cope with the increasing workload, we have therefore had to hire new employees.

Enzyme Business in Denmark closed down some activities at the beginning of 1999 resulting in 15 lay-offs. Moreover, Enzyme Business’ sales in the first three quarters of 1999 only showed a slight increase, and costs had to be cut to achieve budgeted profit levels. Therefore 28 Danish employees were laid off in November 1999. Employees from a new integrated HR department formed a task force which focused on helping people to find a new job as soon as possible through counselling and further training. By 1 February 2000, 24 had found a new job, 14 chose, for example, further study or retirement, and five faced involuntary unemployment.

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**Lone Karakavuk, Chairman of Novo Nordisk Office (NNO), the local internal union for administrative personnel**

“A month in advance we knew that 183 employees would be laid off. The waiting time in itself put a strain on all of us. The reaction came afterwards. Most of the people involved simply didn’t understand it, especially because Novo Nordisk at that time announced one of the best financial results ever. Another problem was that many of the laid-off employees were over 50. This conflicts with the company’s Senior Policy.

It must be said though that the company has done a great deal to help the people who were made redundant. Nevertheless, we felt obliged to express the frustration of our members. The management on their part recognizes that certain things could have been handled better. As a local union we wish to be more directly involved. In cooperation with the management, we are therefore working on improving the procedure in case any lay-offs are made in future.”

Lay-offs remain a sensitive issue. Unless a plant or department is closing down, employees will usually question the reasons for and wisdom of the decision, and they have every right to do so. Nevertheless, every employee in a company must realise that job security cannot be guaranteed. The best guarantee to remain employable is to maintain and develop skills.
WHAT DO NOVO NORDISK PEOPLE REALLY THINK?

During the summer and autumn of 1999, a questionnaire was sent out to more than 12,000 employees in five countries, approximately 80% of Novo Nordisk’s total workforce. Employees were asked to rate the company’s performance and say what they thought about its core values.

The employee survey was conducted for a variety of reasons. Firstly, we wanted to engage with our employees in a systematic dialogue based on what they think and feel about Novo Nordisk’s values. The employee survey was meant to give the employees, as one of our key stakeholder groups, the opportunity to express their views on the company’s culture, systems and management.

Secondly, Novo Nordisk is a knowledge-driven company, and the question of retaining employees is becoming increasingly important. This is clearly linked to job satisfaction and the reputation of the company. The survey investigated these parameters.

Finally, the survey was an opportunity to benchmark the restructuring process. We wanted to consult our employees in order to fully understand their current perception of Novo Nordisk. In 2001, after the restructuring of Novo Nordisk, we will follow up with a similar survey and compare the results.

STAKEHOLDER-DRIVEN PROCESS

In order to ensure that the questionnaire addressed the most relevant issues from an employee perspective, a series of focus groups were held with employees. A total of 38 focus group meetings were conducted in the five participating countries: Denmark, France, India, Japan and the US. In this first cycle, for practical reasons, it was decided not to cover all the countries in which Novo Nordisk operates.

The focus groups involved employees from all parts of the organization in the participating countries. All in all, more than 600 employees were involved in the process of designing and reviewing the questionnaire.

An Independent Advisory Panel was set up from the beginning of the process in order to give guidance and relevant feedback on the survey. The survey was carried out with the help of a team of consultants from the Centre for Stakeholding and Sustainable Enterprise, part of Kingston University in the UK.

RESULTS

In each of the participating countries, all employees received a questionnaire, and all replies were kept anonymous. In total, more than 7,200 employees completed and returned the questionnaire. This corresponds to 47% of Novo Nordisk’s entire workforce and gives an overall response rate of 59% to all the questionnaires sent out. We find this quite satisfactory for an anonymous, postal questionnaire without a reminder. The lowest response rate was in the US (55%) and the highest was in India (90%). The main conclusions of the survey are presented here.

OVERALL REPUTATION

More than seven out of ten respondents in all the participating countries are proud to tell others that they work for Novo Nordisk. Moreover, in four out of the five countries surveyed, many employees strongly believe that social and environmental performance is as important as financial performance.

DECISION-MAKING

The quality of the decision-making at Novo Nordisk appears to be an issue of concern to many, particularly in the Danish part of the company. In some of the focus groups it was mentioned that the Danish style of decision-making has both advantages and disadvantages. Positive features include the commitment that is achieved by the emphasis on reaching a consensus. Negative features include the slowness of decision-making and, in the worst case, decisions never being finalised.

COMMUNICATION

Employees generally feel well informed about key activities in the company but the majority of employees disagree with the statement that there is good communication between different parts of the company.

PATHBREAKING

Over half of the respondents in all countries (in Denmark, France and India more than three out of four) agree that Novo Nordisk is at the cutting edge of the application of health care research and biotechnology.

ROLE RECOGNITION

Role recognition, ie the employee’s and the manager’s mutual understanding of job responsibilities and the respondents’ satisfaction with the recognition they receive for the work they do, is extremely positive across all business areas. Variations between staff groups are small.

WORK PRESSURE

The pressure of work is generally perceived to be high throughout Novo Nordisk. Stress need not always be negative, and some degree of work pressure is probably always to be expected in certain types of jobs.
SOME RESULTS FROM THE EMPLOYEE SURVEY, ALL RESPONDENTS

<table>
<thead>
<tr>
<th>Question</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think the social and environmental performance of Novo Nordisk is as important as its financial performance</td>
<td>90%</td>
</tr>
<tr>
<td>I am satisfied with the quality of management's decision-making in my company</td>
<td>90%</td>
</tr>
<tr>
<td>I am kept well informed about what is going on in my company</td>
<td>90%</td>
</tr>
<tr>
<td>I have a clear understanding of my job responsibilities</td>
<td>90%</td>
</tr>
<tr>
<td>I feel I am given too much work pressure</td>
<td>90%</td>
</tr>
<tr>
<td>In my experience pay at Novo Nordisk is as good as similar companies</td>
<td>90%</td>
</tr>
</tbody>
</table>

In a number of units where the work pressure is particularly high, there is, however, a correlation between levels of work pressure and dissatisfaction that health and safety at work is taken seriously by Novo Nordisk. Work pressure also correlates with a person's position in the organisation with a higher level of work pressure reported at more senior levels in the company.

JOB INTEREST

In general, job interest is above average. All staff groups scored positively on this parameter. Further analysis indicates that job interest is related to a person's position in the company. The higher up people are in the organisation, the higher the interest level.

COMPENSATION

There is some variation among employees working at affiliates as to whether, in their experience, pay at Novo Nordisk is at least as good as at similar companies. In Denmark, there is general agreement with this statement.

EQUAL OPPORTUNITIES

One indicator of equal opportunities is the extent to which men and women are perceived to have equal career opportunities. Novo Nordisk is seen as pursuing this goal, although there are differences according to a respondent's gender and level in the organisation. Men tend to agree more than women with the statement that Novo Nordisk is pursuing equal career opportunities.

RETAINING TALENT

Level of job interest as measured in the survey seems to correlate with stated career intentions. In other words, respondents who plan to leave soon have lower scores on job interest than those who plan to stay longer. The survey findings suggest that many professional staff are only planning short- to medium-term careers with the company. This makes it important for Novo Nordisk to focus more on opportunities for development.

USE OF THE SURVEY RESULTS

The overall success of the survey will depend on how the survey results are communicated and the quality of the subsequent dialogue with employees about the findings and their interpretation.

In India, nine out of ten believe that the senior management in their company will take the results of this survey seriously and respond appropriately. In Japan, one out of four employees agree with the statement, whereas in Denmark, France and the US, approximately half of the employees agree. In all countries except India, approximately one out of four employees neither agreed nor disagreed.

The results of the employee survey were first used in the Organisational Audit process (see page 19), where data from the survey was included as an indicator of management performance in several business units. The survey results have been presented at meetings with top management and have been made available on our Intranet for employees to review and comment on.

The future Health Care and Enzyme Business companies will carry out the next employee survey in 2001. In the meantime, the focus will be on efforts to improve conditions in each part of the company in response to issues raised by the 1999 survey.

INTERNET

• Summary of survey results
• Statement on the survey from the Independent Advisory Panel

DIALOGUE

Torben Bo Bundjord, director, Stakeholder Communications
Tel: (+45) 4464 6511, e-mail: tbb@novo.dk

TARGET 2000

• The businesses to follow up on the survey and initiate necessary actions

TARGET 2001

• Next employee survey to be carried out by the future companies in the Novo Group
PROMISING TREND FOR EMPLOYEES’ HEALTH AND SAFETY

In terms of health and safety, 1999 may be looked at as a successful year for our Danish operations, where the majority of our employees work. Injuries at work at our three enzyme production sites dropped dramatically by 60% following, among other initiatives, an educational programme and greater focus on health and safety. Occupational diseases continued at a low level and rehabilitation cases also decreased to the lowest level since 1993.

Novo Nordisk’s Health and Safety policy is part of our international set of guidelines in the Novo Nordisk Way of Management and as such all units have to comply with it. The policy defines the focus and the commitment to health and safety. Each of our sites has to comply with the framework set up by their top management.

HARMONISATION OF DATA
When reporting on injuries and diseases, we have experienced some difficulties in comparing data from our sites in different countries. The definitions of data vary from country to country. As an example, data on injuries from Switzerland in previous reports included accidents occurring in an employee’s free time because these incidents were covered by Swiss insurance policies. In Denmark only accidents occurring at work are reported. Similarly several definitions are used for the duration of absence from work required for an injury to be recorded. In the Danish statistics, injuries causing more than one day of absence are included.

In 1999, we introduced clearer definitions for collecting comparable data at an international level. The definitions are based on the Danish regulations since the majority of employees work in Denmark.

An occupational injury is a sudden unexpected and harmful incident that happens in connection to work and that causes a wound or other condition to the body. In relation to statistics only injuries causing at least one day of absence are registered.

An occupational disease is a disease (physiological harm or loss of capacity) caused by continued or repeated exposure to conditions of the work environment over a period of time (e.g., infection, strain, toxins, fumes, etc.).

Injuries and diseases are two of our most important indicators for health and safety today. Up to now, outside Denmark we have only looked at production sites, and have therefore not included data from our sales offices and research laboratories. It is therefore our target to review health and safety data collection outside Denmark and explore an appropriate set of global indicators by the end of 2001.

Since we are still not able to give a complete picture on an international basis, we have chosen only to set up targets for injuries and diseases for Denmark again this year.

OCCUPATIONAL INJURIES AND DISEASES
An occupational injury can occur for many different reasons. In our experience, occupational injuries usually occur as a result of the incorrect use of tools and incorrect movements. More rarely, they result from using hazardous substances and materials.

The target for 1999 was to ensure a decrease in the frequency of occupational injuries in our Danish operations to 10.0 or less per million working hours. This target has been reached by a good margin with a decrease to 9.0 compared with 10.5 in 1998.

Behind this decrease there was a dramatic drop in injuries in the Danish enzyme production units from 31 in 1998 to 11 in 1999. One explanation is that there has been an increased focus on health and safety at work and greater involvement in these issues from both employees and managers. For example, the factories at Bagsvaerd and Kalundborg have arranged health and safety seminars for all employees.

In relation to occupational diseases, the target was to ensure a decrease in the frequency of occupational diseases in our Danish operations to 2.0 or less per million working hours. The target has been achieved with a frequency of 2.0.

FREQUENCY OF OCCUPATIONAL INJURIES AND DISEASES IN DENMARK

<table>
<thead>
<tr>
<th>Year</th>
<th>Occupational Injuries</th>
<th>Occupational Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>98</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>99</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

FREQUENCY OF OCCUPATIONAL INJURIES AND DISEASES WORLDWIDE

<table>
<thead>
<tr>
<th>Year</th>
<th>Occupational Injuries</th>
<th>Occupational Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>98</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>99</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

* International data for occupational diseases in 1997 is not available.

Back in 1998, for the first time we saw a substantial decrease in the number of enzyme allergies with only two cases compared to 10 to 15 cases during previous years. This trend has continued with only two cases reported in 1999.
In 1999, the most important category of occupational diseases in Denmark was disorders of the musculoskeletal system as a result of monotonous, repetitive work or unhealthy working positions. This group of diseases accounted for approximately 72% of all reported occupational diseases in Denmark. A research institute initiated a project into musculoskeletal disorders among laboratory workers in Denmark in 1997. About 1,200 employees from Novo Nordisk as well as another company participated in the study through answering questionnaires and more than 400 of these went through a subsequent medical examination. The researchers aim to finalise the results during 2000.

**REHABILITATION IN DENMARK**

We have a long tradition of taking care of employees with rehabilitation needs due to health reasons. Our rehabilitation policy was established in 1992 in order to formalise the existing practice.

The rehabilitation policy states that: “Novo Nordisk employees, who are unable to maintain their present job due to impaired health, should, if possible, remain employees of Novo Nordisk.”

The rehabilitation process focuses on giving the employee the best opportunity to return to work, though this may not necessarily be a job within Novo Nordisk. In a few cases, the best solution is external retraining or education. In other cases, early retirement is the only solution.

In 1999, 76 new rehabilitation cases were opened and 77 were concluded. This is the lowest number of new cases since 1993. One factor is a drop in the number of people taking early retirement since the peak in the mid-1990s. Another factor is probably that more cases are being solved at the departmental level without involving our Occupational Health Service, Human Resources departments or social workers.

Of the cases concluded, 71% of the people remained at work, 22% took early retirement and 7% left Novo Nordisk without another job or firm plans for the future. The early retirement rate is the lowest since 1992. In terms of gender, 56% of cases in 1999 were women and 44% men. From 1992-99, the average was 60% women and 40% men.

In 37% of the cases where employees remained at work or were retrained, their income was supplemented by the state. This subsidy makes it possible to create more flexible solutions and the alternative for most of these employees would have been redundancy. However, it is crucial that the possibility to remain at work is not solely dependent on the external subsidies.

Each year 15-20% of the cases concern employees suffering from mental disorders or brain injury (e.g. a stroke or tumour). These cases need special attention when employees return to work. We can provide some support but additional professional help is really needed.

**NEW REHABILITATION CASES IN DENMARK**

![Chart showing rehabilitation cases in Denmark]

**INTERNET**
- Novo Nordisk's Health & Safety Policy
- Follow-up on Target set in 1998
- Follow-up on the Danish health and safety organisation
- Number of occupational injuries and diseases

**DIALOGUE**
- Anders Ingemann Larsen, manager
  Occupational Health Service Department
  Tel. (+45) 4442 3763, e-mail: ail@novo.dk

**TARGETS 2000**
- Continue initiatives to reduce the frequency of occupational injuries in our Danish operations.
- Continue initiatives to reduce the frequency of occupational diseases in our Danish operations.

**TARGET 2000 - 2001**
- Review health and safety data collection outside Denmark and explore an appropriate set of global indicators.
FINDING THE RIGHT APPROACH TO HUMAN RIGHTS

During 1999 we have been exploring the implications of human rights for our business worldwide. Human rights relates to virtually all aspects of our activities. It is a matter of respecting our employees and other stakeholders. Our starting point has been the United Nations Universal Declaration of Human Rights and we see human rights as an integral part of our commitment to social responsibility. Our formal support of the Declaration means that we are committed to respecting and promoting human rights throughout our operations.

An internal steering group was established in 1999 to manage our human rights project and commission an analysis of strengths, weaknesses, opportunities and threats (SWOT). We engaged two external human rights lawyers from the law firm Schierbeck & Thorsen (now Skadeå & Thorsen) in Copenhagen to help us with this work and to map out potential human rights issues for Novo Nordisk within the context of our production, sales principles and methods, and the wide spread of our geographical locations.

The SWOT analysis identified current and potential human rights dilemmas and analysed the company’s existing policies and management structures from a human rights perspective. The aim was to improve Novo Nordisk’s capacity to meet relevant human rights standards both now and in the future, to identify key stakeholders and to provide recommendations on how to move forward in this area. As well as a review of the company’s positions and structures, the desk study also looked at four representative model countries in detail: Algeria, Brazil, China and India. Human rights issues in relation to the lifecycle of products from both the Novo Nordisk Health Care and Enzyme Business were examined in these four countries.

The analysis revealed that there are two main categories of issues that are particularly relevant to Novo Nordisk – firstly, the human rights of employees (including employees of suppliers) and, secondly, the human rights of the users of our products, particularly people using Novo Nordisk’s pharmaceuticals.

No serious problems within these areas were identified in the analysis but a major recommendation was that awareness of human rights issues should be raised as a preventative measure in the company. The analysis concluded that ‘The Novo Nordisk Way of Management’ constitutes an efficient tool in relation to human rights management but there are opportunities for the more consistent implementation of the company’s human rights commitment. In particular the company’s position on human rights and associated dilemmas could be clearer.

A checklist of relevant issues and key performance indicators was also developed as tools for dealing appropriately with human rights. In addition, the study reviewed human rights and business including the benchmarking of the activities of other international companies.

FIELD STUDIES

Based on the findings of the SWOT analysis and the list of human rights issues, a field study of Novo Nordisk’s Health Care operations in India was carried out in late 1999.

Our Danish human rights consultant, Sune Skadeå Thorsen, participated in our social accounting visit to India in 1999 as part of the human rights analysis. The study covered Novo Nordisk Pharma India Ltd, our Indian Health Care affiliate, which does not have any manufacturing facilities of its own (see also the case study on India, pages 30-31). In particular, the focus was on labour rights and equal opportunities.

Human rights issues often mentioned in relation to India, such as the use of child labour or caste discrimination, were not found to be an internal issue for Novo Nordisk Pharma India Ltd. The findings were that Novo Nordisk Pharma India Ltd is not only aware of possible human rights issues, but is building structures to prevent possible violations.

Indian society has not been at the forefront concerning the implementation of basic human rights standards, including labour rights, through national statutory requirements. However, in general, awareness of the social responsibilities of companies in India is rising.

Human rights are relevant wherever we operate and are not just applicable to the developing world. In addition to the Indian field study, a project examining equal opportunities at Novo Nordisk’s largest production site in Denmark was undertaken in 1999. The list of criteria for assessing human rights and key performance indicators for equal opportunities were applied to the company’s Kalundborg operations. The results of this study are mentioned briefly on page 12.

HUMAN RIGHTS COMMITMENT

For 1999 we set the target to “define the issues and scope of a human rights strategy”. Though we have made progress towards this target, we were unable to meet it during 1999. The restructuring of Novo Nordisk called for a change of plan and the review of human rights continues. We have decided to make our starting point the incorporation of human rights principles within our social responsibility commitments in the new Charter of the Novo Group of Companies.
The next step will be for the separately listed companies to consider how they will incorporate these commitments into their operational policies.

NEW PART OF THE FACILITATION PROCESS
Novo Nordisk's facilitation system and its team of expert facilitators are central to the implementation of the company's corporate values and commitments. To help build sufficient competence within the facilitator group to enable the individual facilitators to assist with the implementation of basic human rights within the businesses, the human rights review recommended that appropriate training sessions should be set up.

The first workshop with the Novo Nordisk facilitators was held in early January 2000. The aim was to create a common basic knowledge and understanding of the concept of human rights, the international conventions, and how human rights relate to business. The one-day workshop explored practical examples and tried to identify suitable tools and structures for the incorporation of human rights issues into the facilitation process. This training will be continued in 2000.

STAKEHOLDER WORKSHOP
Another target for 1999 was "to define a model for stakeholder dialogue and involvement". In accordance with this target, we initiated our first dialogue with stakeholders in this field. A workshop with a small group of expert stakeholders was held in December 1999. Among other things, the issue of human rights and the conclusions of the human rights review were presented and discussed. We will continue to seek dialogue with our stakeholders on human rights issues as a key part of our ongoing stakeholder engagement activities.

Sune Skadegård Thorsen
Skadegård Thorsen, Denmark

"The values expressed in the international human rights conventions are the only set of values that are accepted and recognised globally. As such, they form an excellent point of reference for multinational companies. The corporate sector will become an important partner with respect to sustainable development including human rights, not least due to the trend towards globalisation.

In many areas, Novo Nordisk displays socially responsible conduct beyond human rights standards. The process of dealing with human rights is still at an early stage at Novo Nordisk and certain challenges still have to be met.

Novo Nordisk's approach to implementing human rights standards in its business practices follows the model for implementation they use in the environmental and bioethical fields. First they gain knowledge and increase awareness. Then they develop a strategy before making statements on adherence. Novo Nordisk's bottom-up approach avoids the pitfalls that many companies experience by pledging themselves to human rights without thorough knowledge of the actual implications of their stance."

DIALOGUE
Vernen Jennings, director, Ethics and Social Affairs
Tel: (+45) 4442 8199, e-mail: vj@novo.dk

TARGET 2000-2001
- Finalise the review of human rights initiated in 1999 and integrate key principles into the policies of the future companies in the Novo Group.
SEEING SUPPLIERS AS PARTNERS

After publishing our first social report last year, we were asked: What about your suppliers? In itself, this is a huge field that we are now beginning to explore. Today, we use environmental ratings to evaluate suppliers, but we have set up a target to explore social responsibility issues in 2000. We choose in this year’s report to look into the quality of our relationship with our suppliers, realising that this reflects just one aspect of how we are handling our social responsibility.

Building a few close partnerships with relevant suppliers is part of our Purchasing Policy. The policy is adhered to in both Health Care and Enzyme Business, and here we will look into the principles behind this strategy and how it is actually being put into practice in Enzyme Business. As the case study illustrates, we define a partnership as more than just a close interaction with a supplier. A partnership involves cooperation at many levels and between many departments in the two companies.

PERCENTAGE OF SUPPLIERS PER CONTINENT

<table>
<thead>
<tr>
<th>Continent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>92%</td>
</tr>
<tr>
<td>North America</td>
<td>5%</td>
</tr>
<tr>
<td>South America</td>
<td>2%</td>
</tr>
<tr>
<td>Asia</td>
<td>1%</td>
</tr>
</tbody>
</table>

PRICE ISN’T EVERYTHING

Traditionally, the purchasing department in Enzyme Business would select a specific product with the best quality at the cheapest price, by searching among a number of potential suppliers. This approach is still relevant for certain standard categories of products or services. However, Enzyme Business works more and more in partnership with key suppliers. At headquarters, the key suppliers account for about 30% of all suppliers and deliver 90% of all goods. Enzyme Business is working in close interaction with approximately half of these. For about 5% of their key suppliers, Enzyme Business is building extensive partnerships characterised by knowledge-sharing, mutual trust and long-term commitment.

PARTNERSHIP WITH SEITZSCHENK

Our partnership with SeitzSchenk Filtersystems, a German manufacturer of filter products, is a pilot project that has so far resulted in an improved working environment for our employees and reduced impact on the external environment.

Novo Nordisk has bought filter equipment and material from SeitzSchenk for more than 30 years, but during 1998 the cooperation developed beyond simply buying a product. We have gained access to their filtration know-how and the newest technology in the field. Teams consisting of members from both SeitzSchenk and Novo Nordisk, stretching from R&D to production, have worked together to improve filtration in the production process. As a result, employees are now less exposed to enzyme dust, and water consumption has decreased as our equipment can be used more efficiently. In turn, we have been able to reduce our consumption of raw materials. All this has added up to give us some financial savings, too.

In a collaboration of this kind, mutual trust is of the essence. It involves working with ‘open books’, i.e. letting the partner gain an insight into information that has been kept confidential earlier. In future, Enzyme Business plans to build close, long-term partnerships with more of its key suppliers.

Martin Zeiller, manager of R&D, SeitzSchenk Filtersystems, Germany

“Our partnership is based on trust. It began with an intensive discussion between specialists at Novo Nordisk and at SeitzSchenk. We found more than 100 potential points for improvement and our aim is to realise them one by one. The first priority was improving worker safety. You can only do this kind of process if you are open and have deep discussions. It has been a very time-consuming process for both partners but the benefits make it very worthwhile. A lot of money and resources have been saved by Novo Nordisk. From our point of view, we are able to develop new products in close association with a key customer. For example, we are currently developing partly recyclable filters that are better for the environment.”

DIALOGUE

Ken Hils, director, Enzyme Business Purchasing
Tel: (+45) 4442 3586, e-mail: kfh@novodk

TARGET 2000

• Explore the prospects of introducing social considerations into supplier and contractor relationships.
CLOSE TO OUR CUSTOMERS

There is an important bond between customer and company. When someone buys or uses a product, they are putting their trust in that company to fulfill a promise. We believe our commitment to the customer does not stop when we have sold a product. It goes beyond the product to the provision of services and education to enhance the quality of life for our customers. In addition, their safety should not be compromised. In this section, we look at how Health Care and Enzyme Business approach customers.

In Health Care our customers fall into a number of groups. Taking diabetes care as an example, our prime concern is the life and well-being of people with diabetes. Yet as a company, we do not market our products directly to these people. Who makes the decision to choose our products varies from place to place, but it always involves the interaction between patients, prescribers and purchasers (national health services, health insurance companies).

CREATING AWARENESS

For many years, Health Care has provided educational services to build up awareness of diabetes and elevate standards of care as part of our approach to our customers. The NovoCare® concept was created in 1991 to strengthen our relationship with our customers. It entails a whole range of educational services. The aim is to become an integrated provider of medicines and knowledge.

NovoCare® educational programmes are aimed at both people with diabetes and professionals. Naturally, conventional advertising is being utilised as well, but the educational programmes are supplementing this form of one-way communication with interaction and dialogue.

Differentiation from competitors is a key factor in increasing our share of the diabetes care market, and Novo Nordisk profiles itself through NovoCare® activities. In recent years, the portfolio of educational tools has been broadened and now the Internet also plays a vital role. The aim is to make customised information, interactive services and documentation available at any place and at any time. In our report from India on pages 30-31, we give an example of how NovoCare® is integrated into our business.

FACILITATING PARTNERSHIPS

As diabetes has reached epidemic proportions according to the WHO, it has become clear that the cooperation between all the parties dealing with this disease and its complications must be intensified. In our experience of more than 70 years of cooperation, partnerships between governments and industry can work, despite different perspectives, as long as the terms are mutually agreed.

Building a strong network of professionals around a person with diabetes is also an important factor in improving the quality of treatment. It is our aim to coordinate this network and an example from our operations in France is given on page 33. Being close to our customers and being a preferred partner is thus an integral part of how we do business.

PROMOTING CUSTOMER SAFETY

Most of the products Enzyme Business supplies today have been developed together with our customers. We do not sell or market our enzyme products directly to the consumer but to companies using them within a range of industries including detergents, starch processing, baking and textiles.

We have a responsibility to our customers beyond the product itself and this is illustrated by looking at safety issues. As enzymes are proteins, they can cause allergy under certain circumstances just like other proteins such as pollen. To prevent health problems, for the past 25 years we have offered customers our know-how about handling enzymes gained from our experience in our own factories. For example, we offer training sessions and extensive safety material.

This product stewardship has been expanded over recent years to become an integral part of the way we do business with our customers.

INTERNET

- Example of Novo Nordisk’s diabetes education material: http://www.yourdiabetesworld.com
- Information about Novo Nordisk’s enzymes: http://enzymes.novonordisk.com

DIALOGUE

- Health Care
  Stig Premming, director, External Affairs
  Tel: (+45) 4442 6534, e-mail: spr@novonordisk.com
- Enzyme Business
  Hans Erik Schiff, director, Enzyme Business Safety
  Tel: (+45) 4442 2597, e-mail: hes@novonordisk.com
Empowering our employees is a fundamental part of management at Novo Nordisk. At the Indian affiliate of the Health Care business, where the majority of our employees work alone in the field, empowerment is essential if they are to get their jobs done. They each receive a very special tool box to help them.

The majority of our 100 employees at Novo Nordisk Pharma India Ltd are working in the field. They are ‘marketing executives’ spending their day on the road talking to diabetes specialists or arranging educational activities. Recently, a relatively new employee group has emerged, product specialists, who go out to insulin-users in their homes to demonstrate the insulin pen or give general advice on how to live with and manage diabetes.

A BOX OF VALUES

Anil Kapur, general manager in India, has adopted his own way of communicating the values of the company and the empowerment strategy to his employees. At the introductory course for new employees, Anil Kapur explains about the values of Novo Nordisk and how they are interpreted in India.

Each employee is given a tool box containing the following items:

- A rope — Signifies freedom. You may use it to climb up and achieve a successful career. The rope is also a connecting bond to the core values.
  You may also misuse it to hang yourself.
- A mirror — You must be able to face yourself with what you are doing.
- A piece of sandpaper — Without friction everything would slip by.
  With too much friction, nothing moves. Open, honest, constructive criticism is necessary for improvement and change.
- A watch — Timeliness is crucial for success, so plan to do things on time and meet the set deadlines.
- A pen — You have to give feedback.
- A piece of canvas and a brush — Learn to paint your own dream.

The Indian toolbox is an example of how the Novo Nordisk Way of Management as a corporate framework can be applied locally. The items reflect values such as being accountable, open and honest, and sharing better practices.

All employees are reminded of these values at all large gatherings. Furthermore, when recruiting new employees, the applicants are evaluated against these values to judge whether they would fit in with the company culture.

RESULTS FROM THE EMPLOYEE SURVEY, HEALTH CARE, INDIA

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am encouraged to organise my own work</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>I am free to make the decisions needed to do my job</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>Most days I'm enthusiastic about my job</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>I regularly have to work very long hours</td>
<td>15%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Most of the employees agree that they have the power to make the necessary decisions on their own. In the employee survey, two-thirds agreed with the statement: I am free to make the decisions needed in my job (see chart) and 88% agreed that most days they were enthusiastic about their job. Nevertheless, many seem to experience a common downside of empowerment, namely working too many hours to achieve their goals. This is an issue that will be a priority for the Indian Health Care management in 2000.

Commenting on the development of empowerment in India, Anil Kapur notes that these values existed earlier within his organisation as unspoken principles and people were working by them. However, with an increasing number of employees it is necessary to articulate the values in order for people to be able to reflect on them. He has brought the values to life in a very tangible way with his special tool box. Being a small organisation in a large country, empowerment becomes a very real thing.
CASE STUDY FROM INDIA
PEOPLE WITH DIABETES ARE GIVEN A LIFELINE

India is the world’s largest democracy, a country where the contrasts between rich and poor are everywhere. Apart from a massive burden of infectious diseases, India is struggling with yet another problem: the WHO estimates that India has the highest number of people with diabetes in the world (30 million), however only 15% receive proper treatment. Health care provided by the state is inadequate and often of poor quality. There is limited health insurance but people with diabetes are denied even this.

In this difficult situation, Novo Nordisk in India is pursuing a strategy that seems to benefit both society and our business. Novo Nordisk aims to provide education on managing the disease to the person with diabetes, his family, his doctor and nurse.

Our Indian affiliate has a partnership with another sales organisation, Knoll Pharmaceuticals. Furthermore, educational activities are often arranged in association with Knoll and LifeScan, a producer of diagnostic apparatus for diabetes. Our long-term strategy is to build a close relationship with our current and potential customers and help prevent the complications of diabetes. This strategy has led to a large number of projects, educational facilities and events:

- Training sessions for doctors and patients. Novo Nordisk annually carries out 300-400 sessions in collaboration with Indian partners.
- An annual congress on diabetes care: 600 specialists participated in 1999. After each congress (eight so far), proceedings of 200-300 pages are sent to 5,000 physicians every year.
- Patient camps: 2-3 hours education and sharing better practices. 100 camps were conducted all over India in 1999.
- Production of more than ten booklets on diabetes care.

All insulin-users who become registered in our patient care programme in India are offered additional material and regular updated information such as newsletters. Thus, the marketing of our products goes beyond the product itself and encompasses a variety of services.

SOCIAL DILEMMAS
The people who can afford to see a doctor and pay for the proper treatment are the middle and upper classes of Indian society. Within these social spheres, there is still a huge need to increase awareness and provide education about diabetes.

The cost of treating diabetes requires 10-15% of an average middle-class income of approximately USD 250 per month. Unfortunately, a very large number of people with diabetes in India actually remain undiagnosed. Even if they are diagnosed, they can rarely pay for the insulin themselves even though the prices of pharmaceutical products in India are the lowest in the world – a country where insulin prices are set by the government.

Gvija S Narayan,
diabetes educator, nurse,
Bengalore, India

"Most people in India bear their own health expenses. We must realise that diabetes is a condition best taken care of by the individual and family most of the time. I want to help people get the best out of existing but somewhat scarce resources, namely money, time and trained educators. Belonging to the first generation of diabetes educators, I have tried to reach out to people and families with diabetes. Thanks to the three-day course that I attended through the Novo Nordisk Education Foundation, I feel equipped to start training the next batch of diabetes educators. My wish is a rightful place for the concept of diabetes education and educators in India."

A NON-PROFIT-MAKING ORGANISATION
The issue of providing access to medication is everpresent in India. This problem cannot be solved by the pharmaceutical industry alone. However, being faced every day with the shortcomings of the health care system, Novo Nordisk in India chose in 1998 to set up an independent non-profit-making foundation called the Novo Nordisk Education Foundation.

Novo Nordisk funds the foundation, apart from donations, but there are no advertisements for Novo Nordisk’s products in conjunction with the foundation’s activities. These activities involve both training and awareness programmes, and research, as well as support to centres of excellence around India.

Huge gaps remain in the treatment of diabetes in India. It is a case of making the best use of the limited resources available.

INTERNET
- http://www.diabeteseducation.org

DIALOGUE
Anil Kapur, general manager, Health Care, India
Tel: (+91) 805 598 568, e-mail: akap@novodk
CASE STUDY FROM FRANCE
MANAGING CHANGE IN CHARTRES

In 1998, the French government passed legislation to enable people to work less hours. Accordingly, Novo Nordisk has implemented shorter working hours in 1999. Ironically, employees at our Chartres site outside Paris have never worked harder. Chartres has been through a tough period and is now striving to change things for the better. A high level of decentralisation, with the Novo Nordisk Way of Management as the guiding principles, makes the role of managers crucial, but this decentralised approach doesn’t deliver success automatically – people deliver it.

In Chartres, Novo Nordisk employs 198 people in a factory preparing insulin. A new unit was inaugurated in 1999, creating 60 new jobs and 10 more to come in 2000 when capacity is increased. Production is planned to almost double over the coming 2-3 years. Today, the site exports to 15 countries in Europe.

35 HOURS
One of the main labour issues in France recently has been new legislation to reduce the normal working week for salaried and hourly-paid workers from 39 hours to 35 hours. The rationale is to create more jobs by dividing work between more people.

With the new unit coming into production, it was necessary to introduce a new shift system to accommodate new working hours. An agreement was made to start shift work on Saturdays in line with the practice at some other factories in Novo Nordisk. However, working on Saturdays has quite an impact on family life.

RESULTS FROM THE EMPLOYEE SURVEY, CHARTRES, FRANCE

| My company manages organisational changes well | 11% | 22% | 33% | 25% | 10% |
| It is difficult for me to balance my home and work life responsibilities | 13% | 19% | 35% | 22% | 13% |
| Most days I’m enthusiastic about my job | 13% | 17% | 18% | 22% | 20% |

Although in theory the legislation should give more free time to employees at Chartres (ten days extra holiday), many experienced that they had to work harder during 1999. This was because the site was under pressure to live up to its annual production targets and many people were asked to work overtime. On top of that, the new extension to the factory was being fine-tuned and validated in 1999. All these changes around the same time put extra demands on both management and employees.

Today, it is commonly agreed according to employee representatives and management that the decisions regarding the organisation of work could have been made in a better way. Since March 1999, a number of changes have been made in the management group and the management style has changed significantly towards a more open and inclusive approach in accordance with the Novo Nordisk Way of Management.

LEARNING FROM EXPERIENCE
Too much change within an organisation in a short space of time can lead to demotivation and anxiety. We have learnt from Chartres that in a period of change, transparency and clear communication are essential for making a smooth transition. Management states that it is of critical importance that all levels in the organisation understand the strategy and that employees are consulted about the changes taking place. Not least, all layers of management must be trained to be able to handle this kind of process.

Having overcome the difficulties of 1999 by the end of the year, the Chartres site is now ready for a new start. Some of the key issues for 2000 will be: visible and clear management targets, better defined responsibilities, implementation of self-managing teams and empowerment. For more information, see also the site report from Chartres on page 61.

Eric Vincent,
union representative
for CTCF, Novo Nordisk,
France

"The management group wanted to sign the agreement on the reduction of working hours and at the same time introduce the new shift system and that was very unpopular in the factory. The new shift system could have been introduced later and, most of all, the employees should have been consulted more about the changes. With the new management group, a better discussion with the employees and the union began. Now in 2000 we really have a good communication."

Eric Vincent (left), union representative for CTCF, one of three unions with members at the Chartres plant. The other two unions, CGT and CFDT, are represented by Claude Grubert and Alain Thibaudeau respectively.

DIALOGUE:
Eric Drapé, site manager, Chartres, France
Tel: (+33) 237916100, e-mail: edra@novo.dk
Approximately 100 people are involved in marketing and sales in our Health Care company in France. They are working within three product areas: diabetes care, growth hormone and NovoSeven® (for treating haemophilia). Diabetes care is the largest area and our customer-related activities within this area are reported on here. One customer group is the specialists who are experts on diabetes. A second category of customers is family doctors, no less important in fighting diabetes but perhaps less knowledgeable about it.

CUSTOMER SURVEY
At the end of 1999, we asked an external consultant to carry out a qualitative customer survey of diabetes specialists in France. The initial findings show that Novo Nordisk in general has a good image based on, for example:

- Consistently high quality products
- A long history in the market
- A relevant educational approach
- A reliable, qualified and efficient sales force

These findings indicate that Novo Nordisk is perceived to have strong expertise and to provide high product and service quality. However, according to the survey results the specialists want a greater variety of products than those that are currently available. Although the full survey will not be completed until March 2000, the preliminary findings suggest that Novo Nordisk should continue to provide high quality service as a way of differentiating us from our competitors.

WORKING TOGETHER
It appears that there is still much work to be done in a developed country such as France despite an advanced health service. In 1999, the French Social Security carried out an extensive survey on the treatment of Type 2 diabetes (adult-onset diabetes). The results showed that the overall care given was still far from being optimal.

The family doctor plays a major role in the care of people with diabetes. A well-functioning network connecting the general practitioner and the specialists is therefore of vital importance.

Novo Nordisk believes that a good way to treat diabetes is to bring all the relevant forces together. The French authorities expect the healthcare industry to assist in increasing awareness within the field of diabetes. It is clear to all that being involved in educational programmes also provides a marketing tool for Novo Nordisk, though in a less direct way than advertising. Choosing to do business in a way that also alleviates some societal problems is well in line with one of the goals in our Vision21: "to improve the way people live and work".

COORDINATED EFFORTS
Building on the NovoCare® programme (see page 29 for more details), our next step will be to facilitate networks between the relevant health care professionals whoever they may be: general practitioners (GPs), specialists, nurses or psychologists. Often these professionals do not have access to all the relevant information on a particular patient. By putting updated medical records into a centralised database – naturally with the consent of the patient – we expect to enhance the treatment of people with diabetes.

A pilot project was set up in 1999 with the participation of 30 physicians. Here we are trying to move from a fragmented view to coordinated management of the disease by:

- Developing a network between GPs and specialists
- Training and educating GPs
- Implementing a data system so that all relevant data regarding a patient’s disease and treatment can be shared by all relevant parties
- Sharing data with health care authorities

If the project is successful, it will be extended to other parts of France.

DIALOGUE
Corinne Segalen, general manager, Health Care, France
Tel: (+33) 146845900, e-mail: cseg@novo.dk
We keep our eyes open for opportunities to protect the environment. This often saves us money too.
The strength and pulse of environmental work at Novo Nordisk is the commitment of employees at all levels in the organisation. It is the engagement of many employees all over the world that creates continuous improvements — and sometimes it even saves costs.

At Novo Nordisk, we continually measure and document our environmental efforts. To do this, we use a number of environmental performance indicators as listed in the table on page 37. The focus of our reporting over the years has been on the environmental performance of our production processes. This is where the majority of our environmental impacts are generated. During 1999, we have implemented the further expansion of our corporate indicators. The eco-productivity indices now include both basic production and the finishing stages of production. This is an important element of the ongoing efforts to quantify our environmental performance. A summary of our environmental performance in 1999 is given on page 41.

RESPONSIBLE
We shall conduct our business in a socially and environmentally responsible way and contribute to the enrichment of the communities in which we operate.

From the Charter for companies in the Novo Group

Living up to the principles of the International Chamber of Commerce (ICC) Business Charter for Sustainable Development is an ongoing goal and we present a rating of how far we have come.

Compliance with environmental regulations worldwide is a primary task. Furthermore, our efforts are focused on the environmental targets we set ourselves every year at our factories throughout the world.

Finally, Novo Nordisk’s environmental policy gives the overall framework for our environmental management work. This policy calls for continuous improvement in our environmental performance. In practice, we do this by reducing the impact of our production processes on the environment, and by developing new products that lead to direct environmental improvements for our customers.

On the following pages, we review developments in corporate environmental performance in the period 1997-1999. It should be noted that the data for 1997 and 1998 has been adjusted from the 1998 report in order to include the Danish subsidiary FeF Chemicals in the corporate totals in contrast with previous practice. Our joint venture in Suzhou, China, is not included in the totals.
A fundamental aspect of Novo Nordisk's environmental policy is our effort to comply with global environmental legislation in the countries where we operate and to meet the other requirements and declarations of intent to which the company is party. We have selected a number of indicators to evaluate our environmental compliance.

**BREACHES OF REGULATORY LIMIT VALUES**

Environmental authorities worldwide stipulate a number of conditions for the production approvals for our factories. For some conditions, there are set regulatory limits for emissions of particular substances to the environment. We regularly monitor and document our compliance with the environmental requirements.

In 1999, we did not achieve our target of avoiding repeated breaches of regulatory limits. Fifteen (15) different limits were breached, of which five were breached on two or more occasions.

A total of 131 breaches of regulatory limit values were registered at our factories worldwide. This is a marked increase compared to the 76 breaches registered in 1998. The primary reason is problems with waste water treatment at our enzyme factories in Suzhou in China and Araucária in Brazil. The waste water treatment plant in Brazil has been optimised in 1999, and the problem is now solved.

As regards Suzhou in China, the treatment capacity of the purification plant has been expanded, and the optimised plant was commissioned in December 1999. Since then, no further breaches have been recorded.

Our target to avoid repeated breaches of regulatory limit values will be maintained in 2000.

**ACCIDENTAL RELEASES**

We recorded one accidental release of genetically modified microorganisms (GMOS) and therefore did not achieve our target of zero releases for 1999. The incident happened in the pasteurisation plant at our Gentofte site in Denmark when waste water with a low content of genetically modified E. coli bacteria was accidentally released into the public sewage system from a leaky heat exchanger. The incident was reported to the environmental authorities and the equipment was subsequently repaired and improved in order to avoid similar incidents in future. Our target to avoid the accidental release of GMOS will be maintained in 2000.

Other incidents involved accidental releases and spillage of liquid waste, oil and chemicals to the outside environment. In 1999, a total of 26 accidental releases were registered, compared to 14 in 1998. As stated in the site reports (pages 56-65), in each case remedial measures were taken to collect or neutralise the pollutants where possible.

**COMPLAINTS FROM NEIGHBOURS**

We work to maintain good relations with the communities around our factories. The number of complaints from neighbours is therefore an important indicator in the evaluation of our environmental performance. Regrettably, we received a total of 55 complaints in 1999, which is an increase from 35 complaints in 1998.

A large proportion of the complaints concerned odours from enzyme production in Copenhagen and the waste water treatment plant in Kalundborg. In 1999, however, we have made considerable investments at both sites in environmental improvement measures, which are expected to reduce these problems to a minimum. See also the site reports on pages 56-57.

**LAWSUITS AND FINES**

In July 1996, a fine of USD 1,000 was imposed on our pharmaceutical facility in Clayton, USA, by the local authorities. This was due to an accidental release of approximately 1,100 litres of hydrochloric acid from our neutralisation system to the public sewage system. Action was taken immediately to minimise the problem. Subsequently, the management has initiated new procedures to avoid future incidents.

**INTERNATIONAL ENVIRONMENTAL NETWORK**

In 1996, Novo Nordisk created an international environmental network with the intention to promote and effectively integrate environmental management at our major production sites around the world. The objective of the network is to work for global improvement of Novo Nordisk's environmental performance. At the same time it is meant to be a vehicle for encouraging and increasing awareness and for sharing better environmental practices.
The network is composed of managers and environmental specialists from our largest production sites who meet on an annual basis. The main issues discussed at the 1999 network convention were the future key environmental challenges for Novo Nordisk. On this occasion we also established a number of cross-functional working groups. These groups will focus on issues such as validation and standardisation of sampling procedures and analysis for environmental purposes as well as data compilation and reporting. The first results from the working groups will be presented at the next international network meeting in Tianjin, China, in May 2000. The network is involved in setting the yearly targets for our environmental performance.

**SUPPLIER PERFORMANCE**

In 1999, we continued to develop our systems for environmental assessment of both existing and new suppliers. As an example, in future our suppliers will be asked to give additional information concerning the biodegradability of the raw materials they supply and to state whether they contain any toxic substances. The system has been developed to focus more on our suppliers' capability of documenting good environmental performance rather than simply accepting non-committal statements of intent.

During 1999 Enzyme Business identified which of our main raw materials have the most critical impact on the environment. In 2000 we will draw up an action plan for raw materials containing environmentally hazardous substances and, where possible, specify more acceptable alternatives.

**INTERNET**

- List of all breaches of regulatory limits, accidental releases and complaints from neighbours
- Green accounts for our sites in Kalundborg, Copenhagen, Gentofte and Hillerød
- Environmental data for all factories
- Membership of environmental associations and networks
- Procedure for data compilation
- Definition of the ICC principles
- Novo Nordisk's Environmental Policy

**ENVIRONMENTAL INDICATORS**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Impact on environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSUMPTION OF WATER</td>
<td>Depletion of drinking water</td>
</tr>
<tr>
<td>Quantity and EPI</td>
<td>-</td>
</tr>
<tr>
<td>CONSUMPTION OF RAW MATERIALS AND PACKAGING</td>
<td>-</td>
</tr>
<tr>
<td>Quantity</td>
<td>-</td>
</tr>
<tr>
<td>CONSUMPTION OF ENERGY</td>
<td>Depletion of fossil fuels</td>
</tr>
<tr>
<td>Quantity (GJ) and EPI</td>
<td>-</td>
</tr>
<tr>
<td>DISCHARGE OF WASTE WATER</td>
<td>-</td>
</tr>
<tr>
<td>Volume</td>
<td>-</td>
</tr>
<tr>
<td>Suspended solids</td>
<td>-</td>
</tr>
<tr>
<td>COD</td>
<td>Oxygen depletion</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Eutrophication</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Eutrophication</td>
</tr>
<tr>
<td>DISPOSAL OF SPENT BIOMASS</td>
<td>-</td>
</tr>
<tr>
<td>Volume</td>
<td>-</td>
</tr>
<tr>
<td>Dry matter</td>
<td>-</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Fertilisation</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Fertilisation</td>
</tr>
<tr>
<td>DISPOSAL OF WASTE</td>
<td>-</td>
</tr>
<tr>
<td>Amount per disposal type:</td>
<td></td>
</tr>
<tr>
<td>Recycling</td>
<td>-</td>
</tr>
<tr>
<td>Landfill</td>
<td>-</td>
</tr>
<tr>
<td>Incineration</td>
<td>-</td>
</tr>
<tr>
<td>Controlled destruction</td>
<td>-</td>
</tr>
<tr>
<td>AIR EMISSIONS</td>
<td>-</td>
</tr>
<tr>
<td>Emissions from our production:</td>
<td></td>
</tr>
<tr>
<td>Organic solvents</td>
<td>Global warming and ozone layer depletion</td>
</tr>
<tr>
<td>Emissions from energy production:</td>
<td></td>
</tr>
<tr>
<td>CO₂</td>
<td>Global warming</td>
</tr>
<tr>
<td>SO₂</td>
<td>Acidification</td>
</tr>
<tr>
<td>NOₓ</td>
<td>Acidification, eutrophication</td>
</tr>
<tr>
<td>COMPLIANCE</td>
<td>-</td>
</tr>
<tr>
<td>Breaches of regulatory limits</td>
<td>-</td>
</tr>
<tr>
<td>Accidental releases (GMOs, chemicals, waste materials)</td>
<td>-</td>
</tr>
<tr>
<td>Complaints over nuisances</td>
<td>-</td>
</tr>
<tr>
<td>Environmental projects</td>
<td>-</td>
</tr>
</tbody>
</table>

**NOVO NORDISK'S PROGRESS ON ENVIRONMENTAL PERFORMANCE IN RELATION TO ICC'S BUSINESS CHARTER FOR SUSTAINABLE DEVELOPMENT. THE 1999 RATING HAS BEEN PERFORMED BY NOVO NORDISK AND REVIEWED BY DELOITTE & TOUCHE**

<table>
<thead>
<tr>
<th>Principle</th>
<th>97</th>
<th>98</th>
<th>99</th>
<th>Current challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Corporate priority</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>2. Integrated management</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>Global management systems and auditing programme</td>
</tr>
<tr>
<td>3. Process of improvement</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>4. Employee education</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>Strategy and definition of targets</td>
</tr>
<tr>
<td>5. Prior assessment</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>6. Products and services</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>LCA on selected products</td>
</tr>
<tr>
<td>7. Customer advice</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>8. Facilities and operations</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>9. Research</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>Waste management</td>
</tr>
<tr>
<td>10. Preventative approach</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>11. Contractors and suppliers</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>12. Emergency preparedness</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>13. Transfer of technology</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>14. Contributing to common effort</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>15. Openness to concerns</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>16. Compliance</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>Global auditing</td>
</tr>
</tbody>
</table>

1. Evaluating practice
2. Developing plans
3. Implementing plans
4. Practice in place
5. Regular evaluation for improvement opportunities
CASE STUDY FROM THE ENZYME FACTORY IN COPENHAGEN

EMPLOYEE INVOLVEMENT CREATES ENVIRONMENTAL AWARENESS

Novo Nordisk’s enzyme factory in Copenhagen is certified according to ISO 14001, which is an international environmental management standard developed by the International Standardization Organization. The international standard stipulates continuous improvement in a company’s environmental performance. To meet the requirements of ISO 14001, it is vital that the environmental management system is firmly established throughout the organisation.

In production the operators know every aspect of their processes and where savings can be made. Therefore, at Novo Nordisk’s enzyme factory in Copenhagen we made an effort right from the start to involve our employees actively in the continuous environmental improvements. Interviews were held with the majority of the production employees, who were encouraged to suggest environmental improvement measures. During the last few years we have received a total of 242 suggestions from employees, mostly at the beginning of the ISO project when major improvements were implemented. The suggestions were sent directly to the factory’s management, who in turn responded to all the suggestions. Today around one-third of these suggestions have been implemented.

In general, employees have been very creative. A good example is the washing of tanks, which was previously performed manually in several stages with a relatively high consumption of water. Today, this process has been replaced by a fully automatic washing system. Besides significantly reducing the consumption of cleaning water, the new system also cuts down cleaning time.

Final environmental certification of our Copenhagen factory according to ISO 14001 was obtained in autumn 1998. In 1999, certification was extended to include the approval of an energy management system at this site, which is now fully integrated into the existing quality and environmental management system. Today’s involvement of all employees in ensuring efficient energy utilisation has significantly reduced the factory’s energy consumption per unit of product recovered in 1999. ISO 14001 not only means environmental improvements. The system has also given a number of extra benefits, not the least of which is that our employees are prepared to take on more responsibility.

Our enzyme production sites in the US, Brazil, Denmark and China are working towards obtaining ISO 14001 certification by the end of 2000.

Bjarne Ribsberg Knudsen, quality controller,
Novo Nordisk,
Copenhagen, Denmark

"Earlier we let production more or less take care of itself. Today, you will never see a dripping water pipe on the floor. We really compete to make good suggestions and in production we have become much more aware of the environment. The systems have not made work more difficult. On the contrary, they make all of our lives easier. Procedures have been written down describing what can go wrong. We all know where to find this information. But this is an ongoing process and we are not stopping here. As long as there are processes which have to run, it is possible to optimise and improve."

Environmental management according to ISO 14001 — What does it mean for Novo Nordisk?

Environmental management is a systematic, documented method of handling the environmental aspects of a factory. To be systematic, the relevant environmental conditions must be spotlighted and described. On the basis of this, targets are set for further environmental work by close cooperation between management and employees. These targets must lie within the framework of Novo Nordisk’s environmental policy and strict plans of action are drawn up in order to implement them. A company applies for certification by one of the national organisations authorised to issue environmental certificates. However, the process does not end when the ISO 14001 certificate has been awarded. Each year the environmental management system must undergo a follow-up audit to ensure that the factory still meets the target of continuous improvement in environmental performance.
ACCOUNTING FOR THE ENVIRONMENT

Quantifying the effects of our environmental measures in financial terms is a major challenge given the current status of environmental accounting frameworks. In 1999 we made progress towards achieving our target to develop and refine financial accounting systems for our environmental performance. In particular, we have expanded our eco-productivity indices (EPIs) to include the finishing stage of production. The EPI relates the scale of our production to the consumption of water and energy.

Calculating savings and cost avoidance for energy and water costs provides us with a useful business tool for documenting the value of our environmental measures. In 1999, we have used our EPIs to measure what impact changes in efficiency and prices have had on the energy and water costs in our production. The actual savings were DKK 13.2 million for energy and DKK 1.6 million for water compared with 1998. To calculate this, we have projected what the costs of water and energy would have been if productivity and prices had remained at the 1998 levels.

Actual energy costs (excluding energy taxes) were 5.6% less than projected costs for 1999 and actual water costs in 1999 were 5.2% less than projected costs for 1999. In 1999 total water and energy costs related to production represented 3.9% of total production costs.

ENVIRONMENTAL COSTS

Despite the significant increase (17%) in net turnover in 1999, Novo Nordisk’s environmental costs only rose by 3%, or DKK 7 million, to DKK 226 million. This was primarily a result of the increased efficiency of our biomass handling facilities, a decrease in waste water treatment costs and a relatively low increase in taxes on energy, SO₂ and CO₂ due to an overall improvement in energy efficiency.

Due to efficiency improvements it was possible to increase the production volume without incurring the same relative increase in energy consumption. Furthermore, an energy agreement signed with the Danish Energy Agency secured favourable tax rates on condition that Novo Nordisk invests in energy-saving measures (see page 40 for more information). The result was that the total expenditure on environmental energy taxes only increased by 6% to DKK 42.9 million.

In 1999, remediation costs for polluted sites were not very significant. Most of the costs of DKK 0.6 million were incurred at our site in Copenhagen. The costs relate to clean-up after two minor oil leaks.

ENVIRONMENTAL INVESTMENTS

Tota environmental investments, comprising end-of-pipe pollution abatement measures and measures to avoid spills and leakages, amounted to DKK 43 million. The total investment level has been almost halved in 1999 compared with 1998 due to the finalisation of a number of large investment projects at the international sites in 1998.

Pegula Bosshard, sustainability analyst, SAM Sustainability Group

“Sustainability from an investor’s perspective means looking for companies whose long-term prospects are bright and whose management is clearly superior and focused on principles that will lead to long-term growth in shareholder value. The Dow Jones Sustainability Group Index attempts to identify leading sustainability companies and our evaluation of Novo Nordisk found that they have fully integrated environmental and bioethical issues on a strategic end management level. We also appreciate Novo Nordisk’s eco-productivity indices, which are used by corporate and site level management to measure and report progress made in eco-efficiency.”

Dow Jones entered into partnership with the Zurich-based SAM Sustainability Group to form the Dow Jones Sustainability Group index, a benchmark of over 2,000 companies based on sustainability criteria. Novo Nordisk is among the top 220 sustainable companies selected for inclusion in the index.
At Novo Nordisk environmentally sound production often goes hand in hand with improved productivity. As a result, we can reduce the impact of our activities on the global, regional and local environment by improving processes and products, optimising the use of resources, and minimising emissions and waste streams. The sum of all these efforts is improved eco-efficiency, an indication that we need fewer resources to produce a given amount of products while reducing the impact on the environment per unit produced.

The diagram on page 41 gives a summary of our environmental performance in 1999 with associated resource consumption and emissions. The indicators we use for monitoring and reporting on our environmental performance are listed in the table on page 37.

As our production expands, so does our consumption of resources. However, at Novo Nordisk environmental awareness is closely linked with the more efficient use of resources. We therefore monitor our production by means of eco-productivity indices (EPIs) for water and energy. The EPI relates the scale of our production to the consumption of water and energy. An increase in the index is a positive trend indicating that we have been able to improve productivity by using fewer resources per unit produced.

Corporate EPIs are calculated on the basis of EPIs for each individual production site. In this report we present total indices for Novo Nordisk in order to give an overall picture of our environmental performance. Local production management sets its own operational targets using site-based indices. In accordance with our overall corporate target, we have further expanded our EPIs at both the site and corporate level to include all important production stages from fermentation to the finishing stages of production. In 1999, our EPIs covered 93% of Novo Nordisk's total water consumption and 79% of the total energy consumption. The development in corporate EPIs since 1991 can be viewed in the Internet version of this report.

As a member of the World Business Council for Sustainable Development, we are participating in an international project to develop internationally standardised eco-efficiency indices.

**ENERGY**

Our total energy consumption increased by 0.8% from 1998 to 1999. In the same period our EPI for energy rose by 9%. In total we have considerably improved our energy utilisation, and thereby comfortably achieved our target for 1999. The target for 2000 is an average increase of 4 percentage points in the energy EPI.

In 1998, Novo Nordisk entered into an agreement with the Danish Energy Agency to invest DKK 20 million over a period of three years in energy-saving measures at the enzyme sites in Kalundborg and Copenhagen.

In 1998, we also concluded the first agreements with Swedish Sydkraft on the purchase of environmentally certified hydroelectric power from Sweden. This is not only a more environmentally sound choice than electricity generated by coal or other fossil fuels, but is also a less expensive alternative for Novo Nordisk. With effect from 1 July 1999, we concluded a similar agreement with another Swedish electricity supply company, Elektra.
WATER
Novo Nordisk's total water consumption increased by 1% from 1998 to 1999. This is a very modest increase considering the fact that we have expanded production significantly, especially in Denmark, France and China. During this period our EPI for water increased by 9% showing that we have improved our efficiency in water utilisation.

The positive trend in 1999 results from the fact that throughout Novo Nordisk focus on water consumption has been intensified during 1999 by implementation of local water-saving projects. For example, our largest site in Kalundborg continued to work actively on reducing the factory's groundwater consumption, partly by taking water-saving measures and partly by increasing the use of surface water from a nearby lake. Other sites have concentrated their efforts on water recycling and alternative sources of water for cooling towers, heat exchangers and boilers.

RAW MATERIALS AND PACKAGING MATERIALS
The figures for consumption of raw materials and packaging have increased from 1998 to 1999.

Approximately 40% of our raw materials used in production are agricultural products such as potato starch, soya and sugar. Only a minor part of our total consumption of raw materials, about 1%, is substances which are hazardous to the environment or to health.
Most of Novo Nordisk’s products are manufactured by the fermentation of microorganisms in large tanks. For each specific product, we use a specific strain of microorganism, which is especially suited for expressing that particular product. The majority of the microorganisms used in our production are genetically modified in order to make them more efficient as producers of the desired product. This is not only an economic advantage but also an environmental one, as improved productivity means savings in energy, water and raw materials in the production process.

Microorganisms act as microscopic factories for the production of enzymes, human insulin and other pharmaceutical products.

Novo Nordisk only uses genetically modified (micro)organisms (GMOs) in closed tanks. Our production is based exclusively on well-characterised microorganisms that are non-toxic, that do not cause disease and are classified by the authorities as safe. When introducing a new genetically modified organism into the production, a thorough evaluation of the possible risks associated with contained use of the organism is required before the environmental authorities issue an approval for use on an industrial scale. This evaluation is done by Novo Nordisk, governmental bodies and independent research organisations.

As mentioned, production takes place in large fermentation tanks – the largest being almost three storeys tall. The organisms are fed with a nutritious broth consisting of water, minerals, vitamins and agricultural products such as soya beans, maize, sugar and potato starch. When the microorganisms grow and multiply, they secrete the desired product, e.g. insulin or a particular enzyme, into the fermentation broth.

**ADVANCED CONTROL OF THE PROCESS**

In order to keep the process running efficiently, special chemical and physical conditions must be maintained. One of the parameters that must be controlled is temperature. The organisms generate a considerable amount of heat, and therefore the tanks are equipped with cooling pipes to maintain an optimum temperature.

To grow adequately the microorganisms also need oxygen. Huge amounts of compressed sterile air are therefore blown through the fermentation broth. The air is emitted to the external environment and can result in unpleasant odours being released from the fermentation plants.

**RECOVERING THE END-PRODUCT**

The end-product constitutes only a small proportion of the contents of the fermentation tank. It is recovered through separation and a series of purification stages in which water, filter aids, salts and in some cases solvents are used. Although they are made industrially under artificial conditions, the active constituent in many of Novo Nordisk’s products is identical to the corresponding ‘product’ made in nature by a microorganism.

**AN OVERVIEW OF THE PRODUCTION PROCESS WITH ASSOCIATED RESOURCE CONSUMPTION AND EMISSIONS**

<table>
<thead>
<tr>
<th>Step</th>
<th>Resource Consumption</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FERMENTATION</strong></td>
<td>GMOs, water, energy, raw materials, air</td>
<td>CO₂, SO₂, NOₓ, air (odour)</td>
</tr>
<tr>
<td><strong>RECOVERY AND FINISHING</strong></td>
<td>water, energy, raw materials, air</td>
<td>biomass, waste water, solid waste, CO₂, SO₂, NOₓ, air (odour), organic solvents</td>
</tr>
<tr>
<td><strong>PACKAGING OF PRODUCTS</strong></td>
<td>energy, packaging materials</td>
<td>CO₂, SO₂, NOₓ, solid waste</td>
</tr>
<tr>
<td><strong>TRANSPORT TO CUSTOMER</strong></td>
<td>energy</td>
<td>CO₂, SO₂, NOₓ</td>
</tr>
</tbody>
</table>

**UTILISATION OF THE WASTE**

The remainder of the contents of the fermentation tank – the waste – consists of the spent microorganisms, nutrient residues and large quantities of water. It contains no toxic substances, but because of the richness of nutrients, it could, if released untreated into rivers or the sea, cause excessive growth in algae populations, resulting in a lack of oxygen in the water.

For example, one by-product of our insulin production is suitable as pig feed, namely the ‘yeast cream’. After insulin recovery, the fermentation broth is heated. This inactivates the yeast cells that have been used for the production of the insulin. Lactic acid bacteria are added in order to preserve the substance. The resulting yeast cream is a very nutritious product. In addition, it can serve as an alternative to antibiotic growth promoters due to the presence of lactic acid bacteria in the yeast cream.

Part of the waste from enzyme fermentation processes ends up as a liquid or solid fertiliser called NovoGro® which is rich in phosphorus and nitrogen. Before it is spread onto farmland, it is treated with lime, which inactivates the microorganisms and prevents decomposition during storage.

The remaining liquid waste is treated in waste water plants before it is released into the aquatic environment.
ENVIRONMENTAL PERFORMANCE - OUTPUTS
OUR MAIN WASTE STREAMS AND EMISSIONS

AMOUNT OF COD IN WASTE WATER AND DRY MATTER IN SPENT BIOMASS

DISCHARGED WASTE WATER AND SPENT BIOMASS

PHOSPHORUS CONTENT IN WASTE WATER AND SPENT BIOMASS

NITROGEN CONTENT IN WASTE WATER AND SPENT BIOMASS

LIQUID WASTE

Liquid waste is our major waste stream. It originates from the fermentation and recovery processes. In 1999, this waste category constituted 4,388,200 m³. This is a 3.4% increase from 1998.

There are two types of liquid waste from our production: a concentrated part called ‘biomass’ (26%) consisting of microorganisms, nutrient salts (nitrogen and phosphorus) and water, and the more diluted waste water, which contains only minor quantities of organic material and nutrient salts.

After inactivation, the biomass from enzyme production is recycled as fertilizer in a liquid form (NovoGro®) and in a concentrated form as a solid product (NovoGro® 30). The biomass from insulin production is reused as a feed supplement for pigs (yeast cream). The amount of liquid biomass has decreased by 10.6% from 1998, which is a consequence of an increase in the amount of concentrated biomass. Based on reuse of nitrogen and phosphorus, however, we have registered a slight increase of approximately 1% compared to 1998. Waste water from our factories is treated at our own or at the municipal waste water treatment plants before being released to the aquatic environment. The volume of discharged process waste water rose in 1999 by 8%.

OTHER WASTE

The total amount of other waste, primarily consisting of solid waste from our production, has decreased by 4% from 15,600 tons in 1998 to 15,000 tons in 1999.

An important element of our environmental policy is to minimize the generation of waste. We also endeavor to reduce the environmental impact of our waste production to a minimum by a strategy focusing on recycling and incineration for energy production in preference to landfill and controlled destruction.

Most of the waste from our production is non-hazardous consisting of, for instance, filter materials, paper, cardboard, plastic and metals. Of the total waste amount in 1999, approximately 25% was recycled, which is similar to 1998. The amount of material for incineration of 29% also remains unchanged compared to last year. The share of waste for dumping at landfills was reduced by 6%, whereas the share of hazardous waste, including oil and chemical waste, increased by 5% during the year. Today, hazardous waste for controlled destruction constitutes approximately 17% of the total volume of solid waste.

At our production site in Bagsværd, in order to comply with more stringent regulatory requirements for the handling of chemical waste, we have established a new and modern waste treatment centre, which was inaugurated in 1999. The purpose was also to rationalize the collection and sorting of waste for recycling. For more information, see the case study on page 46.
EMISSIONS TO AIR

Novo Nordisk’s production generates emissions to air, which have an impact on both the local and global environment. The energy consumption in most of our processes is based on the combustion of fossil fuel. The primary emissions from the production of energy are carbon dioxide (CO₂), sulphur dioxide (SO₂) and nitrogen oxides (NOₓ), which contribute to the greenhouse effect, acidification and eutrophication of the aquatic environment. The emissions also contain organic solvents (mainly ethanol and acetone) and minor quantities of ozone-depleting substances (CFCs and HCFCs for cooling), which contribute to the greenhouse effect and the degrading of the ozone layer in the stratosphere.

A high priority task in 1999 in our efforts to minimise these environmental impacts was the strong focus on further improvement of our energy utilisation. The fact that we have significantly improved our eco-productivity index for energy by 9% from 1998 to 1999 documents that these efforts have been largely successful. Throughout the Group we have focused on reducing energy consumption. During the year our enzyme factory in Copenhagen has introduced an energy management system as an integrated part of the existing environmental management system, which was certified according to ISO 14001 in 1998. Our other enzyme factories around the world are expected to follow suit before the end of 2000. In Health Care targets have been set for the incorporation of environmental and energy management in existing management systems.

<table>
<thead>
<tr>
<th>EMISSIONS TO AIR</th>
<th>97</th>
<th>98</th>
<th>99</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENERGY-RELATED</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂ internal 1)</td>
<td>1,000 tons</td>
<td>79.4</td>
<td>79.9</td>
</tr>
<tr>
<td>CO₂ external 2)</td>
<td>1,000 tons</td>
<td>351</td>
<td>256</td>
</tr>
<tr>
<td>SO₂ internal</td>
<td>tons</td>
<td>137</td>
<td>128</td>
</tr>
<tr>
<td>SO₂ external</td>
<td>tons</td>
<td>1,172</td>
<td>1,198</td>
</tr>
<tr>
<td>NOₓ internal</td>
<td>tons</td>
<td>193</td>
<td>196</td>
</tr>
<tr>
<td>NOₓ external</td>
<td>tons</td>
<td>502</td>
<td>504</td>
</tr>
<tr>
<td><strong>ORGANIC SOLVENTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organic solvents</td>
<td>tons</td>
<td>130</td>
<td>118</td>
</tr>
<tr>
<td>Chlorinated organic solvents</td>
<td>tons</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>OZONE-DEPLETING SUBSTANCES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFCs</td>
<td>kg</td>
<td>1,575</td>
<td>1,794</td>
</tr>
<tr>
<td>HCFCs</td>
<td>kg</td>
<td>223</td>
<td>265</td>
</tr>
<tr>
<td><strong>ENVIRONMENTAL IMPACT POTENTIALS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global warming</td>
<td>1,000 tons CO₂-eqv</td>
<td>436</td>
<td>381</td>
</tr>
<tr>
<td>Ozone depletion</td>
<td>kg CFC₁₁-eqv</td>
<td>245</td>
<td>289</td>
</tr>
<tr>
<td>Acidification</td>
<td>tons SO₂-eqv</td>
<td>2,074</td>
<td>2,025</td>
</tr>
</tbody>
</table>

1) Produced on site
2) Produced externally
In 1999, our Kalundborg factory, Novo Nordisk’s largest production site, entered into new agreements on the purchase of environmentally certified electricity based on hydroelectric power, this time with the Swedish electricity supply company, Elektra. The company holds a licence from the Swedish Society for Nature Conservation to sell hydroelectric power under the eco-label ‘Good Environmental Choice’. In 1999, a total of 136 GWh (489,000 GJ) of environmentally certified electricity was supplied covering 67% of the Kalundborg factory’s total electricity consumption. In addition to financial savings, the supplies of hydroelectric power gave a similar reduction in the emissions of CO₂, SO₂ and NOₓ derived from the factory’s energy consumption. In 1999, the company’s total contribution to the greenhouse effect was reduced by 7% compared to 1998.

The emission of organic solvents (mainly ethanol and acetone) to the atmosphere from the Group as a whole has decreased from 118 tons in 1998 to 104 tons in 1999 (including Novo Nordisk’s chemical company FEF Chemicals, which has not previously been part of the corporate totals). As for ozone-depleting substances, the total emission of CFCs has decreased from 265 kg in 1998 to 113 kg in 1999, whereas the emission of HCFCs has increased during the same period from 1,794 kg to 3,793 kg. Our contribution to the depletion of the ozone layer has nonetheless been reduced by approximately 16% from 1998 to 1999 due to the fact that the relatively less harmful HCFCs have a considerably lower ozone-depleting effect than the CFCs.

TRANSPORT
Our activities comprise transportation of raw materials, finished products and waste. In 1999, we have concentrated particularly on refining the methods for the assessment of various emissions from road transport of raw materials and finished products to and from our production sites in Denmark. A complicated distribution system makes it extremely difficult to create a complete overview of the environmental impact. However, thanks to a close cooperation with our road transport suppliers, we are obtaining more and more detailed data. This will form the basis for assessing and improving our environmental performance.

We have reduced the emissions per kilometre transported in 1999 compared to 1998 when we started reporting this kind of data. This improvement, which can be seen in the table on page 46, primarily results from the fact that we have lived up to one of the main principles of our global transportation requirements, namely the aim to optimise the use of each transport unit to reduce emissions. Novo Nordisk’s Global Transportation Requirements can be found in the Internet version of this report.

Case study from Copenhagen, Denmark
AIR PURIFICATION PLANT RELIEVES ODOUR PROBLEM
Novo Nordisk’s enzyme factory in Copenhagen is located in one of the most densely populated areas in the capital. Unfortunately odour from the fermentation plant has periodically caused irritation for the residents of the neighbourhood. Over the years we have made serious efforts to alleviate the odour problem. Recently, in November 1999, we installed a new air purification plant designed to reduce the odour to a minimum. The new plant will also significantly reduce the emission of enzyme dust from fermentation tanks.

The major source of the smell is the fermentation process in the enzyme production. This process requires large quantities of air, which is blown into the bottom of the fermentation tanks and released through the high chimney of the factory. Under certain weather conditions, for instance when there is no wind, the exhaust air can descend from the chimney and settle in the neighbourhood leaving an unpleasant smell.

All the air from fermentation and enzyme granulation is passed through the new air purification plant before being released through the chimney. The plant warms the air to 820°C thereby eliminating the smell.

The strong heating of the air requires more energy from the burning of fuel oil and thereby results in increased emissions of CO₂. However, the plant is designed to reuse more than 95% of the heat energy. It is therefore our general opinion that the plant has an overall positive environmental impact, not least for the benefit of our neighbours.

The air purification plant cost about DKK 20 million. Commissioned in November 1999, the plant is expected to be fully operational in spring 2000.
EMISSION ASSESSMENTS FOR PART OF OUR EXPORT/IMPORT BY TRUCK

<table>
<thead>
<tr>
<th></th>
<th>98</th>
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<th>99</th>
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<tbody>
<tr>
<td>Tons</td>
<td>16,849</td>
<td>32,535</td>
<td>11,043</td>
<td>30,337</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Km (1,000)</td>
<td>677</td>
<td>1,287</td>
<td>611</td>
<td>2,470</td>
<td>11.3</td>
<td>80.4</td>
</tr>
<tr>
<td>EMISSION</td>
<td>(g/kg)</td>
<td>(g/kg)</td>
<td>(g/kg)</td>
<td>(g/kg)</td>
<td>(g/m²)</td>
<td>(g/m³)</td>
</tr>
<tr>
<td>Diesel oil consumption</td>
<td>14.77</td>
<td>14.10</td>
<td>17.11</td>
<td>16.20</td>
<td>277</td>
<td>269</td>
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<tr>
<td>CO₂</td>
<td>46.61</td>
<td>46.69</td>
<td>54.34</td>
<td>51.33</td>
<td>978</td>
<td>852</td>
</tr>
<tr>
<td>NO₂</td>
<td>0.04</td>
<td>0.00</td>
<td>0.06</td>
<td>0.04</td>
<td>12.49</td>
<td>10.74</td>
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<td>0.03</td>
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<td>0.98</td>
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<tr>
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<td>0.005</td>
<td>0.004</td>
<td>0.103</td>
<td>0.110</td>
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</tbody>
</table>

In 1999, LT (Less Truck Load) shipments are included in the figures compared to 1998, which only included FT (Full Truck Load) shipments. The 1998 figures have been recalculated to provide comparability between 1998 and 1999. This means that the 1998 figures in last year’s Environment and Bioethics Report are not comparable to the figures stated in this report.  ** 1998 data was collected from July-Dec.

In 1999, in cooperation with transport suppliers and trade organizations, we have particularly concentrated on emission assessments for transportation within Europe by ship as compared to road. The results can be viewed in the Internet version of this report. We have also collected data on emissions for transport of products from Denmark to the UK and Norway by ship. In the first quarter of 2000, the results will be published in the final report from the TransECO2 project in which Novo Nordisk participates actively in cooperation with the Danish Ministry of Transport.

Our target in 2000 is to continue improving the methods for reporting emissions especially for short shipping routes by sea within Europe and to use the results to reduce environmental impact. However, significant results within the area of transportation can only be reached in close cooperation with the authorities as well as trade organisations and transport suppliers.

Case study from Bagsværd, Denmark

NEW WASTE CENTRE FOR IMPROVED RECYCLING

At the Bagsværd site in Denmark, Novo Nordisk has invested DKK 7.5 million in establishing a new waste recycling and treatment centre inaugurated in June 1999. This was primarily to comply with more stringent regulatory requirements for the handling of chemical waste. The purpose is also to rationalise the collection and sorting of waste for recycling. The centre is designed according to the same principles as a Danish municipal waste recycling station with containers for recyclable waste including paper, cardboard, wood, plastic and various metals. There are also special facilities for handling clinical and chemical waste. In autumn 1999, the waste centre was nominated for the Environmental Award of the County of Copenhagen.

We generate considerable amounts of waste at the Bagsværd site. As Novo Nordisk’s headquarters, with 4,517 employees, it is the largest workplace in the Group. Besides administration, the site includes insulin and enzyme production units as well as laboratories, and research and pilot plant facilities. The new centre means that the staff of eight involved in waste handling are now gathered at one location in new, modern, purpose-built facilities with optimum working conditions.

The centre handles around 25% (approx 615 tons) of the total amount of chemical waste produced by Novo Nordisk’s production sites in Bagsværd, Copenhagen, Genioffe and Hillerød. The waste site is specially designed to prevent the percolation of chemicals into the subsoil. In the event of any accidental spillage, the waste will be collected in an underground tank and sent for safe disposal.

One of the biggest advantages of the new recycling centre is the considerable improvement in waste sorting procedures. We therefore expect that the proportion of waste for recycling can be increased entailing considerable savings. At the same time the higher level of safety in handling chemical waste will be of benefit to both the environment at large and our working environment.
PRODUCT PERFORMANCE

Novo Nordisk’s main environmental impacts come from the manufacturing of enzymes and pharmaceutical products. Environmental and bioethical considerations must be integrated where appropriate into all stages of product development and production, use and disposal. We are able to offer our customers a wide range of enzymes that can improve their environmental performance, and we seek to discover and market new pharmaceutical products that fulfil unmet medical needs, for the benefit of patients and society.

Novo Nordisk is a global market leader in industrial enzymes, and we are continuously improving the performance of our enzyme products. We often enter into direct partnerships with our customers on developing new enzymatic applications, which typically are more environmentally sound than conventional processes. Enzymes are used in a number of industrial sectors, including detergents, textiles, paper and leather, where they are often used as a substitute for traditional chemicals. For example, enzymes can help to reduce the use of chlorine compounds in the manufacturing of paper. Other enzymes are added to animal feed to improve the nutritional value and minimise potential pollution from phosphorus in nature.

ENVIRONMENTAL ASSESSMENT TOOLS

Novo Nordisk’s environmental responsibility does not end when our products are handed over to the consumers. We perform environmental risk assessment of our health care products when applying to the regulatory authorities for marketing authorisation for our products. During this phase we examine the environmental consequences related to the patients’ use of the medicine and the excretion of substances metabolised in the body. We also assess the possible environmental impact of the users’ disposal of unused products, devices and packaging material. On the package leaflet accompanying the pharmaceutical products we urge the users to be environmentally responsible by handing in leftover products and packaging materials to the pharmacies for special destruction.

In Enzyme Business it is our aim is to perform a simple preliminary assessment of the environmental impact of our products in development. The assessment will help us to develop environmentally sound products, and during 1999 we have tested a first working model. In order to exchange experiences within this field, we are participating in a project group under the OECD Working Party for Biotechnology.

NEW ENZYME FOR THE TEXTILE INDUSTRY

One of Novo Nordisk’s latest enzymes is BioPrep™ for the enzymatic scouring of cotton. Scouring is one of the processes that cotton yarn or fabric must go through before it can be dyed. The purpose of scouring is to remove various impurities in the cotton, that is, the non-cellulosic components found in native cotton.

Today, highly alkaline chemicals such as sodium hydroxide are used for scouring. The waste water from this process is highly polluted. In addition, the chemicals not only remove the impurities but also attack the cellulose, leading to a reduction in the quality of the cotton.

Enzymatic scouring – or ‘BioPreparation’ as the process is called – can run under mild conditions. Instead of extremes of pH and temperature, BioPreparation can run at moderate temperatures and pH. Auxiliary chemicals are needed, but due to the mild reaction conditions, less durable and more biodegradable chemicals can be chosen.

The actual cost of using BioPrep™ with the necessary auxiliaries does not exceed the cost of traditional alkaline processes. It even works out cheaper when savings in energy and water consumption are taken into account. The rinsing water can be reduced by up to half depending on the equipment, and as warm rinsing water is sometimes used, considerable amounts of energy can be saved, too.

The BioPrep™ process can be applied in many textile mills without major changes to the production process.

? DIALOGUE

Environmental Issues

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You can never be too big to be decent to others.
A QUESTION OF RESPECT

The pace of change in the development and application of biotechnology is very rapid. In times of rapid change, society is challenged to examine its ethical values.

Novo Nordisk bases much of its research, development and production on gene technology and other techniques of modern biotechnology. Furthermore, Novo Nordisk is dependent on the use of animals for research and testing. In addition, new pharmaceutical products have to be tested on people.

We appreciate that some of the ways we use animals and microorganisms cause concern to some people. Therefore bioethical considerations are very important to us in order to earn our licence to operate and innovate.

Though bioethical issues are often controversial, certain principles are widely accepted as a starting point for ethical deliberation. Firstly, we see the ability to benefit mankind in terms of health and quality of life as the guiding principle of our activities. It is also important in the process of creating benefit for some not to cause harm to others. We not only put great emphasis on avoiding physical harm or suffering, but we also emphasise autonomy and respect for human dignity. Finally, we recognise a duty to contribute to a just distribution of benefits and burdens among people. The latter principle also covers our relation with developing countries.

At Novo Nordisk, we define bioethics as "all ethical issues related to the use of life science technologies for the development and production of biotechnological and pharmaceutical products". We look at bioethics in the environmental, medical and animal spheres:

Environmental ethics covers primarily biosafety as well as aspects of access and benefit sharing, and intellectual property rights in relation to our use of natural resources.

Medical ethics covers ethical aspects of the development of pharmaceutical products such as clinical trials and the use of human cells and tissues.

Animal ethics covers ethical and welfare aspects of experimental animals and the use of genetically modified and cloned animals.

We are eager to discuss bioethics with our stakeholders in a meaningful and consistent way. We face a number of complex ethical issues. Our challenge is how to make ethical considerations fully operational and how to develop common methods of ethical assessment.
ENVIRONMENTAL ETHICS
THE GENE DEBATE AND RECYCLING OF BIOMASS

The use of gene technology is a key subject of our discussions with various stakeholder groups. One example in November 1999 was an open day held at two of our Danish production sites where members of the local community had a chance to learn more and debate gene technology. There was a valuable discussion with particular focus on the reuse of biomass as fertiliser on farmland. In this part of the report we will focus on the use of food enzymes made from genetically modified organisms, biodiversity and the safe use of biotechnology.

MODERN BIOTECHNOLOGY AND FOOD

One area where the use of gene technology arouses much debate is its application in food products. A growing number of Novo Nordisk's enzymes for food manufacturing are produced using genetically modified organisms (GMOs). As part of the production process the final enzyme product is recovered and purified, and therefore does not contain any GMOs. We always inform both our customers and other interested parties about the techniques and processes used to make our products. We acknowledge the wish of the public to know about the food they eat and to exercise their right to base buying decisions on ethical grounds.

The use of gene technology in food remains a controversial issue in certain countries and we will continue to play an active role in this debate. For example, in September 1999 we hosted a one-day conference on the use of genetic engineering. It was arranged by the Association of Biotechnology Industries in Denmark with speakers from industry, the Danish government, consumer groups and the academic world. One of the main topics was food.

BIODIVERSITY IN PRACTICE

Novo Nordisk uses a broad variety of natural resources (e.g. samples from soil, plants, or water) in its research and development programmes for new pharmaceuticals and industrial enzymes. In 1997, as part of our efforts to implement the Convention on Biological Diversity issued in 1992, we developed a set of Novo Nordisk requirements for the use of and access to genetic resources. In accordance with these requirements, all future relevant patent applications and publications will state the country of origin of genetic material covered by the Convention.

During 1999 we finalised the registration of genetic material used by Novo Nordisk (plants and microorganisms). It is now possible, for example, to track the origin of our samples of microorganisms.

BIOMASS – A VALUABLE WASTE PRODUCT

Our core production technology is fermentation using a range of selected microorganisms. This type of production gives rise to large quantities of nutrient-rich liquid waste known as biomass. The waste from the enzyme fermentation processes is converted into a fertiliser named NovoGro® whereas the waste from our insulin production is suitable as a protein-rich feed supplement for pigs called ‘yeast cream’.

Before being used as fertiliser on farmland or as pig feed, the biomass is inactivated. This ensures that all microorganisms are killed. Based on many years' experience and research, we consider the treated biomass to be safe.

WE LISTEN

The NovoGro® product and the yeast cream may contain small amounts of genes coding for resistance to specific types of antibiotics (see box opposite for more details). Some people are concerned about the use of antibiotic resistance genes in the biotech industry due to the general increase in antibiotic resistance in the environment and the potential impact on human health. One question is whether fragments of DNA containing antibiotic resistance marker genes in the recycled waste products could be transferred to pathogenic microorganisms in the environment.

The concerns of the public should be heard and treated with respect. We are therefore investigating the possibility of developing our new enzyme production strains without the use of antibiotic resistance marker genes. Where possible, we will introduce this technology for new production strains as soon as it is ready, hopefully within the next two or three years.

Novo Nordisk has already developed a new insulin production strain without antibiotic resistance marker genes. This strain will be introduced into production as soon as it has been approved by the authorities.

NOVOGRO®

Minute amounts of antibiotic resistance genes can be present in NovoGro® and therefore be released to the environment, although all genes are undergoing a natural degradation process. Despite optimal laboratory conditions, we have not been able to transfer resistance genes from DNA isolated from NovoGro® to other bacteria. In addition, all our findings suggest that there is no increase in the level of antibiotic resistance in the microflora in fields treated with NovoGro® for several years compared to fields not treated with NovoGro®.

YEAST CREAM

Studies focusing on the fate of recombinant DNA during the yeast cream process have enabled us to increase the degradation of the DNA to a level where it cannot be detected even when applying the most sensitive techniques. We are presently working on implementing this improvement in the yeast cream process in full-scale production.
MEDICAL ETHICS
A REGULATED AREA

This is the first time that we report on 'medical ethics' in our annual reporting on bioethics. However, for many years Novo Nordisk has incorporated ethical practices into the procedures that govern our way of doing clinical research.

INTERNET

- Novo Nordisk's requirements for the use of and access to genetic resources
- Article on the retrievability of two genetically modified production strains at the Kalundborg production site
- Position paper on the use of genetically modified organisms for food enzymes
- Position paper on the labelling of enzymes manufactured using genetic engineering
- A list of enzyme products produced using genetically modified organisms
- Novo Nordisk Enzyme Business' position on the use of antibiotic resistance genes in genetically modified microorganisms used for the production of enzymes
- International collaborations and external activities

DIALOGUE
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DIALOGUE
Medical ethics
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TARGETS 2000
- Implement the modifications of the yeast cream process in full-scale insulin production to ensure optimal degradation of the ampicillin resistance genes.
- Expand the field monitoring of microbial flora in fields treated with the fertiliser NovoGro®

TARGETS 2000
- Further develop our ethical code of conduct for the use of human cells and tissues in drug discovery and development.
- Establish an internal ethical code of conduct as regards gene therapy

USE OF HUMAN CELLS AND TISSUES

Human cells and tissues are used in the drug discovery and development programmes. The Convention on Human Rights and Biomedicine, issued by the Council of Europe, requires appropriate information and the consent of the person from whom the material originates. Furthermore, financial gain from dealing with the human body or its parts is prohibited by the convention. To ensure that Novo Nordisk is in compliance, we have recognised the need for further development of our internal ethical code of conduct for the future use of human cells and tissues.
ANIMAL ETHICS
THE SEARCH FOR ALTERNATIVES CONTINUES

Experiments on animals are a vital part of Novo Nordisk's research and development activities. Without these experiments, today it would not be possible to develop new products that are safe and effective and which can subsequently be approved by the regulatory authorities. Novo Nordisk has been working for many years to develop and introduce procedures that will reduce and/or replace animal experiments. As all animal experiments cannot be replaced in the foreseeable future, it is important that the care and use of the animals are continuously refined.

Professor William Russell

"The Three Rs are important for both animal welfare and for biomedical science.

Reduction in the number of animals used to obtain results of given precision both spares animals and maximises scientific efficiency.

Refinement of procedures, to minimise distress, is not only humane to the animals, but, avoids physiological stresses that disturb or invalidate the experimental results.

When we know enough for the replacement of conscious living animals by insentient material, such as tissue cultures, there are always scientific benefits.

The pharmaceutical and cosmetic industries can make great contributions to the progress of The Three Rs, and I am happy to say that they have already achieved much in this direction.

May the good work continue!"

1999 marked the 40th anniversary of the publication of "The Principles of Humane Experimental Technique", which Professor William Russell wrote together with R L Burch. This introduced the principles of The Three Rs: Reduction of the number of animals used, Replacement with alternative methods and Refinement of methods so as to avoid pain and discomfort.

Novo Nordisk supports the principles of 'The Three Rs': Reduction of the number of animals used, Replacement with alternative methods and Refinement of methods so as to avoid pain and discomfort.

The two main factors determining the annual total of animal experiments at Novo Nordisk are the number and type of ongoing research projects and the development phase of each particular project. In 1999, approximately 90% of our animals were used in the discovery and development of new pharmaceuticals, 6% were used for biological product control, that is the testing of the potency and quality of our products, and 4% were used for the safety assessment of enzymes. Within all these areas Novo Nordisk practises The Three Rs (see box on page 53 for examples from 1999). A 21% decrease in the number of animals used by Novo Nordisk has been achieved in 1999 compared to 1998.

The graph to the right shows the total number of animals used at Novo Nordisk and our contract research organisations. Details of the exact number of each animal species used are available on our Internet version of this report.

One of the areas where animal experiments could be considerably reduced is within biological product control. At Novo Nordisk, a task force was established in 1999 with the objective of reducing the number of animals used for biological product control by removing all unnecessary tests required by internal and external protocols. The task force has shown that a number of tests can be replaced with alternative methods and these will be adopted wherever possible. This is being facilitated by the trend towards a more open attitude from the authorities with regard to the use of alternatives.
Before alternative methods can be approved by the authorities they need to be validated. In 1999, we have validated a new assay for the blood sugar efficacy testing of human insulin. When approved by the authorities it will result in a reduction of the number of rabbits per assay from 24 to 8. We have also validated an in vitro test (LAL) to replace the endotoxin test (pyrogen) in rabbits. The test is used to examine raw materials for endotoxins. Furthermore, work is in progress to validate suitable in vitro tests to replace the eye and skin irritation tests of enzymes on rabbits. In collaboration with customers, we are also validating a less invasive test method for the assessment of the relative allergenicity of enzymes.

ETHICAL REVIEW AND COLLABORATIONS

In 1999, we conducted an internal ethical review focusing on the implementation of ‘Novo Nordisk Principles on Use of Animals’ issued in 1996, and the principles of ‘The Three Rs’. As a result of the review, we will now further develop our ethical code of conduct for the care and use of animals for experimental purposes.

We are working at an international level on the implementation of ‘The Three Rs’ through collaborations with several companies, universities and animal welfare groups. Novo Nordisk also participated in the Third World Congress on Alternatives and Animal Use in the Life Sciences in Bologna in September 1999.

INTERNET

- Principles for the use of animals
- Guidelines for monitoring the use of animals at contract research organisations
- Number of each animal species used, 1999
- International collaborations and external activities

DIALOGUE

Animal ethics
Hanne Gürler, director, Bioethics Management
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TARGETS 2000

- Further develop our ethical code of conduct in relation to the care and use of animals for experimental purposes.
- Continue working towards the removal and/or replacement of animal tests for the appropriate product approval and control.

Examples of Reduction, Replacement and Refinement

BIOLOGICAL PRODUCT CONTROL

- In Japan a partial replacement of the bioassay in rabbits with an in vitro (HPLC) assay for eight insulin products has been approved. This has resulted in a reduction of the number of rabbits used from 256 to 134 in 1999.
- A new glucagon bioassay test has been approved in all countries except the US. A 50% reduction in the number of rabbits is achieved.
- The general safety test on NovoSeven® has been abolished, saving the use of 100 mice and 40 guinea pigs in 1999 compared with 1998.
- An in vitro test (LAL) to replace the endotoxin test (pyrogen) in rabbits for the quality control of NovoSeven® has been validated and approved by the authorities in the US. This will result in a reduction of the use of at least 76 rabbits per year.
- The EU has approved the removal of the weight gain test for growth hormone. This will mean a reduction in the use of 290 hypophysectomised rats per year.

DISCOVERY AND DEVELOPMENT OF PHARMACEUTICALS

- In vitro assays have been implemented for the measurement of the activity of our long-acting human insulin analogue and for a new glucagon-like peptide-1 analogue. In the former case, this has resulted in a 50% reduction of rabbits used, and in the latter, in the total replacement of rabbits used.
- In vitro flow models have replaced in vivo thrombosis models in the testing of new drug candidates and this has resulted in refinement of the model and a reduction of the number of rabbits required.
- A new animal model combining the glucose tolerance test and the intraperitoneal clearance test has been developed. This has resulted in a 50% reduction of hamsters and rats used.
- A new procedure allows us to determine the pharmacodynamic effects of drug candidates using only four pigs compared to the traditional test where 16 pigs were required to make the same total number of observations.
- When testing the effect of new diabetes drug candidates on the oral glucose tolerance of obese rats, it has been possible to reduce the number of rats for each drug candidate from six to three and still obtain valid conclusions from the data.
- The administration of more drug candidates in very small amounts simultaneously to one animal (cassette dosing) is being applied to reduce the number of animals used in the pharmacokinetic screening of new potential drugs. This has reduced the number of rats and dogs per drug candidate screen by a factor of between 3 and 5.

Enzyme testing

As an example of refinement, we have introduced a routine where our enzymes are tested in an in vitro cytotoxicity test to screen out corrosive substances before deciding whether or not to carry out in vivo irritation tests.

in vitro/in vivo

In vitro is Latin for ‘in glass’. The term refers to a process taking place in an artificial environment such as a test tube. In the context of animal testing, it refers to the testing of compounds in cell cultures or isolated organs from animals or humans or in chemical assays as opposed to testing in vivo, ie in live animals or humans.
As part of the local community, we want to stay on good terms with our neighbours.
In this section, we give a local perspective on Novo Nordisk's environmental and social activities.

Novo Nordisk is present in 68 countries with affiliates and sales offices within Health Care and Enzyme Business. We have 18 production facilities undertaking production of enzymes and manufacturing of pharmaceuticals. This section of the report provides summary data from our ten largest sites including references to the most important environmental and - for the first time - social issues. The data shows that our production sites have generally improved their individual environmental performance during 1999.

A complete set of social and environmental data for all our 18 production sites can be found in the Internet version of this report.

Part of our aim is to demonstrate that our environmental policy is being put into practice at local production sites.

In each of the site reports, the local management accounts for environmental and social performance and informs about the practical efforts made to support the continuous improvement process at the production units. We also comment on environmental compliance status and breaches of local regulatory limit values, if any. The annual reporting from the sites is an important tool in our ongoing effort to define global standards for environmental, health and safety, and social issues.

In 1998, one of our enzyme production sites fully implemented an environmental management system and succeeded in obtaining certification according to ISO 14001. We are pleased to report that during 1999 our other enzyme factories have all taken important steps in the process of integrating environmental issues into management systems. ISO 14001 certification of all enzyme production sites is scheduled to take place before the end of 2000.

In accordance with the Danish Environmental Protection Act, we have prepared green accounts for our factories in Kalundborg, Copenhagen, Gentofte and Hillerød. The 1999 accounts are available in the Internet version of this report along with the environmental, health and safety, and social data for our eight smallest production sites which are not part of the printed report.

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**INTERNET**

- Data for all Novo Nordisk's production sites worldwide
- Green accounts
KALUNDBORG, DENMARK

The factory in Kalundborg is Novo Nordisk's largest production site. Novo Nordisk's basic insulin production takes place here, primarily by fermentation of genetically modified microorganisms. The factory also produces industrial enzymes, glucagon and Factor Vila for the treatment of haemophilia. Novo Nordisk in Kalundborg employs 1,657 people. See also the case study on pages 10-13.

MAJOR IMPACTS

Novo Nordisk's factory in Kalundborg is the Group's largest consumer of water and energy, and emissions from the factory are correspondingly large, primarily as biomass from enzyme production and process waste water. The factory also affects the neighbouring environment with odours from the biological treatment plant and air emissions containing enzyme dust.

ENVIRONMENTAL FOCUS 1999

Ample quantities of clean drinking water are vital to production in Kalundborg. To reduce the factory's groundwater consumption, we have in recent years in cooperation with the municipality arrived at alternative solutions, including the use of surface water from the nearby Lake Tisso. In 1999 we embarked on a cooperative effort with the municipality regarding a new water works, run by the municipality, which will purify water from Lake Tisso to drinking water quality.

The Kalundborg factory is covered by the agreement of 1998 between Novo Nordisk and the Danish Energy Agency on investments in energy-saving measures over a three-year period. In 1999, approximately DKK 4.3 million was spent on energy-saving measures in Kalundborg. The project will continue until the end of 2000.

In cooperation with the rest of the organisation, we devoted considerable resources in 1999 to reviewing and optimising our waste water treatment plant. This was part of a series of experiments to combine the purification of waste water from the factory and the municipality. These experiments have now been finalised and the results are pending.

In 1999, we held an open day for our neighbours and interested parties to discuss gene technology with particular focus on the reuse of biomass from our production on farmland in the form of the agricultural fertiliser NovoGro®.

FOCUS AREAS 2000

There are major environmental and financial benefits to be gained in our continuous efforts to reduce our consumption of resources. In 1997 we began to set annual targets for cutting the water and energy consumption per unit produced. These targets have been achieved in basic production, and activities are now being initiated to include the finishing stage of production. Resource consumption will continue to be a focus area in 2000.

In 2000, an environmental management system based on ISO 14001 will be implemented in the enzyme production in order to ensure effective follow-up on the environmental impact of production and to increase employees' awareness of the environmental protection.

ENVIRONMENTAL COMPLIANCE

One case of a breach of a regulatory limit value was recorded concerning odours. In four cases we registered accidental releases of the agricultural fertiliser NovoGro® to land outside the permitted spreading area. In three of these cases the release was collected and remediation measures were taken. In the fourth case the spillage ran into Kærby stream. In total four breaches of the dosing limits for spreading NovoGro® were registered.

The number of complaints from neighbours has risen from two in 1998 to 13 in 1999. The majority of the complaints were due to odours from the waste water plant. In connection with optimisation of the treatment plant, a substantial effort has been made to eliminate these problems.

HEALTH AND SAFETY

The extensive reorganisation of health and safety work in 1997 is now beginning to yield measurable results at the Kalundborg site. In 1999, improvements were seen in all business areas, in some cases with reductions of the number of occupational injuries of up to 50%. At the same time the number of accidents without absence from work and near-accidents are tending to rise. We interpret this to indicate that health and safety work is functioning smoothly and that all incidents are reported. In 1999, there were eight cases of occupational diseases. This is an increase compared to the previous year but no cases were due to enzyme allergy.

SOCIAL ISSUES

We have initiated a programme for upgrading the skills of some maintenance staff and a large number of other employees have undertaken external education to improve their technical and personal competencies. In 2000, our main focus will be on organisational development. All departments will work actively on implementation of self-managing teams. The overall objective is to increase the employees' influence on their work situation.
COPENHAGEN, DENMARK

Novo Nordisk’s enzyme factory in Copenhagen is located in a densely populated area in the north-western area of the city. The factory employs 356 people and produces enzymes for, for example, the leather, textile and food industries.

MAJOR IMPACTS
Given the location of the enzyme factory, it is our duty to be at the forefront in environmental issues to ensure that both the authorities and residents in the area can feel secure about our activities. The most significant environmental impact from enzyme production is the high consumption of water and energy and the resulting emissions, primarily as process waste water from the fermentation and recovery processes. The biomass from production is collected and transported to the factory in Kalundborg where it is treated and used as agricultural fertiliser.

ENVIRONMENTAL MANAGEMENT IS AN IMPORTANT TOOL
We consider environmental management to be one of the most important tools for improving environmental conditions. In 1998, the factory’s environmental management system was the first in the Novo Nordisk Group to be certified according to ISO 14001. At the start of 1999, we introduced an energy management system that has now been incorporated into the existing environmental and quality management system. In autumn 1999, the Danish Standards Association carried out its annual audit and unconditionally extended our certification.

ENVIRONMENTAL FOCUS 1999
In 1999, we also made a concentrated effort to reduce our consumption of water, energy and raw materials, in order to limit emissions and waste. This contributes to increased productivity, enabling us to recover more enzymes with fewer resources calculated per unit produced.

Odours are by far the greatest nuisance for our neighbours. In November 1999, as planned, we commissioned a new plant for purifying the air from the fermentation tanks, an investment of approximately DKK 20 million. The first measurements indicate that the odour problems will be solved by the new facility, which will also reduce the quantity of enzyme dust in the air. See also the case study on page 45.

In 1999, we held an open day for our neighbours and other interested parties to discuss gene technology with particular focus on the reuse of biomass from our production on farmland in the form of the agricultural fertiliser NovoGro®.

FOCUS AREAS 2000
In 2000, we will make a continued effort to reduce consumption of water, energy and raw materials in order to limit emissions and waste. More specifically, we will look into the possibilities of reducing the volume of biomass transported to Kalundborg for NovoGro® production. We will also have to verify the effect on odour reduction of the new air purifying plant.

ENVIRONMENTAL COMPLIANCE
The number of recorded breaches of regulatory limits fell from 15 in 1998 to 3 in 1999.

One accidental release of culture broth from the enzyme factory was registered. The number of complaints from neighbours rose from 13 in 1998 to 26 in 1999. The majority of the complaints were received during the summer months due to odours from the fermentation plant.

HEALTH AND SAFETY
In 1999, the focus was on a reduction in the number of occupational accidents and injuries. The number of occupational injuries resulting in absence from work was reduced from 10 in 1998 to 7 in 1999. Employee training and education is important in this area and will continue to be a key item on the agenda in 2000. As planned, we have taken measures to reduce the noise level at the fermentation plant. At the same time, all work processes were reviewed in order to reduce the quantity of enzyme dust in the air. As a result of the review, a DKK 3.5 million investment was approved to reduce enzyme dust.

SOCIAL ISSUES
The fermentation plant at the Copenhagen factory operates 24 hours a day, 7 days a week. In 1999, we implemented organisational changes in this production area with the aim of increasing the responsibilities of the process operators. Instead of shift supervisors on all shifts, now only two supervisors working normal hours take care of the development of the teams. This gives the process operators more control of their own work situation. In 2000, we will expand this organisational model to include the recovery and drying plant.
GEHTOFTE, DENMARK

Novo Nordisk in Gentofte manufactures pharmaceutical products. Its activities include production of human growth hormone and glucagon and filling and packaging of Factor VIII for the treatment of haemophilia. The site is the workplace of 1,050 people and also houses development laboratories, warehouses and administration.

MAJOR IMPACTS
Water and energy are the two largest resources used at Novo Nordisk's production site in Gentofte. However, this consumption accounts for only a few per cent of Novo Nordisk's total water and energy consumption. The impact on the environment is likewise modest and is limited to discharges of waste water and ventilation air containing small quantities of alcohol. Before being discharged to the sewage system, all waste water from the fermentation plant containing genetically modified microorganisms is inactivated in a pasteurisation plant.

ENVIRONMENTAL FOCUS 1999
In autumn 1998, we established a local environmental protection group in Gentofte with the primary purpose of increasing employees' environmental awareness. This has significantly strengthened environmental work and enhanced involvement of employees at all levels. In 1999, the environmental group prepared a proposal for the introduction of an environmental management system to ensure a more systematic approach to environmental work.

FOCUS AREAS 2000
In 1999, we achieved our objective of an annual reduction of water and energy consumption per unit produced. This will also be an important focus area in 2000.

As part of our environmental courses, we have encouraged employees to suggest environmental savings in production. All proposals received are assessed, prioritised and stored in an ideas bank. A two-day training course for salaried employees, which includes a separate environmental module, is now offered to hourly-paid staff as well. In 2000, we will continue to offer courses for both salaried employees and hourly-paid staff.

ENVIRONMENTAL COMPLIANCE
In 1999, there was one breach of the regulatory limit values set out in our environmental and gene technology approvals for the fermentation plant for human growth hormone. This occurred when there was an accidental release of genetically modified E. coli bacteria, as described below.

There have been two accidental releases to the public sewage system. In one case waste water from the pasteurisation plant with a low content of genetically modified E. coli bacteria was accidentally released from a leaking heat exchanger. The equipment was subsequently repaired and improved in order to eliminate the risk of future incidents. Another release occurred in a laboratory when two litres of chemical were split from a glass flask. Both incidents were reported to the environmental authorities.

We have received two complaints due to noise from snow clearing and salt spreading. Our procedures have now been changed in order to minimise the noise in future.

HEALTH AND SAFETY
In 1999, we conducted a detailed review of our regulatory approvals for health and safety. Ongoing assessment of our production processes and the safety of our products continue to take high priority. Within the area of health and safety we have prepared safety data sheets for internal use for all the products made in Gentofte.

In our efforts to avoid repetitive monotonous work a plan has been adopted to automate this kind of work in the manual packaging unit and the laboratory. The project will be completed before the end of 2000.

SOCIAL ISSUES
In 1999, focus was maintained on management as well as employee education. The main purpose was to increase awareness within the areas of product knowledge, production processes, quality assurance, logistics and economics.

During the year we also focused on the psychological working environment, including a theme day for managers and health and safety representatives as an introduction to a project that will take place in 2000.
HILLERØD, DENMARK

Novo Nordisk’s new high-technology factory in Hillerød produces the disposable insulin pen, NovoLet®. It is also the location for Novo Nordisk Medical Systems, which conducts research and development as well as production and assembly of the durable insulin pen, NovoPen® and the insulin injection device, Innovo®. Novo Nordisk in Hillerød employs 625 people.

MAJOR IMPACTS

Environmental conditions at the Hillerød factory are generally unproblematic. During the construction of the new factory numerous environmental and health and safety issues were taken into account.

As a factory for manufacturing finished products with no basic production of insulin, the consumption of water and energy is limited and the environmental impact is correspondingly modest. The major source of waste from the factory is plastic waste from the production of devices. We have an agreement with a company that collects all plastic waste for recycling.

ENVIRONMENTAL FOCUS 1999

The manufacture of finished products comprises every stage from moulding the pen through filling insulin cartridges to assembly and packaging. The last stage of the project, a plant for finished pharmaceutical products involving the formulation and filling of insulin cartridges, will be commissioned in the first quarter of 2000. The total consumption of both water and energy rose in 1999, primarily due to the commissioning of a new production unit in the filling factory.

FOCUS AREAS 2000

The factory’s power station supplies the whole factory with water, steam and compressed air. Its advanced technology enables us to monitor and control energy consumption for lighting, heating and manufacturing processes. The target in 2000 is to further reduce total energy consumption per produced unit.

The recovery of heat from our refrigeration plant also contributes to reducing energy consumption. In the refrigeration plant, we use ammonia instead of ozone-degrading Freon, and we are investigating possible risks from the use of ammonia.

ENVIRONMENTAL COMPLIANCE

In 1999, no breaches of regulatory limits, accidental releases or complaints from neighbours were registered.

HEALTH AND SAFETY

We have succeeded in reducing the number of occupational accidents resulting in absence from work from 17 in 1998 to nine in 1999. Occupational safety will continue to be a key focus area in 2000.

We have also focused on workplaces where there is a risk of stress from repetitive monotonous work. The high-technology processes in the new factory are automated, so machines and robots carry out a large part of the repetitive work. The introduction of autonomous groups and job rotation is another method of preventing repetitive monotonous work.

SOCIAL ISSUES

Given that the health and safety conditions are by and large in place, it is natural to consider the psychological climate. In 1999, we worked with health and safety representatives and human resources consultants on defining how to improve well-being and job satisfaction so as to reduce sick leave and staff turnover. This work continues in 2000.

Since production began in 1998 at the new NovoLet® facility, we have been working with self-managing teams. In order to allow our employees more personal freedom for planning their working hours, we have introduced flexible working hours for the hourly-paid staff in the durable insulin pen production.

To develop and maintain a good relationship with the local community, we have offered guided plant tours to neighbours, local schools and interested organisations.
BAGSVÆRD, DENMARK

The site at Bagsværd, Novo Nordisk's headquarters, is the largest in the Group with 4,517 employees. Besides administration, the area accommodates research facilities, laboratories, and production and pilot plants. At this site insulin is recovered, filled and packaged. Other activities include standardisation, granulation and packaging of enzymes produced in Kalundborg and Copenhagen.

MAJOR IMPACTS

The main environmental impact in Bagsværd relates to the use of energy in production and the resulting emissions of carbon dioxide, sulphur dioxide and nitrogen oxides. As a result of the many different research and production activities, we also generate considerable waste volumes, including hazardous waste.

ENVIRONMENTAL FOCUS 1999

In Bagsværd we have performed a careful review of production and cleaning processes. As a consequence we have been able to optimise the processes that require water and thereby minimise water consumption and the volume of waste water discharged.

In 1999, we completed a survey of significant environmental conditions at the production site in Bagsværd. An application for an overall environmental approval will be submitted, as planned, to the regional authorities no later than July 2000. Enzyme Business has also mapped environmental conditions in production in preparation for ISO 14001 certification, which is anticipated before the end of 2000.

To meet more stringent regulatory requirements for the handling of chemical waste, we have established a modern waste treatment centre at this site, which was inaugurated in June 1999. The purpose was also to rationalise the collection and sorting of waste for recycling (see also the case study on page 46).

FOCUS AREAS 2000

In 1999, we completed a survey of noise pollution at the Bagsværd site. Measurements revealed that our contribution to the noise level in the environment varies between 43 and 56 dB(A) at night. Noise reduction calculations indicate that an investment of DKK 8.5 million may reduce the noise level to approximately 40 dB(A). In 2000, the environmental authorities will determine the limit value for our noise contribution to the external environment.

ENVIRONMENTAL COMPLIANCE

In 1999, no breaches of regulatory limits were registered. There were three accidental releases in Bagsværd. An accident while moving a container led to spillage of insulin solution into the drainage system. There was also a release of cleaning fluid to Sørmosen, an adjacent recreational area. Finally, hydrochloric acid was spilt on the ground due to a damaged pipe. In all cases, we completed the necessary clean-up and the incidents did not have any adverse effects on the environment.

In 1999, we received 14 complaints from neighbours related to odour and noise. These problems will all be solved in dialogue with our neighbours.

HEALTH AND SAFETY

Each year we perform an evaluation of the working environment of all our workplaces. The evaluation defines necessary actions in an action plan signed by the manager and health and safety representative. In 1999, action plans primarily focused on prevention of monotonous repetitive work by means of work reorganisation, use of alternative equipment and reduction of machinery noise.

SOCIAL ISSUES

We have worked on a project for the implementation of self-managing teams in Health Care Product Supply with encouraging results. A strategy for organisational development has been set up with the objective of introducing team-based management.

In Bagsværd we have sponsored various local activities. This includes sponsorship to the local Red Cross, Danish Handicap Federation and a local rowing club.

We are cooperating with the local job centre and the centre for adult vocational training and offering unemployed people a six-week training course. During the last couple of years, approximately 80 people have received permanent jobs in the company after having attended this course.
CHARTRES, FRANCE

Novo Nordisk's factory in Chartres dates from 1961. In 1999 a new insulin production facility was inaugurated, considerably increasing production capacity. Here crystalline insulin produced in Denmark is formulated, packed and distributed to the local market and other European countries. The factory employs 198 people.

MAJOR IMPACTS

The production processes require fairly large quantities of energy and water. In particular the filling of insulin into cartridges demands large amounts of ultra-pure water. In order to deionise the water we use chemicals, which are subsequently neutralised in a controlled process before the waste water is discharged from the plant.

The new filling plant was completed in 1998, and will reach full-scale production of Penfill® 1.5 ml and 3 ml cartridges by mid-2000. This will considerably increase the consumption of water, gas and electricity.

ENVIRONMENTAL FOCUS 1999

In 1999, we primarily focused on reducing water consumption. In August, we commissioned a new automatic flushing unit for controlling purges in the cooling towers. Since then the savings achieved indicate that we will reach the target of annual water savings of approximately 2,000 m³.

As planned we have installed a monitoring system to redirect acidic or alkaline waste water into a holding tank. At the end of 1999, the system was still under test. Energy and cost savings have been achieved by optimisation of an air-dryer in the compressor unit for neutralisation. In addition, ozone-depleting CFC (R 12) has been removed from the cooling equipment and replaced with ammonia.

FOCUS AREAS 2000

In 2000, we will continue to develop measures to reduce water and energy consumption. The new filling plant is still being commissioned and we wish to gain more experience before setting specific targets for reduced consumption of resources. The first year of production will be considered a year of data collection enabling us to set our targets for 2001. Through employee training programmes we aim to increase the awareness of environmental issues especially concerning water consumption.

ENVIRONMENTAL COMPLIANCE

During 1999, there were no breaches of regulatory limit values, accidental releases or complaints from neighbours.

HEALTH AND SAFETY

In 1999, in collaboration with our local health and safety representatives and external consultants from local authorities, we focused on monitoring and setting targets for reducing occupational injuries. The procedure that we have implemented ensures that every injury is reviewed and that appropriate action is taken to avoid future incidents. As the majority of the processes in the new filling plant are automated, we avoid much of the monotonous repetitive work.

SOCIAL ISSUES

In France, new legislation has reduced the working week from 39 hours to 35 hours. At the Chartres site, we implemented this legislation at the same time as introducing a six-day working week for production and ancillary units. This was a controversial issue in 1999 (see the case study on page 32).

During the year we focused on employee development, in particular to improve language and information technology skills. The training is carried out in collaboration with external teachers and takes place within normal working hours. In 2000, emphasis will be made on the implementation of self-managing teams in the production area.
MAJOR IMPACTS
Environmental impacts are our consumption of water and energy and the generation of hazardous waste. Most of the water is used in support processes designed to ensure the purity of our insulin products. Our resource consumption increased further during 1999 due to a significant expansion of the production capacity.

ENVIRONMENTAL FOCUS 1999
In 1999, our primary environmental objective continued to be a reduction in water usage and effluent volume. Implementation of several resource saving projects during late 1998 and early 1999 resulted in reductions of 16% in water consumption and 21% for effluent volume. These reductions were achieved while site production increased by 67%.

Another focus area for the site is energy efficiency. During this same period of rapid production growth, our energy consumption has remained virtually unchanged.

Numerous activities reflect our commitment to improve site progress relative to the principles of the International Chamber of Commerce Charter. A number of these activities include an Environmental Management and Safety training programme, which was implemented in early 1999. At the same time we adopted a site specific Environmental Policy.

FOCUS AREAS 2000
In 2000, we intend to establish an environmental management committee and initiate the implementation of a formal environmental management system. Another important objective is to identify opportunities for further reductions in the use of water and energy.

Current environmental activities include studying alternative methods for waste insulin disposal and a reduction in the generation of solid waste through an increase in production efficiency. Improving our recycling programmes will be a focus area in 2000.

ENVIRONMENTAL COMPLIANCE
Production and support processes do not significantly contribute to pollution of the site or surrounding area. We mitigate the potential risk through employee awareness training and sound waste and materials management practices.

In 1999 we recorded one accidental release of hydrochloric acid from the site neutralisation system to the public sewage system. It did not impact the plant or operation of the public treatment works, but the incident resulted in a USD 1,000 civil penalty. Subsequently, changes were made to the waste water neutralisation process. Two breaches of regulatory limit values were registered during the year, one concerning Biochemical Oxygen Demand (BOD) in waste water and the other resulting from low pH accompanying the above-mentioned release of hydrochloric acid.

In 1999, we did not receive any complaints from neighbours.

HEALTH AND SAFETY
Working in conjunction with the North Carolina Ergonomics Resource Centre, we began implementation of a comprehensive Ergonomics Programme. The programme included surveys of the ergonomic conditions for selected employees. Some of the results of this were improvements of numerous workstations and provision of ergonomics training for all site personnel.

SOCIAL ISSUES
In 1999, with the involvement of all hourly-paid employees, we have carried through a project on redesigning the work schedule in the production area. This has been carried out to facilitate transition to 24-hour continuous operation, while balancing company needs, employees' desires, and health and safety concerns.

We have experienced some difficulties in recruiting new employees. Therefore, we organised a community open house, which attracted almost 400 applicants to a number of open positions.

The Clayton site promotes many activities in relation to the community. For example, employees participated in a Juvenile Diabetes Foundation Walk-a-thon to raise money for diabetes cure research. We also arranged our annual campaign for the support of local charities. In 2000, we will continue our focus on these activities.
FRANKLIN TON, US

The Franklinton site is located in North Carolina and serves as the North American regional headquarters for Enzyme Business. The plant produces a wide range of industrial enzymes, primarily for the North American market. By the end of the year, the site employed 350 people.

MAJOR IMPACTS
The primary process inputs are energy, potable water, agricultural based raw materials and specialty chemicals. Spent biomass and process waste water are the main by-products. Spent biomass is recycled as fertilizer on crops grown by 200 neighboring farmers, while more than 95% of the waste water is used for irrigation of surrounding farmland (see the case study on page 44).

Much of the process and packaging solid waste materials go to landfills. However, recycling programmes have been initiated for a number of other waste products.

ENVIRONMENTAL FOCUS 1999
In 1999, a number of capital projects were completed for reducing water usage, for noise containment and for reducing dust emissions. The major site focus in 1999, however, has been the implementation of the environmental management system based on ISO 14001. As part of the ISO 14001 implementation work, all employees have received awareness training on environmental aspects and have identified potential impacts. Final certification is scheduled to take place by the end of the first quarter of 2000.

During 1999, we developed evaluation criteria for the environmental performance of suppliers, and existing primary suppliers were ranked against established criteria. Similarly, environmental performance has been integrated into the selection of new suppliers.

FOCUS AREAS 2000
The ISO 14001 objectives and targets for reducing environmental impacts will focus on decreasing solid waste disposal and water usage, and minimising the potential to release ozone depleting and hazardous gases. Additional targets and objectives will be developed in 2000 as part of the ISO 14001 process of continual improvement.

ENVIRONMENTAL COMPLIANCE
In 1999, the regulatory limit value for nitrate in groundwater was breached 12 times. The number of irrigation sites exceeding the regulatory limit value for nitrates in groundwater was reduced from six to three, primarily as a result of upgrading the waste water treatment system. In 2000, the number of wells exceeding the standard should be further reduced.

Eleven accidental releases were recorded in 1999. Five of these spills were contained and cleaned up before they reached surface waters.

No neighbour complaints have been received in 1999. This is a significant improvement from 1998 when we received 15 complaints.

HEALTH AND SAFETY
In 1999, we had an unannounced safety inspection by the local Occupational Safety and Health Administration who complimented us on our compliance with safety regulations and employee safety training.

A new pilot programme to minimise occupational injuries has been started. Immediate feedback following the identification of critical safety behaviours and observation of these behaviours allows employees to receive positive recognition or suggestions for improvement of safe working habits. Three departments are participating in the pilot project, which will subsequently be extended to the entire site.

SOCIAL ISSUES
In 1999, we developed a project designed to help us remain the ‘preferred place to work’ in a geographical area with less than 2% unemployment. This requires defining a combination of factors, which both attract and retain employees. Together with an external consulting organisation we have now set out to analyse these factors. In 2000, based on the results of the analysis, three separate task forces will examine key issues found and work on initiatives such as developing a stronger connection between performance and remuneration, enhancing leadership development, and setting more specific employee development goals and objectives.

Training regarding all types of harassment in the workplace has been provided to the employees.

In 1999, the Franklinton site donated money and/or equipment to, for instance, local schools, colleges and charitable organisations. This commitment will continue in 2000.
ARAUCÁRIA, BRAZIL

Novo Nordisk’s enzyme plant in Brazil is situated in Araucária in the southern part of the country. Inaugurated in 1989 the plant produces enzymes for the detergent, animal feed, food and textile industries, primarily for the Latin American market. The number of employees at year end was 153.

MAJOR IMPACTS
The main impact on the environment is the discharge of process waste water. Liquid waste in the form of spent biomass is reused on farmland where it replaces artificial fertiliser to a large extent with its high content of nitrogen and phosphorus.

ENVIRONMENTAL FOCUS 1999
Our aim is to reduce the volume of liquid waste in general and, in particular, the amount of nitrogen, phosphorus and organic matter in waste water. Following detailed monitoring throughout 1999, we intend to formulate an action plan in anticipation of future changes in local regulatory limit values.

The sanitary waste water treatment plant has been improved and is monitored daily. Furthermore, we have surveyed and recorded the drainage system of the production area and identified the locations where sanitary and industrial wastes mix. Alterations to the drainage system have resolved the problems by separating the two types of waste water.

We have implemented programmes for improved waste separation and paper and material recycling. These projects contribute to improving the environmental awareness of our employees.

FOCUS AREAS 2000
During the implementation of an environmental management system in accordance with ISO 14001, we will identify and document all relevant environmental impacts. These points will be included in our future strategic planning.

ENVIRONMENTAL COMPLIANCE
In 1999, we recorded a total of 32 breaches of regulatory limits of which 31 were caused by organic overload of the waste water treatment system. There were 21 breaches of the regulatory limit value for BOD (Biochemical Oxygen Demand) and 10 breaches of the limit value for suspended solids in discharged waste water. However, the installation of two new aerators in the biological lagoons has efficiently solved the problems. No further breaches have been recorded since June 1999.

During the year, we recorded one accidental release of fermentation broth, which overflowed from a fermentation tank. The problem has been solved by the construction of a new vent.

We received no complaints from neighbours in 1999.

HEALTH AND SAFETY
Our health and safety activities focus on preventing problems instead of solving them after they have occurred. By means of a special health and safety programme with periodic follow-up we are able to prevent most of the problems related to, for instance, enzyme allergy, monotonous repetitive work and noise.

In 2000, we will continue following up periodically on our health and safety programme, particularly with the aim of avoiding monotonous repetitive work.

SOCIAL ISSUES
In 1999, we conducted an internal project for a better integration of the workforce and increased understanding of the role and responsibilities of the company’s various business areas and departments. We have initiated a team-building project for managers, directors and foremen in the production area. This project will continue in 2000. Furthermore, the Human Resources department will introduce a management development programme. We also plan to start up projects on the industrial application of biotechnology and to collaborate with various public and private organisations with interests in the area of biotechnology in the state of Paraná where we are located.

During the year, we have introduced specific training programmes for students from technical schools and universities to help these young people in their education and facilitate their introduction to the labour market. We also carried out a charity campaign to help the most needy people in the local community.
TIANJIN, CHINA

Novo Nordisk’s high-tech enzyme plant is situated in Tianjin, a coastal city close to Beijing in the northern part of China. The plant produces industrial enzymes for distribution mainly on the Asia Pacific market. The factory employed 178 people at year-end.

MAJOR IMPACTS

Our water consumption in enzyme production is high and the main impact on the environment is related to the discharge of process waste water.

Spent biomass is treated separately in a treatment plant similar to that of our Kalundborg site in Denmark. We have received permission from the local environmental protection authority to distribute the treated biomass in the form of NovoGro® a solid fertiliser to be spread on local farmland.

ENVIRONMENTAL FOCUS 1999

Since the factory was inaugurated in 1998, the production capacity has doubled and will reach full-scale capacity in 2000. Thanks to the improvement of the production performance, however, our consumption of fresh drinking water did not increase proportionally.

In October 1999, we started to reuse treated waste water from our production to irrigate land within the Tianjin Economic Development Area (TEDA). We have signed a contract with TEDA stating that 70% of our treated process waste water will be supplied free of charge for the irrigation of the surrounding green areas of the TEDA industrial estate. For the second time, Novo Nordisk (China) Biotechnology has also in 1999 received the TEDA Administration Council’s award for good environmental performance during the year.

In 1999, we have had odour problems from the production. To eliminate the problem we are considering the installation of a biofilter.

FOCUS AREAS 2000

The current water consumption is still considered too high. We have now established a water-saving project group commissioned to find methods of recycling process waste water in order to reduce consumption of water, which is a limited resource in this area.

In 1999, we have taken the first steps towards implementation of the environmental management system ISO 14001. We have now initiated a mandatory environmental training programme for all employees in the production. Final certification is planned to take place by the end of 2000.

ENVIRONMENTAL COMPLIANCE

In 1999, we have registered 11 breaches of the regulatory limit value for the concentration of nitrogen in the discharged waste water. The local authorities do, however, allow some deviation in the start-up period. The problem has now been solved and no breaches have been recorded since April.

At the Tianjin site there have been no accidental releases in 1999, and we have received no complaints from neighbours.

HEALTH AND SAFETY

The health and safety organisation in Tianjin is now in operation and training takes place continuously in the use of personal protection equipment as well as in attitudes towards health and safety in the workplace. Considering that our health and safety organisation is new, we are still improving and developing the system. For instance, our health and safety manager has attended a health and safety course in the US, and a group of volunteers from the staff has been trained in fire-fighting.

SOCIAL ISSUES

Throughout our organisation in China, a number of training activities are offered to our employees. English language training is a long-term employee benefit, which continues to be popular.

We have sponsored several cultural activities, and the Novo Nordisk Biotechnology Award has been presented to ten students and one teacher at the three key universities in China (Beijing, Qinghua and Narkai) to encourage their studies.

At the Tianjin factory we have implemented self-managing teams in the production area to create a challenging working environment for our skilled workforce providing each individual with the opportunity to influence the performance of the team. Team-building activities have been introduced to support this development.
## Environmental Data from Sites

### Kalundborg, Denmark

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### Notes

- **Kalundborg:**
  - The figures for spent biomass include all spent biomass and other nutrient- rich liquid waste treated at the Kalundborg site.
  - The figures thus include both the amount of nutrients in the waste water treatment plant and the amount of nutrients in the waste water treatment plant at the Kalundborg site.
  - The number of breaches of regulatory limit values is exclusive of breaches of dosage limits for NOₓ.
  - The figures for consumption of electricity have been adjusted from the 1998 report. The stated amount of waste for landfill for 1997 includes 679 tons of construction waste.

### Sites Reports

- **NOVO NORDISK**
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<td>10.2</td>
<td>68.8</td>
<td>66.8</td>
<td>64.0</td>
<td>3.1</td>
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<tr>
<td>SO₂</td>
<td>tons</td>
<td>4.1</td>
<td>7.5</td>
<td>8.6</td>
<td>37</td>
<td>42</td>
<td>43</td>
<td>328</td>
<td>345</td>
<td>316</td>
<td>58</td>
<td>53</td>
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<tr>
<td>NOₓ</td>
<td>tons</td>
<td>5.8</td>
<td>12</td>
<td>11</td>
<td>29</td>
<td>29</td>
<td>22</td>
<td>232</td>
<td>203</td>
<td>142</td>
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<td><strong>ENVIRONMENTAL IMPACT POTENTIALS</strong></td>
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<td>Global warming</td>
<td>1,000 tons CO₂eqv</td>
<td>3.2</td>
<td>4.9</td>
<td>5.9</td>
<td>9.0</td>
<td>10.0</td>
<td>10.2</td>
<td>69.9</td>
<td>72.2</td>
<td>66.0</td>
<td>3.2</td>
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<td>Ozone depletion</td>
<td>kg CFC₁₁⁺dbv</td>
<td>74</td>
<td>0</td>
<td>0</td>
<td>0.6</td>
<td>0</td>
<td>0.1</td>
<td>26</td>
<td>152</td>
<td>87</td>
<td>3.9</td>
<td>9</td>
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<tr>
<td>Acidification</td>
<td>tons SO₂eqv</td>
<td>8.1</td>
<td>15.9</td>
<td>16.1</td>
<td>57</td>
<td>64</td>
<td>59</td>
<td>480</td>
<td>487</td>
<td>416</td>
<td>62</td>
<td>57</td>
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<tr>
<td>Eutrophication</td>
<td>tons NOₓeqv</td>
<td>7.8</td>
<td>16.2</td>
<td>45.4</td>
<td>44</td>
<td>43</td>
<td>33</td>
<td>378</td>
<td>275</td>
<td>196</td>
<td>69</td>
<td>241</td>
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</table>

**COMPLIANCE**

- Breaches of regulatory limit values
- Limit values with repeated breaches
- Accidental releases
- Complaints over nuisances

**FRANKLINTON:**

The 1998 figure for emissions of ozone layer degrading substances has been adjusted from the 1998 report.

**TIANJIN:**

Spent biomass for 1998 includes liquid and solid biomass. The 1998 figures for water and SO₂ emissions have been adjusted from the 1998 report.
<table>
<thead>
<tr>
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<tr>
<td>No of employees* (in ft)</td>
<td>1,048</td>
<td>2,297</td>
<td>250</td>
<td>352</td>
<td>359</td>
<td>76</td>
<td>116</td>
<td>254</td>
<td>127</td>
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<tr>
<td>Male</td>
<td>2,220</td>
<td>105</td>
<td>698</td>
<td>266</td>
<td>122</td>
<td>82</td>
<td>95</td>
<td>26</td>
<td>45</td>
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<tr>
<td>Female</td>
<td>1,857</td>
<td>4,517</td>
<td>356</td>
<td>1,050</td>
<td>625</td>
<td>198</td>
<td>198</td>
<td>350</td>
<td>133</td>
</tr>
<tr>
<td>Total</td>
<td>3,905</td>
<td>5,814</td>
<td>406</td>
<td>1,402</td>
<td>984</td>
<td>274</td>
<td>342</td>
<td>604</td>
<td>133</td>
</tr>
<tr>
<td>Full-time</td>
<td>3,905</td>
<td>5,814</td>
<td>406</td>
<td>1,402</td>
<td>984</td>
<td>274</td>
<td>342</td>
<td>604</td>
<td>133</td>
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<tr>
<td>Part-time</td>
<td>94</td>
<td>549</td>
<td>34</td>
<td>200</td>
<td>19</td>
<td>4</td>
<td>0</td>
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<tr>
<td>% of total Novo Nordisk staff</td>
<td>10.9</td>
<td>20.7</td>
<td>2.3</td>
<td>6.9</td>
<td>4.1</td>
<td>1.3</td>
<td>1.3</td>
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<tr>
<td>Average age distribution</td>
<td>40.1</td>
<td>40.0</td>
<td>42.2</td>
<td>40.6</td>
<td>37.3</td>
<td>35.7</td>
<td>37.2</td>
<td>23.9</td>
<td>26.9</td>
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<tr>
<td>Average years of service</td>
<td>8.7</td>
<td>9.3</td>
<td>12.1</td>
<td>9.5</td>
<td>5.3</td>
<td>6.4</td>
<td>2.0</td>
<td>6.2</td>
<td>5.0</td>
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<tr>
<td>Rate of absence (%)**</td>
<td>2.5</td>
<td>5.7</td>
<td>4.3</td>
<td>3.4</td>
<td>6.9</td>
<td>1.5</td>
<td>1.2</td>
<td>3.5</td>
<td>0.2</td>
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<tr>
<td>Rate of staff turnover (%)***</td>
<td>2.5</td>
<td>2.9</td>
<td>13.6</td>
<td>6.0</td>
<td>6.1</td>
<td>6.4</td>
<td>11.2</td>
<td>10.0</td>
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<td><strong>HEALTH &amp; SAFETY</strong></td>
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<tr>
<td>Occupational injuries with absence</td>
<td>24</td>
<td>68</td>
<td>9</td>
<td>12</td>
<td>9</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
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<tr>
<td>Frequency of occupational injuries</td>
<td>9.6</td>
<td>10.3</td>
<td>15.0</td>
<td>6.9</td>
<td>9.6</td>
<td>2.9</td>
<td>9.6</td>
<td>4.8</td>
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<td>Occupational diseases</td>
<td>8</td>
<td>15</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Frequency of occupational diseases</td>
<td>3.2</td>
<td>2.3</td>
<td>1.7</td>
<td>1.7</td>
<td>1.1</td>
<td>0</td>
<td>6.5</td>
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<td>Diversity/equal opportunity policy in place</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td><strong>STAFF REPRESENTATION</strong></td>
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<tr>
<td>Independent trade unions operating on site</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<td><strong>SUPPLY CHAIN</strong></td>
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<tr>
<td>Suppliers audited with environmental screens</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Suppliers audited with social/ethical screens</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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</tr>
</tbody>
</table>
WE WELCOME ANY FEEDBACK AND COMMENTS ON THE CONTENTS OF THIS REPORT. PLEASE CONTACT EITHER THE RELEVANT PERSON NAMED ON THE RESPECTIVE PAGES OF THE REPORT OR ANY OF THE CONTACT PERSONS BELOW FROM OUR STAKEHOLDER RELATIONS UNIT.

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Tel: (+45) 4442 2554
Fax: (+45) 4444 4039
E-mail: stakeholders@novo.dk

Front page photo: ‘Putting values into action’
For more than 40 years, the Vancouver Aquarium Marine Science Centre’s Marine Mammal Rescue and Rehabilitation Programme has provided emergency medical care and rehabilitation to orphaned and stranded marine mammals. The primary goal of the aquarium’s Rescue and Rehabilitation Programme is to provide housing and care for ill, injured or abandoned marine mammals and to rehabilitate them for release back into their natural habitats.

Novo Nordisk was winner of the 1995, 1996 and 1997 European Award for Environmental Reporting. In 1997, we received the award together with British Telecom. For our 1997 Environment & Bioethics Report, we also received the Danish award for the best environmental report of the year.

Edited by: Stakeholder Relations. Editor in Chief: Torben Bo Bundgård.
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Environmental data manager: Johnny Mørk.
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GLOSSARY

AA1000
A process standard for social and ethical accounting, auditing and reporting. AA stands for Accountability.

Acidification
The most important substances contributing to acidification are SO₂ and NOₓ. These are released into the atmosphere when fossil fuels such as oil and coal are combusted. Air pollution with these substances leads to acid deposition (acid rain) that can pollute forests, lakes and rivers, as well as buildings.

Biodiversity
Biodiversity is a compilation of the term biological diversity. It encompasses the inestimable variety of the world’s flora and fauna and their habitats and ecosystems. There is widespread concern about a reduction in the number of living species as a result of e.g. deforestation.

Biotechnology
Biotechnology refers to the application of living organisms and their cellular, subcellular or molecular components to create products and processes. Historically, the first use of biotechnology took place centuries ago with the discovery of the fermentation of wine and beer. Modern biotechnology is often used synonymously with gene technology.

BOD₅
Biochemical Oxygen Demand after five days. An analytical biological method used to determine the content of biodegradable organic material in e.g. waste water.

CFCs
Chlorofluorocarbons. CFCs consist of a number of gases – best known under the trademark Freon. Although they present no risk to human health or the environment while in contained use, if they escape to the atmosphere by leakage or incorrect disposal they can damage the stratospheric ozone layer as well as increase the greenhouse effect. The ozone layer protects the Earth from harmful ultraviolet rays.

CO₂
Carbon dioxide. CO₂ air emissions arising from the combustion of fossil fuels such as coal, oil and natural gas increase the natural greenhouse effect, which in the longer term is feared to cause adverse climatic changes.

COD
Chemical Oxygen Demand. An analytical chemical method used to determine the amount of oxygen-demanding substances in waste water.

Corporate governance
Corporate governance is the system or process by which companies are directed and controlled. It is based on the principle that companies are accountable for their actions and therefore broad-based systems of accountability need to be built into the governance structures of companies.

Eco-productivity index (EPI)
The site-based EPI is an expression of our ability to utilise resources. It is calculated by relating the total yield of products to the respective consumption of water and energy.

The site-based EPI = production (1999) \times \frac{water or energy consumption (1999)}{production (1999)} \times \frac{water or energy consumption (1999)}{production (1999)} \times 100

Empowerment
Empowerment makes it possible to upgrade the performance of an organisation through greater delegation of authority to act. It encourages and empowers employees to take decisions and take more responsibility for their actions.

Environmental impact potentials
The purpose of calculating impact potentials is to compare the contributions made by different substances to a particular environmental impact, e.g. global warming. Global warming is calculated as carbon dioxide equivalents. 1 g CO₂ corresponds to 1 g CO₂ equivalent, while 1 g HCFC₂₂ and CFC₁₁₂ respectively correspond to 1,700 and 8,500 g CO₂-equivalents.

Eutrophication
An increased load of nutrients, particularly nitrogen and phosphorus, in the aquatic environment supports the rapid growth of algae. Upon decay the algae may cause oxygen depletion in shallow waters, causing adverse effects particularly on sedentary organisms.

Global Reporting Initiative (GRI)
An evolving set of guidelines for corporate reporting against the ‘triple bottom line’.

Global warming greenhouse effect
The atmosphere of the Earth with its content of CO₂, methane and water vapour creates a natural global warming or greenhouse effect, which delays the emission of the Sun’s heat from the Earth. Without this global warming effect, the average temperature on Earth would be around −18°C.

GMO
Genetically Modified Organism. At Novo Nordisk, microorganisms such as bacteria (Bacillus, E. coli) and microfungi (yeast, Aspergillus) have been encoded with genes for producing enzymes or pharmaceutical proteins.
HCFC
Hydrogen chlorofluorocarbons. A group of cooling agents that are used as alternatives to the ozone-depleting CFCs. HCFCs contribute to the greenhouse effect and to a lesser degree to ozone depletion. 1 kg HCFC22 = 0.04 kg CFC11.

ICC Business Charter for Sustainable Development
A code covering environmental performance. ICC stands for the International Chamber of Commerce.

ISO 14000
An international environmental management system. ISO stands for the International Standardization Organization.

Life-cycle assessment (LCA)
A management tool to appraise and quantify the environmental impact of a product during its entire life-time from ‘cradle to grave’. Life-cycle assessments comprise three main steps: 1) inventory analysis where resource consumption and emissions of a product are accounted for; 2) impact analysis; 3) interpretation of results and conclusions.

NGO
Non-governmental organisation. A collective term for voluntary groups that work for a particular cause, for example environmental protection, human rights or consumer interests.

NOx
Nitrogen oxides. A collective term for various compounds of nitrogen and oxygen. Emissions of NOx arise from combustion of eg fossil fuels. NOx contribute to acidification (acid rain) and can together with organic solvents and ultraviolet radiation createphotochemical smog. Furthermore, NOx contributes to the eutrophication of rivers and lakes.

Ozone depletion
The ozone layer in the stratosphere (10-50 km above the Earth) filters the Sun’s hazardous ultraviolet radiation, thereby protecting all life on Earth. Certain chemicals such as freon and halons can damage the ozone layer.

Performance
The impact of an organisation on its stakeholders, particularly in dimensions in which they hold it accountable. This may be assessed from its records, actions and stakeholder views.

SA8000
A code and monitoring standard covering labour standards in global supply chains.

SO2
Sulphur dioxide. Combustion of fossil fuels containing sulphur leads to the emission of SO2 which contributes to acidification (acid rain).

Social (the concept)
Relating to ‘society’, ie the systems of interrelationships connecting people together.

Stakeholder
A set of individuals, groups or organisations, which affect and/or are affected by an organisation. Stakeholders may be internal or external.

Sustainable development
Sustainable development was defined in ‘Our Common Future’ – the Brundtland Report of the World Commission on Environment and Development (1987) – as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Sustainable development does not mean a return to a pre-industrial era, but calls for continued economic growth, with business and industry acknowledging and taking responsibility for their impact on society and the environment.

Ton
1,000 kg

Triple Bottom Line
The three dimensions – economic, social and environmental – in which a sustainable organisation must perform.