INTRODUCTION

In addition to preserving the biosphere, environmental policy also aims to improve the quality of life through air quality control and a hygienic water supply, and by ensuring that foodstuffs are free of environmental contaminants. Today as in the past, it is important for the government to act at this interface between environment and health.

ATMOSPHERIC POLLUTANTS

Around 96% of sulphur dioxide emissions stem from the combustion of fossil energy sources. Despite the rise in energy consumption of relevance to emissions, there has been a clear reduction in sulphur dioxide emissions since the mid-70s.

With regard to the legislative measures that are already having a clear effect, mention should first be made of the Ordinance on Large Combustion Plants of 1 July 1983. For the first time ever, this Ordinance imposed stringent emission requirements on existing facilities, thus requiring them to undergo extensive retrofitting. These existing facilities had to be retrofitted by 1 July 1988 and will have to comply with the requirements for new facilities by 1993 at the latest. To date, this Ordinance has led to a reduction of around two-thirds in the sulphur dioxide emissions from these facilities vis-à-vis 1982. Mention should also be made of the Amendment to the Technical Instructions on Air Quality Control, which entered into force on 1 March 1986. This administrative regulation covers all plants subject to licensing under the Federal Act on Air Pollution Control and Noise Abatement (Bundesimmissionsschutzgesetz) and also establishes an extensive concept for the retrofitting of existing facilities. Finally, the 1988 Amendment to the First Ordinance on the Implementation of the Federal Act on Air Pollution Control and Noise Abatement deals with small firing installations, for example firing installations for households and commercial enterprises. The Ordinance makes stricter requirements on the fuel used and on the technical fittings of such facilities. Finally, with regard to regulations on products, the Amendment to the Third Ordinance on the Implementation of the Federal Act on Air Pollution Control and Noise Abatement, which limits the sulphur content of light heating oil and diesel fuel, has led to a reduction of up to 50,000 metric tons in annual emissions of sulphur dioxide. All these measures have resulted in a reduction in sulphur dioxide emissions from 2.9 million metric tons in 1982 to 2.0 million tons. It is expected that sulphur dioxide emissions will be reduced to as little as 1.0 million metric tons by 1995.
The second group of atmospheric pollutants to mention comprises nitrogen oxides (NO$_x$). These stem almost entirely from combustion processes as a result of the nitrogen content of fuel and combustion air. Most nitrogen oxides are emitted as nitrogen monoxide (NO) and then oxidised to nitrogen dioxide (NO$_2$) in the atmosphere. Emissions of nitrogen oxides showed an increase up to 1986, when they amounted to 3.0 million metric tons as against 2.8 million metric tons in 1982. Most of these emissions stem from road traffic (more than 50%) and power stations and district heating stations (around 25%). As a result of the measures adopted under the Ordinance on Large Combustion Plants — for example the use of low-emission firing systems and denitrification technologies — a reduction in nitrogen oxide emissions is already becoming apparent in the power-station sector which will amount to around 70% by the mid-90s. In contrast to this, the increase in the number of vehicles and in overall mileage is producing an increase in emissions from road traffic which would be even greater without the measures already adopted. However, despite the continued increase in the amount of transport operations and the mileage covered, it is expected that emissions will fall significantly by the mid-90s as a result of the increase in low-pollutant passenger vehicles (especially ones with closed-loop 3-way catalysts).

Finally, more than 80% of carbon monoxide emissions today stem from incomplete combustion in engines and small firing installations, with the remainder stemming from industrial production processes. Since around 1970 there has been a sharp reduction in emissions, due in particular to legislative provisions on exhaust gases in the traffic sector. A further significant future reduction in emissions from the traffic sector in particular is also expected. According to current estimates, total carbon monoxide emissions will still be as high as 10.1 million metric tons in 1992, but will have fallen to around 4.3 million metric tons by the mid-90s.

CONTAMINANTS IN DRINKING WATER

The waterworks are still fulfilling their task of supplying drinking water to the population. However, stricter qualitative requirements for drinking water and the decline in water quality in some cases, are increasingly causing problems. This is verified by discussions on the contamination of waters with nitrates and plant protection agents.

Tighter standards for plant protection agents and pesticides are due to enter into force on 1 October 1989 in the Federal Republic of Germany. The extremely low limit of 0.1 μg/l for plant protection agents was established both for toxicological reasons and from the point of view of hygienic-aesthetic quality criteria. In addition, the principle of precautionary action as laid down in the Federal Water Act has also been incorporated into the Ordinance on Drinking Water. This value is now being exceeded in a number of water catchment areas.
Since waterworks should not have to take remedial action to counteract poor untreated water, greater efforts must be made in order to protect the groundwater. Expert discussions were held at the Federal Health Office last year on the question of inventories, preventive strategies, and strategies for the clean-up of waters. It was found that the licensing authorities have hardly any influence at all on compliance with or the assertion of restrictive conditions regarding the use of plant protection agents in agriculture. Calls have therefore been made for the following protective measures: the designation of areas in which the use of plant protection agents is prohibited because of the soil and hydrological conditions, an improvement in farmers' awareness of drinking water protection, and the development of readily degradable plant protection agents. Although there is not necessarily any risk to health if the standard is exceeded, greater efforts should be made to keep drinking water free of anthropogenic pollutants.

ENVIRONMENTAL CONTAMINANTS IN FOODSTUFFS

Contaminants are substances that usually enter the environment as a result of human activities and then enter human food via the food chain. In the interests of precautionary health protection it is necessary to determine the sources of these harmful substances, to reduce their input to the environment, and to establish maximum permissible quantities. In this respect a number of measures have been initiated within the last years.

One of the regulation covers polychlorinated biphenyls (PCBs). PCBs were used widely until the beginning of the 70s. Unfortunately, large quantities of PCBs entered the environment as a result of improper waste disposal, fires in transformers etc. Owing to their poor abiotic and biotic degradation properties, PCBs can still be found throughout the world in environmental samples. PCBs are adsorbed by human beings via the food chain and can, via human milk, lead to undesirably high levels in infants. In order to reduce the risk to both the environment and human beings it was necessary to ban production. The marketing of PCBs in open systems was banned as early as 1978 under the Tenth Ordinance on the Implementation of the Federal Act on Air Pollution Control and Noise Abatement. The marketing of PCBs for closed systems was then banned with the implementation of EC Directive 85/46/EEC of 1 October 1985. However, problems are still being encountered regarding the safe and comprehensive management of existing facilities containing PCBs.

Most contamination of foodstuffs with lead and cadmium occurs via particulate deposition. Vehicle traffic represents the predominant source of lead. Another important way in which lead and cadmium enter agricultural soil is the spreading of mineral fertilizers containing heavy metals and the spreading of sewage sludge. Efforts to minimise inputs of heavy metals are being concentrated on the use of low-emission products. This includes, for example, the voluntary renunciation of cadmium in pigments and of red lead in anti-corrosive paints. The reduction
in lead emissions has registered the most success to date and has been achieved through the introduction throughout Europe of the low-pollutant car and the associated introduction of unleaded petrol. In the medium-term, this will virtually eliminate the biggest source of lead emissions.

A further step towards greater protection of the population against environmental contaminants in foodstuffs was made with the "Ordinance on Maximum Permissible Quantities in Foodstuffs" which entered into force in 1988. This Ordinance establishes maximum permissible quantities for a number of polychlorinated biphenyls and for mercury in fish, crustaceae, shell fish and molluscs. Such foodstuffs cannot be placed on the market if these maximum permissible quantities are exceeded.

Sources of solvent emissions, especially emissions of PER ( perchloroethylene), include both dry cleaning facilities and metal-working industries. During an expert hearing called by the Federal Health Office in October 1987 the experts were of the opinion that efforts should be made to achieve guide values of 0.1 mg PER/kg in foodstuffs and 0.1 mg PER/m³ in the indoor environment. The possibility of implementing this recommendation through an amendment to the Second Ordinance on the Implementation of the Federal Act on Air Pollution Control and Noise Abatement is currently being examined. In addition to this, a "Draft Ordinance on Maximum Permissible Quantities of Perchloroethylene and Associated Solvents in Foodstuffs" has been drawn up and is due to be submitted to the Bundesrat this year. This Ordinance provides for a ban on the marketing of foodstuffs if the content of tetrachloroethylene, trichloroethane, trichloromethane or tetrachloromethane exceeds 0.1 mg/kg or if their combined amount exceeds 0.2 mg/kg.

However, it should be pointed out that all these ordinances on maximum permissible quantities can only be considered supporting measures. The contamination of foodstuffs cannot be prevented through legislation on foodstuffs. Effective measures must therefore aim at greater control and reduction of the input of dangerous substances to the environment.

CONCEPT OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES

The main problem to be solved is that of the estimated 100,000 existing commercial chemical substances that have not been subject to any form of toxicological investigations or have been investigated inadequately. As a first step, a list of 581 substances that are manufactured in volumes exceeding 10 tons per year and which are suspected of having toxic effects were singled out from the notified substances. The Federal Health Office, the Federal Environmental Agency, the Federal Office for Occupational Safety and Health, industry and science will cooperate to draw up environmental health criteria for these chemicals. The competent authorities will then prove which protective measures relating to the environment, health and safety at the work place need to be introduced.