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## CHEMICAL ENVIRONMENTAL PROBLEMS IN LATVIA

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### Introduction

This short review will focus on some major chemical environmental problems in Latvia. Most of them are general problems and common for all the three Baltic States. The specific environmental problems facing these countries may be different but there is a broad consensus that science, engineering and education are key ingredients of environmental management. This paper emphasises the role of chemists in the implementation process of these tasks in Latvia. More detailed analyses of specific problems, results of scientific research, as well as advanced chemical environmental technologies will be shown in other reports of the workshop.

### The environmental priorities in Latvia

Unlike most of the Eastern European countries, having fallen into serious ecological crisis due to the former socialistic "planned economy", there is a rather good ecological situation in Latvia now. Unfortunately, the reduction of emissions and industrial waste is not a result of cleaner technologies, but of a reduction in industrial production volume. Thus, obviously, in a growing economy, environmental pressure and ecological risk in future will increase, and even in present relatively good situation there are some serious problems in Latvia.

Rivers, lakes and the Gulf of Riga all show signs of influence from as well organic matter as nutrients /1/. In the air of largest cities, due to the traffic and heating sisters, the recommended maximum limits are either close to being or are exceeded. The use of pesticides and old depositions of persistent toxic wastes without proper controls may eventually end up untreated in ground water, surface waterbodies, and the Baltic Sea through leakage and open-air burning. In Latvia, and in the other Baltic countries, there are some environmental problems, which have come to light only since their independence - many heavy polluted sites are found in the former Soviet military bases. As a result, the quality of drinking water is not always good. The impact to health is difficult to determine but the statistical data show that average life expectancy in Latvia is lower than in Western countries, and infant mortality is higher.

In 1995 the Ministry of Environment Protection and Regional Development (MEPRD) has prepared the *National Environmental Policy Plan for Latvia* /2/. On the base of the *Environmental Action Programme for Central and Eastern Europe* /3/ and the recommendations of Helsinki Commission *Baltic Marine Environment Protection Commission* (HELCOM), ten environmental problems were found to be of priority importance, which should be tackled without delay and on which the government should concentrate all its attention. Most of them are technological problems and need chemical awareness. Such problems are transboundary pollution, impact of traffic, impact of agriculture, eutrophication of waterbodies, impact of wastes (including toxic substances) and low quality of drinking water. Other aspects of the problem are accompanying measures, where monitoring and management programmes need to be established. Consequently, there is a need to improve environmental, political, economic, and social instruments and to increase the level of environmental awareness through education.

## Science

Environmental chemistry, as a part of the fundamental Environmental science, has already long experience in the world. Today the amount of such scientific information available to Latvian scientists is large in comparison with the time when Latvia was a closed society within the former Soviet Union. Still, when it comes to sustainable development, there is not much activity by the university institutions or by the academic staff. In general, there is a conservative attitude toward new fields of research and inter-disciplinary style of work /4/. Besides it there are some other obstacles, first of all financial. The Baltic states, like all other countries of Central and Eastern Europe, are faced with the need to spend a lot on environmental matters at a time when they are suffering serious economic hardship. Therefore financial support from other countries is needed. Since 1989, rather large number of international environmental programmes have been initiated. The total amount of international financial support to Latvia for different environmental projects during last five years has been 91 782 020 ECU (the domestic contribution to the projects was only 11 943 183 ECU) /4/. The main objectives of these projects are transfer of advanced technologies from other developed countries (mainly for the control and monitoring of pollution), advice on the development of policies and training of Latvian specialists. Such priorities are in context with the recommendations of World Bank and Commission of the European Union (EU) that limited resources should be applied to the most urgent problems first, and invest in projects which provide both economic and environmental benefits. Unfortunately, this "win-win" policy do not include fundamental scientific research projects. Therefore the applied environmental chemistry is more popular in Latvia.

The main scientists - environmental chemists come from the University of Latvia (UL). Fundamental scientific investigations have been carried out in the field of environmental hydrochemistry - structure of the humic complexes, accumulation of metals and phosphorus in the hydroecosystems and persistent organic pollutants in water biota, quality of drinking water (M. Klavins with collaborators, UL). Some chemists participate in the Baltic Sea environment programmes. A group of chemists in the Institute of Aquatic Ecology, organized on the basis of former institute of the Latvian Academy of Sciences, are interested in eutrophication and other aspects of water chemistry.

The chemists of the Riga Technical University (RTU) are involved in some applied scientific research programmes. For example, a common UL - RTU project "Chemical influence of the environment to the stone materials of the cultural heritage and their anti corrosion protection" (A.Spricis, UL, I.Vitina, RTU) has been started some years ago.

The environmental protection includes also environmental monitoring, data collection and analysis. There are several analytical groups in Latvia - RTU, UL, Research & Technology Group "VIRSMA" Ltd. etc. The Laboratory and Data Centre of the Ministry of Environmental Protection and Regional Development, participate in the HELCOM Baltic Monitoring Programme (BMP). The Environmental Committee disseminates HELCOM Recommendations and Guidelines for the BMP, collects annual national reports including also information on the data quality, organizes seminars, and intercalibration exercises. However, there are still many problems in the sector of environmental analytical chemistry in Latvia. One of the urgent tasks is creation of a modern analytical unit specialized in the analyses of different toxic wastes including old depositions of pesticides. One can understand that the analytical sector of environmental chemistry will develop in Latvia.

## Engineering

Environmental Engineering is a multidisciplinary field of activities, because practitioners in this field must recognize and deal with water pollution, air pollution, solid waste, and ground water aspects that affect the environment and human health. Clearly, chemistry, microbiology and hydrology are crucial in providing technical tools for participants in this field. Industry and waste management are the two segments of the sustainable development where the efforts of the specialists in the environmental chemistry are especially necessary.

Based on previous experience regarding cleaner technology and environmental management projects in Latvia, and in other Baltic countries, it has become increasingly evident that the Latvian industry and its specialists have insufficient knowledge and experience to apply a preventive ("at the source") approach in combating adverse impacts on the environment from industrial activities. During the Soviet period, most industrial technology development was carried out within the state institutions. Once developed, a technological system tended to be used throughout the former Soviet Union. Consequently, no major technological developments took place at the level of the single enterprise. This means that today not many enterprises possess a formal tradition for developing and implementing own developed technological changes. In the same time, as the Latvian industry gradually becomes part of the international market, the need for a more efficient approach to the environmental problems and more adequate environmental documentation will be underlined in the nearest future. It should be understood that outdated production technologies, physically and morally worn-out equipment and unskilled labour make it impossible to solve the environmental conflict by using updated purification technologies at the final stage of production. It has been proved in the example of Sloka Pulp and Paper Mill that the environmental solution is only possible through cardinal changes in the production process itself. A modern type of water treatment plant alone cannot save the situation.

New developments in the Latvian environmental policy, e.g. environmental taxation and tax on natural resources, and the fact that Eastern and Central Europe has become an area of interest for Western investments, have forced Latvian industrial leaders to focus more on the inter-linkage between the poor environmental conditions, the industrial activities and the profitability of the enterprises.

An economic survey of the Latvian industry shows /5/ that all industrial sectors have experienced a heavy decline in the volume of production. The total output in the manufacturing industry has dropped by 42% over the last 5 years. However, during the last 1-2 years, the decline of production has leveled out and the productivity has even increased within some of the branches. They are food & beverage, textile & wearing apparel, wood & furniture, chemical, metal articles & machinery and publishing sectors of industry.

Together with other Eastern and Central European countries, Latvia has entered an Associate Agreement with the European Union, committing the country *inter alia* to bring the legal framework of Latvia into line with the EU rules. This EU-approximation process concerns the Latvian industry in many ways. In this process, it is important that the Latvian industry is prepared to accept and fulfill the requirements and guidelines concerning a methodical environmental approach, the principle of the polluter pays, best available technology, and the Environment Management System and Audit Scheme.

Besides the industry, there is also a lot of other spot pollution from landfills, storage places of fertilizers and pesticides, and different hazardous chemicals in cities, rural areas, and former

Soviet military bases in Latvia. The total amount of hazardous wastes in 1995 was 75 000 tons in Latvia. According to the Latvian environmental regulation, hazardous waste cannot be disposed of on landfills, and according to the Basle convention, it is not legal to export the waste to treatment facilities in other countries. There is only one storage house for pesticides in Gardene, but a proper complex national collection and disposal system for hazardous waste is still absent. Such situation leaves the industrial enterprises with no other alternative but to store their hazardous waste in the territory of the enterprise. Especially dangerous situation is in the case when the owner of the company is changed. Such uncontrolled deposits are negligent to the potential environmental effects of leaks and spills. Understanding how contaminants are released and their transport and fate in the environment is necessary for successful hazardous waste management and remediation of the chemically polluted sites. There are two groups of specialists in this field.

The specialists from the Faculty of Chemical Technology of the Riga Technical University (J.Malers, J.Millers, J.Avotins, V.Kokars) focuses on the physico-chemical processes which include technologies that can be used for ground water and soil remediation, as well as hazardous waste treatment and recycling. The microbiological treatment processes are used as an auxiliary polishing method. The second company Baltec Assoc., Inc. use biological process as a main method for the ground water remediation at Tukums bulk fuel terminal and other sites in Latvia.

## Education

At present there are not many job opportunities in Latvia for the "general environmental" scientists and engineers /6/. The new prepared specialists are better recognized on the job market, when their education is related to a traditional discipline with a specialization in environmental science. This is the reason why there is not any special higher environmental education institution in Latvia. Two institutions are responsible for the higher chemical education:

- the Faculty of Chemistry of the University of Latvia (FC-UL),
- the Faculty of Chemical Technology of the Riga Technical University (FCT-RTU).

The specialists, which graduated from these universities after 1985, are chemists with an awareness of environmental problems and the technological skills to solve them. Environmental problems, and how to solve them, have been integrated into all the relevant existing disciplines. Besides it a supplementary disciplines of ecology and environmental protection, as well as different other special disciplines, dealing with the environmental issues, were added.

The Centre for Environmental Studies at FC-UL offers a Master degree programme in Environmental Chemistry (A. Spricis). The FCT-RTU offers both the diploma course and Master degree programmes *Environmental technologies and Equipment*. Both the faculties have also started some activities at the doctoral level of studies in the relevant fields.

Besides it there are two institutions for postgraduate education in environmental sciences at the UL: The Centre for Environmental Science and Management Studies (R.Ernsteins) and the Faculty of Geography (M. Klavins). This is the way for practicing specialists, including chemists, graduated from the universities before the 1980th, how to obtain environmental knowledge, and the academic degree in this field.

Over the last six years a similar institution - The Department of Postgraduate Education at RTU has established two years environmental engineering education programme for



practicing professionals with complete higher education in any speciality (S. Valtere). After two years academic studies and thesis or project they obtained Master's degree in Environmental Engineering. Around 50% of the participants were chemists graduated from one of the two faculties - FC-UL or FCT-RTU. The feedback from the participants and their enterprises was encouraging but, despite this, last year the Council of Riga Technical University decided to close this course. The main objection was the fact that there were joint groups - students with different first specialities. It shows, once again, an ignorance and conservative attitude towards new interdisciplinary style of education in this new field of sciences.

## Conclusion

Presently, after regaining independence, Latvia faces many problems, but also many new possibilities. Action towards sustainable development should include support for

- expansion of fundamental and applied research,
  - implementation of best environmental technologies,
  - implementation of effective systems for environmental monitoring, data collection and analyses,
  - introduction of modern principles and methods in environmental education,
- and the chemists of Latvia are very significant actors in achieving this goal.

## Abbreviations

BMP - Baltic Monitoring Programme (HELCOM)

ECU - European Currency Unit

EU - European Union

FC-UL - Faculty of Chemistry of the University of Latvia

FCT-RTU - Faculty of Chemical Technology of the Riga Technical University

HELCOM - The Baltic Marine Environment Protection Commission (Helsinki Commission)

MEPRD - The Ministry of Environment Protection and Regional Development

RTU - Riga Technical University

UL - University of Latvia

## References

1. Helsinki Commission. Baltic Sea Environment Proceedings. 1993, 46, 59-63.
2. National Environmental Policy Plan for Latvia. VARAM, Riga, 1995.
3. Environmental Action Programme for Central and Eastern Europe. Abridged version of the document endorsed by the Ministerial Conference, Lucerne, Switzerland, 28-30 April, 1993.
4. Ubelis A. A Sustainable Baltic Region, booklet of The Baltic University. 1997, 10, 14-19.
5. Statistical Data About the Industry in Latvia, The Royal Danish Embassy, 1995.
6. Valtere, S. European Journal of Engineering Education. 1996, 21 (4), 403-407.