Letter from the CIS

By Alex Yelshin

Separation technology and progress

There appears to be a polarisation of expert views on the environment. One extreme is to discuss problems in a global context, while the other is where the problem is considered very narrowly. Here we focus on how this relates to solid-liquid and gas filtration and separation.

Several international conferences this year have focused on the problems of society and environmental developments. A polarisation of expert views is observed at such meetings. The first extreme is where people strive to discuss the problems in a global context (climatic changes, 'greenhouse effect', atmospheric pollution etc.). This position is wholeheartedly supported by countries with a low level of economic development, and by international organisations and foundations.

The second extreme is when the approach to the problem is predominantly from 'singleness'. The 'particular' (local) level of the problem is ignored, or is not focused on. It is apparent in the high degree of specialisation of most firms in solving 'narrow' tasks of industrial and/or environmental protection. Here we will dwell on problems concerning solid-liquid and gas filtration and separation.

The former USSR and Russia – where problems of social progress and environmental protection have been discussed from a general viewpoint – may serve as an example of the first view. Here such concepts as 'single' and 'particular' (local) remain in the background. There are many examples in law, education, industry, financial support of environmental protection etc.

The existing situation here leads to a low level of environmental protection on the part of industry, and a general lack of ecological awareness. This leads to continuous environmental degradation – and to a possible ecological catastrophe – unless each citizen realises that environmental protection starts with his or her own refuse bin.

The other situation leads to the slowing down of industrial progress, by narrowing the field of producers and executors. Experts are less enthusiastic about finding the 'golden mean'.

General solutions and progress will come through understanding the problem at a local (particular) level. This may be one reason why the US and some European countries are losing their lead in environmental protection practices, compared with the progress of Japan and Germany in this area.

Thus, a local (particular) level of the problem is the bridge from 'single'

to 'general' levels. Excellent results can be achieved by the interaction of these two viewpoints.

Here is one more example. The First National Seminar – 'Engineering, Environmental and Economic Aspects of Energetics' – within the framework of the '21st Century Leadership Development Programme' was organised 14–17 March this year by the Rockefeller Foundation, in Moscow. Participants talked a great deal about the 'greenhouse effect' and the energy contribution to it, about price rises by energy carriers, and about the Russian programme for energy development, which intends to further expand coal and gas extraction as well as developing nuclear energy and maintaining oil extraction at a medium-sized level.

Practical ways of solving energy and ecological problems were discussed much less, although in the former USSR it is possible to save up to 30% of produced energy by improving its consumption and distribution; in 1991 the volume of production in Russia was reduced by 14%, with energy consumption remaining at almost the same level (down by 0.7%). These figures indicate the solution of global energy and ecological problems at the local level of energy consumption, raw materials processing and manufacture of goods. This holds for all developing countries.

At this level filtration & separation processes appear to be a powerful factor in reducing energy consumption and improving environmental protection, with filtration & separation processes having both direct and indirect effects on technology and ecology.

The direct effect is thickening, separation, purification of raw materials, reagents, semi-products and products. Its advantages are:

- relatively low process temperatures
- low energy consumption per unit of output (several times less than with thermal processes)
- the possibility of combining several technological operations in one piece of equipment
- reduced volume of material flows (concentration, separation)
- improved quality and service life of machines and mechanisms working with pure gases and liquids
- control of composition of liquid and gas phases (membrane processes)
- reduced cost of storing and shipping products to the customer (dewatering, expression etc.).

The same may be said about filtration and separation for treatment of liquid and gaseous wastes. Furthermore, filtration and separation equipment can work under extreme conditions, and is 'friendly' to reactors, heat and mass exchange apparatus. Filtration and separation help to minimise demand on and consumption of accompanying solutions, extragents and other reagents. Filtration and separation processes can be integral with operating or designed technologies at any stage. Equipment can be installed directly in the waste formation area, ensuring local purification and reducing the load on the main purification units.

These processes have not yet proven themselves in waste recycling, particularly for liquids and gases. Clearly, with increasing expenditure in the discovery and extraction of raw materials, recycling of new types of waste will attract much more attention. Combining traditional filtration separation processes with membrane technologies offers a number of new possibilities. Industrial distillation or purification of water, biosuspension separation, gas purification and separation with membrane technology will become accepted alongside traditional separation processes. ▶

It is clearly impossible to boost filtration separation development and disseminate new possibilities through separate companies, however large. The time has come to set up – and subsequently maintain – national and international centres for long-term research in the field of filtration and separation. These would unite the efforts of specialists from different branches of science and engineering.

Such centres would enable filtration/separation techniques to be developed more highly, so that they occupy a prominent place in industry and the world environmental community – and especially in countries with a low level of economic development – creating at the same time new market capacities for filtration & separation technologies and equipment.

Taking into account the increasing role of filtration and separation in technology, energy production and the environment, then commercial operations as well as state and academic institutions should be involved in setting up and maintaining such centres. This demands active 'propaganda' and explanation of the role of filtration and separation in society, through the media, to gain public support. F&S

Letter from China

By Gu Minyuan

Dye Industry to do more to Protect Environment

The dye manufacturing industry in China is a major source of pollution from wastewater, waste gases and industrial residues. However, efforts are being made to reduce the industry's high levels of pollution.

Chinese dye production is leading to serious pollution. During the 7th Five-Year Plan (1986–1990), large and medium-sized dye manufacturers worked towards protecting the environment. This initially helped to reduce pollution, but the unchecked growth of dye manufacturers in small towns, many of which have not taken measures to prevent or control pollution, has resulted in levels increasing.

The main problem facing the industry is that progress in sewage disposal has been too slow. There have been no significant technical breakthroughs yet in the removal of colour, or in treating salt-containing organic wastewater, sulfurised liquids, napthalene intermediate wastewater and used sulfuric acid. Poor utilisation of materials and a low recovery rate of the dye product, inefficient contamination clear-up and dividing liquid flow, and the monotonicity of flocculating agent, add to the difficulties of wastewater treatment.

Also, current equipment for wastewater treatment is not able to operate under good conditions, so biological ▶