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K.M.DUMAEB ✓
Vice-minister
of Ministry of Science
of Russia,
member-correspondent of
Russian academy of Sciences

ACHIEVEMENTS and DIFFICULTIES of RUSSIAN CHEMICAL INDUSTRY

Many problems influencing the development of chemical industry arise in the period of the transition of Russia to market economy. Among these problems I would like to discuss there are those pertaining to investments, finances, credits, regional politics, science organization and foreign trade.

Russian chemical industry is a huge branches complex occupying one of the leading places in the industrial potential of the former USSR.

67% of the former USSR commodity output was provided by chemical industry. Production of this industry includes 74% of polymers, 80% - of plastic articles, 75% - of synthetic dyes, 76% - of organic synthesis production, 93% - of activated coal, 90% - of chemical reagents and especially pure substances and 65% - of chemical fertilizers.

61% of industrial funds and about 60% of industrial personnel of the former USSR are concentrated in chemical industry of Russia.

In the structure of the Russian industrial production chemical industry occupies 6,9%. It does not correspond to the demand for chemical materials and to Russian resource capacities.

The development of chemical industry, especially in 1985-1991, proceeded slowly. The rates of chemical industry development relatively to the rate of the whole industry development was 5% higher in 1985. In the earlier periods this ration was usually 30 - 40%. It reflects the stagnation of the Russian chemical industry at the present stage.

The decline of volumes of various chemical production varied from 3 to 25% in 1991 - 1992. The most dramatic decline occurred in

the production of chemical fibers, calcinated soda, high pressure polyethylene, synthetic dyes and organic synthesis products.

The principal reason of this decline is a crisis state of Russian economy manifested in the drastic decrease of centralized money investment and of raw-material purchages and equipment import and also in the loosening of agreement discipline and deterioration of economic relations.

These negative processes were aggravated by a high rate of wear (more than 60%) of base funds and especially of their active part and stopping of exploitation of some branches of chemical industry in connection with ecological problems.

The technical level of Russian chemical industry does not correspond to the contemporary demands, The ratio of the progressive materials and products in the whole industrial output is 2-3 times lower than in developed countries. 60% of the whole output is produced by obsolete technologies. The generation of technological processes are changing each 20-30 years (in developed countries - each 7-8 years).

Russian capacities in raw materials are not used properly. Thus only 20-25 mln tons of crude oil (4 - 5% of volume of its extraction) undergo the chemical processes. The predominant part of it is exported or used as fuel; 477 mln tons of natural gas (less then 0,1% of its output) is chemically processed. Insignificant volume of gases of coking coal and many types of accompanying hydrocarbons are also insufficiently used. Among them there are ethylene and a wide hydrocarbon fraction which are burnt (each year about 1.5-2.0 mln tons) or simply lost in the course of oil extraction.

All these drawbacks lead to the decrease of chemical industry competitiveness and to the growth of its ecological risk. The export potential of Russian chemical industry remained low during the last decade. Volume of export in the whole output of chemical industry is only 1.5 - 3.0%.

At present the world society recognized necessaity to take urgent measures for liquidation and prevention of the anthropogene influence upon environment which reached of threatening dimensions.

Russian chemical industry is steadily trying to decrease the ecological danger of its plants. Thus, during the last decade the output of chemical industry increased by 25%, at the same time the atmospheric pollution decreased by 30% and water consumption - by 20%.

In the precedent presentation we heard several examples characterizing chemistry as a protector of nature and human society. I would like to tell about some more projects performed in our country and financed - including from federal budget. Most of them are developed in the framework of military conversion.

The Chemical Research Institute in Tambov is dealing with the substitution hog chloride compounds used in cellulose bleaching for sodium peroxide obtained as a by-product of peroxides production. This bleaching may also be used at home. The same Institute is developing the safe oxygen absorbents on the base of metal-chelates which fulfil these function many times like hemoglobin. The regeneration is carried out by biasing the atmospheric air warmed up to 80 C. The low potential heat produced for instance by refrigerating installations may be used for this purpose. These oxygen absorbers may be used for food storage and for safe transportation of explosives.

The scientific industrial corporation "НЕОРГАНИКА" ("INORGANIC") is developing:

- the filtro-ventillation installations for air purification of harmful substances produced in the course of indoor welding (The air consumption is 200, 500, 1000 and 2000 cubic meters per hour, purification efficiency is 95-99,9%);

This corporation also develops methods and techniques of highly sensitive testing of microconcentrations of gas and steam admixtures in the air (including the open air). These methods are based on the effect of the "molecular nuclei of condensation". Their sensitivity is not lower than 10 g/cubic meters for organic and inorganic compounds and for aerosols not lower than 0,015 milligram/cubic meters. The time of determination is not longer than 30 sec. Both stationary and movable installations are available.

Another products of the corporation are filters for burning car exhaust gases. Consumption is 10-500 cubic meters per hour and purification efficiency - 95-99,9%.

A huge scientific potential accumulated by the corporation in the course of the development of special protection devices will permit tc create in 1-2 years the highly efficient methods of air supply for hermetical compartments for car, tractors and harvester working in the atmosphere containing pesticides, herbicides, defoliants, hazard chemical substances and radioactive compounds.

ГРНИИОХТ develops an unprecedented method of immuno-selective group concentration of polychlor-di-benz-p-dioxines and subsequent highly sensitive detection of these compounds.

The method decreases many times the cost and duration of analysis, increases a reliability of detections. Important is also a possibility to prepare the samples by low-skilled personal.

And at last our perspective plan is the organization of the Russian center of chemical safety.

This center will do the following:

- development of the method of informational and program suppo for risk analysis;

- scientific and industrial development of protective means and of the operations in the case of accidents;

- development of monitoring systems;

- coordination of the activities of the Institutes creating safety systems in Russia

- information exchange and joint works with foreign scientific institutions on development of safety systems.

This short survey of Russian chemical industry shows that it is simultaneously characterized by high scale production and considerable scientific achievements and at the same time by the low technical level and abundance of energy-wasting and ecologically dangerous plants.

Russia has all the necessary preconditions for the intensive development of chemical industry which were not properly used while framework of the USSR planned economy, namely:

- Russia has available vast and variable chemical raw materials and energy. The output of oil for 1990 was 516,2 mln tons, natural gas - 640,6 milliard cubic meters, coal - 395,4 mln tons, electric power - 1082 kilowatt per hour. It comprises about 75% of the output of the former USSR;

- about 60% of skilled workers of chemical plants of the former USSR are concentrated in Russia. It comprises about 1.2 mln persons;

- Russia possesses 72% of scientific and technical specialists in chemistry. They perform about 75-80% of scientific investigations of the former USSR.

All these facts give us a ground to look optimistically to the possibility of Russia's exit out of the present crisis and of the subsequent development of Russian chemical industry. Of course, all this will be provided only by system of management and investition politics in chemical industry and by introduction of market mechanisms

We fully understand that market economy per se is not simplifying but on the contrary makes more difficult the solution of the strategical problems of chemical industry.

For many decades a particular trait of our economy, including chemical industry, was the desire to create a maximally universal industrial structure i.e. to be able to produce into one country all necessary goods. This desire resulted in avtarkia, shortages to the excessive centralization of economy management. A syndrome of big business (well known from world practice) appeared in our closed system, where the activity of enterprises based on various subsidies and privileges, was not stimulating the economical and scientific and technical development. Plans decisions were not fully accomplished. The distribution of produced goods was centralized with the participation of state structures. All that created many

shortages.

At the present stage of Russian transition to market economy the awareness is growing between scientists, businessmen, legislates and politicians that a self-organizing open economical system should be created. This system must influence on the development of market strategy, market infrastructure and competition mechanism.

To what extent have the economy management in Russia to be centralized and have it?

It seems that the efficiency of the problem of economy management during the transition to market is determined by the character of interactions between the central structures and the market.

For chemical industry the main problems are: creation of the long-term strategy of scientific and technical development, the determination of top priorities and the formation of state scientific, technological and investition programmes.

This work will be based on independent expertise in the conditions of competition of alternative projects.

The systems of aim subsidies, favorable credits, indirect stimulation on the base of tax and price privileges, accelerated amortization in the whole cycle, from the idea to sale.

The forms of property on means of productions must be differentiated and the optimal coordination between various forms must be formed.

Some of the mechanisms must be noted:

- transition to the flexible system of management permitting to perform various ways of collaboration between science and industry: from the whole to partial decentralization (firms, companies, concerns, trusts etc) to the creation of innovative joint- stock enterprises on the joint-stock base. In that case special aim firms are created for development of new products and for the penetration into market;

- support of the regional industrial development on the base of the creation of the active zones of high technologies for raising the economical role of small and medium enterprises using natural, labour and material resources of Russia's regions;

- elaboration of the strategy of the internationalization of scientific researches and industrial investments. Joint investment, innovative and industrial companies and firms dealing with perspective directions of science, technology and industry will be created. These companies will be oriented towards the reorganization of the Russian chemical industry and the increasing of population life qualify level;

- preparation of administrative, scientific and engineering personal for working in market conditions, training of chemical personal in the case of the creation of new plants.

These are, from our point of view, the basic problems which our chemical industry faces during the economic reform.

What was achieved in the course of this reform and what are main difficulties? We are at the very beginning of the reform. We are creating the legal base . Market structure is appearing.

The laws regulating economy are not yet fully formulated. Economical activity is often regulated by president and government decrees and by a lot of acts issued by departments. We are trying to eliminate the shortage of laws creating a new legal system including the defence of intellectual property forms and regulating of the rights of foreign investors, regulation of foreign trade and currency activity.

A few words about joint enterprises in Russia which we have 3000 at present. But only 38 of them were registered in chemical industry in January 1992.

In most of these joint enterprises Russian capital is prevailing comprising 60-70% of the total enterprise capital. The fields of activity of these enterprises are mainly consulting, intermediary services, construction projects, elaboration and introduction of new means of automatization and control.

Russia presents a vast market, has very rich natural resources and develops technical and industrial potential. Chemical industry dealing with the processing of raw materials might become a sphere of active joint business.

I would like to say some more details about the development of the market of scientific and technical production and base approaches to its management.

In the last decade only about 49% of new technologies were applied in industry, which stopped to be susceptible to them, mainly because of the state was running all the industry and distributing its production.

As a result though there is a great scientific background in all the chemical sciences and scientific services in Russia (about 120000 persons, including academic and applied fields of science, application of modern and perspective scientific technologies is carry out rather slowly. It can not change anything, in fact, in Russia chemical industry, especially to improve scientific level and to use ecologically safe and resource-saving technologies.

The current state of our chemical scientific potential is characterized by following:

- unusually wide front of scientific researches resulting in scattering of finances and resources;

- monopolization of scientific researches supporting by departmental organization "НИОКР";

- low mobility of scientific and technological potential in responce to new needs of society;

- lack of legal protection due to unperfected legislation in the fields of rights of the authors, patent rights and intellectual property.

Our private business is now only nascent therefore next five - seven years state the main task of state politics is to stimulate and interest business and entrepreneurship in innovation activity.

Estimation of current state of scientific potential in critical economical station which is now in Russia should causes main and quick development of those fields of chemical industry which are oriented on life support, for example:

- ecology and ecoglobe saving, safety of human community;
- wealht-fare;
- energy support of human community'
- food support and social one of human community;
- improving of traditional chemical materials and constructing of new one.

In frameworks of these important spheres of activity some state scientific and technical, social and economical programmes were formed They enable to transform the structure of our chemical industry. One of them, "Ecologically safe chemical processes and technologies", includes researches and application of new chemical technologies, new methods of oil, coal and gas processing, using membranes for liquid and gas separation, modern technologies of purification of drinking water and wastes. Distribution of money for different studies inside this programme was performed on the base of competition. Its realization will provide our community with the modern chemical production, receiving on the base of new generation technologies.

Let me give some examples.

In the framework of direction "Chemistry and technology of pure water" there are two projects: "Oka - a pure river" and joint Germany-Russian project "Oka-Elba- pure rivers". The aim is investigation and realization of legitimate, organize and technological measures to clean, purify and improve ecological state of these water reservoirs.

НИОКР was finished in the field of cellulose processing which permits to lessen 10 times the quantity of wastes and prevents gas explosions.

Principally new reactor with metal-capacity reduced 10-100 times realized at four plants.

A new technological line producing polymer membranes with productivity of moulding 3-1- times higher than in known analogs is working. The consumption of polymer per 1 square meter of membrane was

5-10 times lower than usually in such line.

A new membrane sorbtion installation was tried on a heat power-station. This installation lessened the volume of wastes 2 times and decreased the consumption of ion exchange resins 3 times.

By 1995 a principally new base will be created for constructior of productive lines of new generation for small and medium chemical plants.

The national scientific centers will give substantial support for the realization of state scientific and technological programmes.

These centers are oriented to support in Russia the world level of work on prior directions of sciences. The centers will be provided with centralized financing, capital investments and currency. They will receive tax privileges and a system of guarantees and favorable conditions for their employers.

The special (non governmental) scientific innovation fund "Chemistry for ecology" is created.

The main tasks of this fund are:

- organization of industrial application of the results of most important projects, their partial or full financing;
- function of financial and property guarantor and reserve;
- financing of pilot projects on the grant and repayable base;
- estimation and prognosis of market value of new chemical products and technologies;
- expertise of new projects;
- creation of the centers certifying chemical products according to international standards.

The fund is creating card-index, databanks and databases.It may be an abonent of other databanks on the commercial basis.

During the transition to the market economy the financing of scientific researches and designers works realized through scientific and technological programmes will be based on the flexible combination of buget funds, funds coming from interested enterprises and organizations, bank credits and sponsor investments.

Budget money are distributed through the Ministry of Science of Russia. Scientific Councils of independent experts determine on the competitive base the participants of works. Unlike the plan system not the whole organization, but an active group of specialists is financed.

The applied market-oriented НИОКР must be financed mainly by the interested enterprises with a certain state support (mainly legal) and division of risk.

The state support of applied research is provided from the non-budget funds creates in ministries and departments, concerns, corporations and associations. These funds are created from 1.5% of

the production cost.

The financing of applied НИОКР from state budget must be given only to important initiative programmes, able to yield economic results and to improve the export potential of Russia in the sphere of high technologies.

I tried to delineate the main tasks of Russian chemical industry in the course of economic reform.

Without development of chemical industry Russia will not be able to solve the problems of economical reorganization, creation of competitive industries and the sufficient production of vital commodities.

We hope that in the near future the legal base for private business will be created.

It will hope Russian chemical industry to become an open economical system.

This fact gives us a hope that the economical reforms in Russia will be irreversible and that foreign investors will take part in the restructuring of chemical industry. In its turn Russia will take part in various international scientific and technical programmes in the fields of new materials, ecology , biotechnology etc.

Thank you for attention.

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