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J.A. Ahenbah

FEATURES OF THE CLUSTERS AS INTEGRATION STRUCTURES

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Construction of competitive regional economy on principles of the innovative approach in many respects depends on harmonious dialogue of business, a science, authorities, the credit organizations. However the existing structure of economy of regions doesn't allow to create the flexible, steady, competitive economic systems having strong positions in market space and capable to resist to powerful external influences. One of ways of overcoming of the crisis phenomena in economy is formation in regions of progressive integration structures, as bases of an effective utilization technological, industrial, a state manpower.

Such structures in domestic and foreign practice of management are clusters. Cluster is a regional association of the industrial enterprises, financially-credit, research and educational institutions, and also other enterprises and the organizations on principles of interaction and interdependence for the purpose of strengthening of competitive advantages, position stabilization in the market and maintenance of long-term reliable partner relations between participants of cluster with support of external institutes. In the given definition it is necessary to understand administrative, state, imperious, consulting, rating and other structures as external institutes.

The basic features of clusters are: territorial localization of the basic participants; presence of the large enterprise – the leader defining long-term economic, innovative and other strategy of cluster as a whole; stability and dominating value of economic communications between the enterprises.

The most widespread and perspective forms clusters now are business incubators and technoparks which are capable to provide overall objective achievement clusterisation – to raise competitiveness of participants of cluster. Creation of business incubators and technoparks is a necessary and expedient condition of effective development of participants of regional economy. And as a whole, clusterisation is pledge of successful realization of innovative processes, transfer the advanced innovative technologies and consolidation of efforts of research-and-production community.

M.M. Ahmedov
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OBTAINING SULFUR OUT OF HYDROGEN SULFIDE ON THE METAL ZEOLITE CATALYSTS

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The problem of natural environment contamination is extremely actual for the whole

mankind. That's why the enterprises of gas, petrochemical and metallurgical industries pay great attention to the measures on protection of environment from contamination.

The enlarged ecological standards make high demands on efficiency of the plants on oil, gas and metal processing assigned for extraction and purification of sulfuric compounds.

The key role in this problem solving belongs to the process of obtaining elementary sulfur out of hydrogen sulfide by Claus method, which is the most perspective in technological, ecological and economic aspects process of obtaining sulfur out of sour gases while purification the natural and incidental gases, as well as the gases of petrochemical and metallurgical industries.

Today Claus process on the one hand solves the problem of utilization of hydrogen sulfide and gives an opportunity to obtain a valuable product – gas sulfur, on the other hand – while getting the gas sulfur the pollution of atmosphere with harmful yield of the waste gases takes place as well as with hydrogen sulfide. The highest contest at the world market moves on another important problem – the rise of its quality.

Thus, technical-economical indices of the processes of sulfur production, their ecological characteristics as well as the quality of sulfur don't satisfy the modern demands of sulfur market. In spite of the fact, that industrial beginning of Claus process started in the 60-es of the last century, a lot of questions of this process remained unsolved, the main scientific elaborations are held in the field of the rising the depth of extraction the sulfur out of gas and the quality of ware sulfur, the fall of harmful yield into environment. Therefore, mastering Claus process in these directions is an actual direction in the gas, oil-processing and metallurgical industries.

We have made the systematic investigations and search of effective catalysts on the base of the natural zeolites, promoted by some transitive elements (Co, Ni, Fe, Cr) for obtaining sulfur on catalytic stages of Claus process (at 250-400°C). On the base of obtained experimental data we have chosen the cheapest and easiest iron clinoptilolite catalyst, its catalytic activity has been studied all around.

There were found out optimum technological parameters of the process: temperature 250-400°C, volume rate of gas mixture 500-1000h⁻¹, correlation of initial reagents $\text{CO} + \text{H}_2 + \text{H}_2\text{S} + \text{COS} / \text{SO}_2 = 1,8-2,4$ at the first stage; $\text{H}_2\text{S} / \text{SO}_2 = 2,0-2,2$ at the second stage. The general yield of sulfur made up – 93-95%.

There was investigated the influence of different components of the reactionary mixture (oxygen, vapour) on the process of rehabilitation of sulfur dioxide by hydrogen sulfide. It was shown, that in conditions of the contact processing in oxygen medium (3; 6 vol.%) the duration of catalyst activation rises till 90 minutes. Existence of the oxygen till 3-6% in the system with preliminary activated catalyst leads to the fall of sulfur yield by 9-10%.

The presence of vapour in the composition of initial gas mixture up to 12 vol.% influences the rate of the process, which diminishes the yield of sulfur and rises the quantity of hydrogen sulfide in the products of reaction (at 400°C).

S.G. Aliyeva
S.Sh. Guseynova

PRODUCTION OF ECOLOGICAL DIESEL FUEL FROM THE MIXTURE OF AZERBAIJAN OILS

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The emissions from fuel burning by the diversified consumers (including industry, power, municipal-household sector and transport) aggravate environmental problems all over the world. The pollution of city air leads to negative influence on health of the people, especially quickly growing cities.

It has been arisen essential necessities for release diesel of higher quality in connection with the wide application of diesel engines in transport.

Since 2005 the countries of the European Union should provide manufacture of diesel fuel with sulphur content no more than 50 ppm, and since 2011 in all stamps of diesel fuel sulphur content are required to be no more than 10 ppm.

As is known, it's important carrying out hydropurification, deparaffination and hydrosaturation processes for the production of ecologically pure diesel fuel.

Sulphur content of the straight-run diesel fuel from Azerbaijan oils limits 0,065-0,110% of weights. At use of the gasoils of catalytic cracking and coking as the components of raw materials of hydropurification of the sulphur content reaches 0,15-0,27% of weights.

Hydropurification depth depends on the boiling end of diesel fuel as with increase of the end of boiling hydropurification process is at a loss.

So, we have taken the diesel fuel obtained from the mixture of Azerbaijan oils with the boiling end not above 340°C. Hydropurification process has been carried out on the flowing installation of pilot production of IPCP. The catalysts AKGD-400 and also nano-structured catalysts EK-2009/118-1 and EK-2010/118-1 have been used for the hydropurification. For the hydropurification of straight-run diesel fuel without by-products on the catalyst AKGD-400 at the regime ($t=340^{\circ}\text{C}$, $P=4.0\text{MPa}$, $V=0.5\text{ h}^{-1}$, $H_2=500\text{l/l}$) on the nano-structured - ($t=280^{\circ}\text{C}$, $P=4.0\text{MPa}$, $V=0.5\text{h}^{-1}$, $H_2=500\text{l/l}$) the sulphur content decreases from 0.110% to 0.0032% and 0.0025%.

After hydropurification iodine number, acidity and resin concentration is minimized in the obtained samples of the fuels and obtained ecologically pure diesel fuel meeting the requirements of Euro-3 and Euro-4.

V.L. Belyaev
A.A. Shalaginov

IMPROVED HEAVY-CURRENT CONTACT CONNECTION

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Russia*

The work is devoted to the research of heavy-current contact systems (HCS) used at

electrolyzed enterprises of chemical and metallurgical industries.

The purpose of the future work is to make the construction simpler to economize materials and non-ferrous metals to make the transition resistance lower and more stable and to economize electrical energy at bus arrangements of electrolysis units of the following types BGK-100, DM-100, BGK-50/25, KB.10.86 and others.

The heavy-current contact systems are represented by single copper or aluminum busses being the main part of bus arrangements of electrolysis units which consist of anode connection of the electrolysis unit, HCS and cathode terminal of the next electrolysis unit.

Due to usage of conductive pastes and lubricants in the HCS joints with anode and cathode terminals as well as due to increase of contact area and insulation zone of the entire contact from the surrounding space, transition resistance is not increasing and the initial minimum value of the transition resistance is preserved for a long time.

In addition to that the modernized HCS system has been developed and adopted which possesses the lower number of parallel buses of bigger cross section. This property has given the possibility to reduce the heat losses in the HCS system.

The technical and economic advantage is determined by the economy of non-ferrous metals by means of reducing the number of copper buses from 20 standard copper items with the cross-section $120 \times 12 \text{ mm}^2$, which are located in couples one over the other up to 10 single copper buses of the bigger cross-section which are located nearby with the cross-section $120 \times 18 \text{ mm}^2$, and reduction and stabilization of the transition resistance due to the usage of conductive pastes and lubricants.

V.K. Bishimbayev
Y.V. Ponomarenko
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ENVIRONMENTAL EDUCATION OF STUDENTS: INTERDISCIPLINARY APPROACH

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The main themes of discussion at the 7-th Conference of ministers «Environment for Europe» (September, 22-24, Astana) were the following ones: aspiration of countries to economy, harmless for the surrounding world and its planting of greenery. These problems will excite also the future generations and this raises the question of improvement of environmental education system of students.

The environmental education is a many fold, complicated and complex process of formation of responsible attitude of a personality to nature, including the formation of the system of scientific knowledge in the field of interaction of a man, society and nature, bringing up a humanistic, emotionally - sensitive world of a personality and also of its willing factor.

The environmental education can not be linked only with studying of the subject «Ecology», the ecologization of the whole educational process and realization of ecological potential of subjects of various cycles are needed. The necessity to provide integration of the received environmental knowledge and skills, modified into a certain cultural unity, appears. Linked with this the interdisciplinary approach appears as a tool, providing the integrity of the environmental education process.

The realization of interdisciplinary approach implies the identification of every subject in the general system of environmental education, education of inter-subject relations and provision of generalization of inter-subject approaches. Close in meaning to this factor is the factor of complement activity. Providing the inter-subject basis, it allows solving a number of problems:

- to substantiate the system of bearing nature protection knowledge and skills with the consideration of study disciplines specificity, to elicit the succession and ways of introducing knowledge into subjects content, considering the inter-subject coordination and step-by-step integration;
- to develop ways of inside – and inter-cycle step-by-step integration and of introduction of generalized knowledge about the ways of interaction optimization of man, society and nature;
- to define an effective combination of ways and forms of work on the formation of generalized environmental knowledge and skills in various kinds of students' activity, etc.

Creation of an effective system of inter-subject and inter-cycle relations in its turn will allow coordinating the subjects, which are the most important in the step-by-step formation and systematization of environmental knowledge and skills (physics, chemistry, biology, etc). In addition to this, complex integrative issues, that allow to ensure and to increase the quality of environmental training of specialists, are formulated and successfully solved on the basis of inter-cycle integration.

T.V. Bobra

ENVIRONMENTAL POLICY IN UKRAINE IN IMPROVING ITS ENVIRONMENTAL MANAGEMENT SYSTEM AND AUDIT

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Currently, Ukraine is actively integrating into the global economy and international system of ecological security. A comprehensive program of national implementation of decisions adopted at the World Summit on Sustainable Development for 2003-2015. Implementation of the concept of sustainable development in Ukraine involves socially, economically and environmentally balanced development of regions of the country on the basis of rational use of resources, strengthening the environmental constituent of the economy and the harmonization of environmental and economic interests of society in whole.

Unfortunately, the same process of the formation of the legal and regulatory framework, establishment of appropriate standards and documents in this field has begun relatively recently in Ukraine. In 1996, by the Ministry of Nature and Ecology of Ukraine, a voluntary national system of environmental audit was organized. In the first stage it possible to collect information on organizations wishing to engage in environmental auditing and have experience in this field.

Legal institution of environmental audit began to develop in Ukraine since June 24, 2004, when the Law of Ukraine "On the environmental audit." was adopted. Up to this moment it has been adapted by the legal basis in Ukraine international standards of ISO (International Standards that have been granted legal registration as DSTU - the state standard): first - DSTU ISO 14010-97 "Guidelines for the implementation of the environmental audit". A unified standard DSTU ISO - 19011:2003 "Guidelines for the audits of quality management systems and (or) environmental management." replaced general principles.

The Law of Ukraine "On the environmental audit" has considerably changed attitude to this activity [<http://www.ukrecoaudit.com>]. First of all, changes were made in:

1 - improving the legal status of environmental auditing and its introduction into the Ukrainian legislation. The relevant provisions of this type of activity were included in the basic law "On the Environmental Protection" (1991), legislation on privatization (Law "On State Property Privatization" (1992), "The privatization of small state-owned enterprises (small-scale privatization)" (1992) .) Services for environmental auditing of objects or activities that are enhanced environmental risk have been attributed to the List of services identified as specific for procurement associated with privatization of state assets (Annex to the Cabinet of Ministers of Ukraine from 05.06. 2001 г. No. 422).

2 – a unified certification system for Ukrainian environmental auditors was established and a single register of environmental auditors and legal persons having the right to conduct an environmental audit was set up. The respective functions of certification and maintenance of the registry as well as methodological support and environmental auditing, was placed on a specially authorized body in the field of environmental protection - the Ministry of Environment of Ukraine. The law first established uniform requirements for the subjects of environmental audits, which are consumers, the executors of an environmental audit, in certain cases, stipulated by law, can even be managers or owners of the objects of environmental audit.

3 - an innovation in the domestic legal system was the introduction of the mandatory environmental audit (together with the traditional form of voluntary environmental audit), where objects or activities that are of high environmental risk (according to the list, which is approved by the Cabinet of Ministers of Ukraine) should undergo.

The role and position of an environmental audit of the environmental management system in Ukraine continues to grow. This is evidenced by the fact that the Law of Ukraine On the Basic Principles (policy) of the State Environmental Policy of Ukraine for 2020 (10.12.2010 city) environmental audit is referred to the basic tools of implementation of the environmental policy in Ukraine.

Environmental auditing is used at all stages of economic activity – from preproject researches till its termination. The range of objects of the environmental audit is wide enough. The objects of environmental audits are various types of investment, economic and administrative activities of government agencies, enterprises, companies and industries that have or may have ecologically significant effects that affect the environment and human health.

Nowadays, environmental auditing activities in Ukraine are realized through these basic types (see Table 1.).

Types of environmental audits	Objectives
A comprehensive environmental audit of the company	Identification, analysis and development of the solutions for environmental problems with the development of the company report, conclusions, recommendations
Environmental audit of the privatization, restructuring of the ownership change, bankruptcy	Risk assessment of a change of ownership, the development of investment obligations of the owner
Environmental audit of the recycling process of waste	Minimizing Waste
Environmental audit for evaluating the effectiveness of investment projects	Minimizing investment risks
Environmental audit in the certification of environmental requirements, including the certification for compliance with standards of ISO 14000	Preparation of the enterprise to its avowal of the environmental policy and intentions to implement it
The environmental audit for purposes of the environmental insurance	Assessing the environmental risk associated with the production activities of industrial enterprises and economic systems, as well as calculation of economic damage as a result of anthropogenic accidents
Environmental audit for eco-label products	Development of the criteria for labeling products

L.N. Bulavina
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ENVIRONMENTAL AUDIT, ITS OBJECTS

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Environmental audit in Russia is a new trend in wildlife management practice. At the present time, the legal regulation of environmental audit

hasn't been developed, and the few existing normative documents contradict each other. For example, there is the following definition in the 1st Article of the Federal Law No. 7-FL "On Environmental Protection": "Environmental audit - an independent, integrated, documentary assessment of compliance with the requirements by the entity involved in economic or other activities, including standards and normative documents in the area of environment protection, requirements of international standards and preparation of recommendations about improvement of such activity"...

In AUSS R ISO 14050-2009 Environmental Audit is defined as a systematic documented verification process of objectively received and estimated audit data for determination of conformity or discrepancy to criteria of audit of certain environmental activities, events, conditions, management systems or information about these objects as well as messages to the client about the results obtained in consequence of this process.

On the basis of analysis of definitions existing today, we consider the following definition more correct: «Ecological audit - is independent verification of certain directions of ecological activity and management systems of economic entities. According to the procedures accepted today ecological audit is carried out: in the implementation of international obligations; in the preparation and justification of the investment programs, when it is provided by investment conditions; on behalf of public authorities, including for a substantiation of ecological sanitation of the enterprises; to account the environmental factors during the privatization of state and municipal enterprises; at realization of bankruptcy proceedings; to carry out of obligatory ecological insurance.

Many heads of organizations have begun to understand that the timely policy of realization of ecologically well-founded approach to business is some kind of the capital investment focused, among other things, on expansion of commodity markets. The main objectives of an environmental audit with account of international practices include: obtaining reliable information about the activities of economic entities in the field of environment and natural resources, increasing their competitiveness in the world market; promoting economic entities in the independent regulation of their environmental policy, reducing the financial risks of business entities.

V.D. Burkovskiy

CONCEPTIONS OF ECOLOGICAL SECURITY: LEGISLATIVE AND POLITICAL ASPECTS

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For the last decades due to the environmental crisis in process the problems of providing ecological security to guarantee the safety of person, society and state have become urgent. There is a need for the balance between the economy and ecology

which makes it possible to use the natural resources without destroying the ecosystem.

Under the legislative aspect ecological security represents a constituent part of the protection of the environment as well as the activities carried out parallel to the nature management, the latter being identical with the environmental protection and nature management. The aim and the principle of the environmental protection are realized in the ecological function of the state. Legal documents providing ecological security should envisage the prevention of ecological risks, a free access to the ecological information and counteraction to ecological terrorism, reimbursement of the damage caused to citizens and environment by breaking the laws of ecology. The methods to ensure ecological security include the establishment of ecological standards, ecological expertise, ecological licencing, ecological certification, and ecological control. Nevertheless, the legal sphere of ecological security often demonstrates a formal approach and inadequate means used; required measures are the development of the system of ecological education, raising the legal consciousness, the state support of public ecological movements, strengthening the international cooperation in the field of providing ecological security.

The majority of the people of today's Russia are living in the conditions of increased ecological danger. The fact is especially significant, since the vast territory of Russia, the ecosystems of which purify and reproduce the environment, and the unique character of the Russian ecosphere are of ecological value to the whole of the world. The condition of the atmosphere, drinking water and the situation with radioactivity – all these ecological problems represent a matter of concern for the public opinion and have political colouring. Lending a political character to ecological movements takes two directions: the state one (downwards) and the non-government, non-state one (upwards). The state ecological policy is directed at the quantitative and structural change of the anthropogenic influence upon the environment, maintaining the life-support functions of the ecosystems of the biosphere. Unfortunately, the ecological policy at the regional and municipal levels is ineffective. The regional ecological policy should be formed on the basis of the national ecological policy with due regard for the geographical, natural, socio-economic and other peculiarities of the region; the nature protection activities in the regions require sufficient funds, ecologically grounded distribution of productive forces, ecologically safe development of agriculture, ecologically optimum waste-disposal, detoxication and burying wastes, rational use of exhaustible natural resources. Necessary should be considered permanent enlightenment work for the ecological instruction of the people, training and further educational training of managers in the issues of ecological security, development and realization of regional ecological programmes, scientific research work in the field of the protection-of-nature activities.

V.A. Burkovskaya
I.V. Burkovskiy

TOPICAL PROBLEMS RELATED TO THE ECOLOGICAL LEGISLATION OF RUSSIA

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Issues of the legal regulation in the field of nature management and ecology remain topical as before. In Russia there is a ramified system of legislation related to the rational use of natural resources and environmental protection: The Land Code of the Russian Federation (2001), The Law of the RF "The Bowels of the Earth" (2005), The Water Code of the RF (1995), The Forest Code of the RF (1997), The Federal Law "On the Fauna" (1995), The Federal Law "On the Protection of the Atmospheric Air" (1999). At the same time the legislation of the Russian Federation in respect of the protection of nature is one of the most contradictory branches of law; certain acts of law are frequently of declarative character, the mechanisms of their realization are not always reasoned out; there are discrepancies between different legal acts and norms, between ecological and other branches of Russian legislation; there are certain deficiencies of legal practice and so on. At present the law of ecology is overcoming the state of crisis, which is expressed in matching the legislation related to natural resources with the real circumstances, the use of the ecological approach in other branches of Russia's legislation. However, the authorized state bodies do not follow, to a full degree, the requirements of the laws currently in force; it should be admitted that certain progressive clauses are excluded from the laws of ecology; the state control in matters of nature management and environmental protection needs optimization; instances of neglecting a scientific approach also occur.

The considerable short-coming of the legislation is the laws are created by different institutions responsible for this or that object of nature. The state bodies which are to carry out the control of the condition of the environment often duplicate the activities of one another bearing in mind their own interests and benefits while using the resources.

Of importance is the problem of support of ecological rights of the citizens, broadening of the range of their opportunities to control the ecological situation and ecological activities of the officials, activation of the ecological functions of self-management. It is necessary to reconsider the views in respect of the ecological well-being of society and methods of its achievement; to correct the mental perception of a Russian nature manager; to provide the use of natural resources for recreational and other humanitarian purposes as one of the first priorities, to regard the ecosystem principle when governing and controlling; to accept the higher status of ecology rather than economy despite the hardships of the economic crisis; to ensure publicity while exercising the main functions of power and control; to seek the ways of solving the problem of the accumulated ecological damage.

At the beginning of February, 2011 the committee of the State Duma for natural resources, nature management and ecology and the committee of the Federation Council

for natural resources and environmental protection approved the draft for “The Grounds of the State Ecological Policy up to the year of 2030” which was developed by the Ministry of Nature. The legislators, however, made critical remarks concerning the draft. In particular, they considered it to be necessary to determine the directions and priorities of the ecological policy for the short-term (2011-2017) and the long-term (2018-2030) periods. It is pointed out in the commentary that the balance of interests of economical development and ecological good is only declared in the draft, but the real providing mechanisms are not available. In a gist, the ecological legislation and ecological policy of the Russian Federation are in the state of constant development and require the solution of a lot of urgent problems of nature management.

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DEVELOPMENT OF «EISIN» SCADA SYSTEMS

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The “EiSin” project sets the task of continuation of SCADA systems introduction (Supervisory Control And Data Acquisition) in industrial and civil construction, in buildings with high and average level of responsibility, pursuing the aims of reduction of maintenance cost and risk of emergency. The feature of the project is the combination of the results received by an instrumental way (through strain gauge sensors) and the data received during a visual survey of constructions, with full trace of collected data.

Project features

- Possibility to divide into classes and to conduct statistics; to assign the number and the parametrical description to structure elements for further tracing of their condition. Also these structure elements should refer to the sensors attached to them and carry the information of the sensors position and other technical information.
- Possibility for an element to assign critical parameters according to the preliminary calculation (for example critical parameters of strain) or when it concerns the whole building (for example parameters of critical temperature and humidity).
- Possibility to make the automated report on a condition of elements, both the whole building and the concrete element. Formation of reports.
- Possibility of manual input of the construction parameters received at manual, tool and visual survey. That means that the system provides creation of database in which engineers, carrying the regular examination (conducted once in 10 years in Russia) could add their reports about the design condition. It is necessary because we can not consider, for example, corrosion of truss through strain.

The «catalog number» is assigned to each element and according to this number we can define what works had already been conducted, are being conducted now or are planned for the given structure element (for example, painting or anticorrosive protection of the given element).

- Possibility of the automatic analysis of information both received from sensors and entered during the regular survey and emitting of warnings.
 - Possibility to emit warnings operatively by the visual and sound channels.
 - Creation of a complex with use of a free/open software.
- At present the following tasks are carried out:
- Field survey of existing SCADA systems (sample from 22 SCADA systems had already been executed).
 - Now the concrete SCADA system is chosen. This system is used as the base of our complex because of its sufficient functionality and openness (GPL v2.0). Its studying is started.
 - The equipment for trial experiment had already been selected and bought (ICP DAS 7000 - data I/O-module).
 - Preparation for experiment.
 - Creation of the system of building parameters and elements of constructions description and working out of sample filters and reports forming rules.

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L.L.Chernichenko

DIE ÖKOLOGISCHE KOMPONENTE SOZIALER VERANTWORTUNGEN DES BUSINESS

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In den entwickelten Ländern hat eine weite Verbreitung die Konzeption der sozialen Verantwortung des Business bekommen, die eine wichtige Institut im System des sozialen Schutzes der Bevölkerung ist, die den Widerspruch zwischen der Wirtschaftseffektivität und sozialen Gerechtigkeit auf dem korporativen Niveau zeigt und löst.

Die Konzeption sozialer Verantwortung des Business macht nur die ersten Schritte unter Beachtung der Voraussetzungen in Russland. In Russland existieren mindestens drei Herangehen an Verständnis der gegebenen Erscheinungen.

Erstens wird unter der sozialen Verantwortung verstanden, dass eine wirtschaftliche Tätigkeit einen Unternehmen nach der Bestimmung den sozial bedeutsamen Charakter hat. Es zeigt sich in Produktion von qualitativen Waren und Dienstleistungen, bei Steuerzahlung und Anbau von gutbezahlten Arbeitsplätzen.

Zweitens steigt ein Unternehmer mit seiner Tätigkeit außerhalb minimalem gesetzgebend bestimmtem Rahmen aus und verwirklicht strategisch zweckmäßigen Beitrag an die Entwicklung von internen und externen Umgebung der Handlung des Business. Der Unternehmer erhöht dadurch seiner Immunität in Sicht der langfristigen Perspektiven. Dabei führt der Unternehmer interne und externe soziale Programme, die mit seiner Entwicklungsstrategie einstimmt.

Drittens beobachtet man eine Tendenz auf dem Hintergrund des wachsenden Interesses der russischen geschäftlichen Gesellschaft zu den Fragen der sozialen Verantwortung, die sich darin besteht, dass der Unternehmer sich nach Reputation als sozial verantwortliche Organisation strebt. In diesem Fall besteht eine soziale Verantwortung nicht nur darin, dass der Unternehmen wechselnden öffentlichen Erwartungen in Bezug auf Produktion oder Dienstleistungen berücksichtigt. Sie nehmen aktive Beteiligung an Formierung der hohen öffentlichen Standards, zum Beispiel solchen wie Bildungsqualität, ärztliche Betreuung, Umwelt und bringen dadurch eigenen Beitrag in Lebensstandards Verbesserung im Land.

Die Besonderheiten von der Programme der sozialen Aktivität sind die Freiwilligkeit ihrer Durchführung, Systemcharakter und Gebundenheit mit der Mission und der Entwicklungsstrategie den Unternehmen. Es orientiert sich auf Befriedigung der Anfragen verschiedenen Mitgliedern, die an Tätigkeit der Organisation interessiert sind, und zwar Arbeitgeber und angestellte Arbeitskräfte unter regulierender Funktion des Staates.

Die Kennziffern der Einschätzung von sozialer Verantwortung des Business bestehen aus folgenden Gruppen:

- die Kennziffern von sozialer Verantwortung vor Arbeitnehmern;
- die Kennziffern von sozialer Verantwortung vor umgebenden Gesellschaft;
- die Kennziffern ökologischer Verantwortung..

In die Gruppe von aktuellsten Kennziffern ökologischer Verantwortung von wirtschaftenden Subjekte kann man aufnehmen:

- Steigerung von der Kosten auf Umweltschutz;
- Anteil von Kosten auf Ökologie in Selbstkosten der Produktion.

Die Beziehung der quantitativen Daten nach jeder Kennziffer für Anfang und für Ende einer Rechnungsperiode, die sich prozentual geäußert, ermöglicht es, den relativen Koeffizienten der gegebenen sozial-ökologischen Kennziffer auszurechnen.

In der russischen Wirtschaft verwirklicht sich eine Realisierung der sozialen-ökologischen Programme hauptsächlich mit großen einheimischen Unternehmen. Das ernste methodologische Problem besteht darin, um die Wege für Versetzung der Prinzipien der sozialen Verantwortung, sowie der ökologischen Verantwortung, von den großen Unternehmen auf riesige Schicht der Unternehmer, die im kleinen und mittleren Business beschäftigt sind, zu finden

Aktualität der Frage über eine Notwendigkeit der Durchführung von sozial-ökologischen Veranstaltungen in Maßstäben des kleines und mittleren Unternehmen, einschließlich auf den Kaukasischen Mineralwasser Russlands, ist kein Zweifeln. In erster Linie ist es mit der Verstärkung von Rolle des gegebenen Wirtschaftsektors als materiellen Konsumproduzenten, sowie Aktivierung des Prozesses der sozialen Konsolidierung und Lösung der Probleme ökologischen Sicherheit der Erholungsressourcen in der Kurregion des Nordkaukasischen Föderationskreises Russlands verbunden.

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ANALYSIS OF HEALTH RISKS IN EMERGENCY SITUATIONS DUE TO AIR POLLUTION

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Today one of the main social-hygienic monitoring objectives is health risks analysis due to environment pollution including ones in the emergency situations.

In July-August, 2010, the fire emergency situation was registered in Voronezh region. Fires and smoke pollution were registered in 14 regional administrative districts from 33.

Over the period analyzed 676 air tests have been studied in 15 monitoring points in Voronezh; 16 of them (2,4%) have not passed the hygienic standards. In 27 smoke places 418 air tests have been studied in 13 regional districts; 6 of them (1,4%) have not passed the hygienic standards.

The most unfavorable air pollution situation in Voronezh was registered on the 31st of July, 2010: carbonic oxide was fixed to be exceeded in 2 times; suspended solids – in 1.8 times; of carbon soot – in 3.3 times; of formaldehyde – in 24.6 times.

Health risks analysis in Voronezh city at acute influence of pollutants indicated high non-carcinogenic acceptable risk level in the days when air pollution reached its highest levels due to influence of formaldehyde (HQ = 17,9), of suspended solids (HQ = 3,0).

Along with air pollution the higher temperature was the additional health risk for population of Voronezh. According to the data of the Main Department "Voronezh Hydrometeorology and Environment Monitoring Center" it has reached its maximum of 40,1-40,5°C during the period under investigation.

To estimate air pollution and high temperature influence on health, information about daily emergency calls and mortality hospitalization (including blood circulation disorder and respiratory diseases) of the Voronezh population was collected.

Cause-effect relations study results are introduced in the Table 1.

Table 1

Air pollution and high temperature influence on health during the fire season

No	Parameters	Risk factors	Correlation coefficient
1.	Mortality	daily mean temperature	0,7
2.	Blood circulation mortality	daily mean temperature	0,7
3.	Respiratory mortality	daily mean temperature	0,4
1 day			
1.	Blood circulation hospitalization	nitrogen peroxide	0,5

2 days

1.	Respiratory mortality	formaldehyde	0,4
2.	Blood circulation mortality	nitrogen peroxide	0,5
3.	Respiratory hospitalization	suspended solids	0,4

3 days

1.	Mortality	suspended solids	0,5
2.	Blood circulation mortality	suspended solids	0,4
3.	Respiratory mortality	carbone oxide	0,3
		carbon soot	0,5
4.	Hospitalization of population	carbone oxide	0,5
		suspended solids	0,4

To forecast a situation and make the administrative decisions on human safety in Voronezh region, information about air pollution was daily (two times per day) transferred to the Russian Ministry for Civil Defense, Emergences and Disaster Response in Voronezh region; 39 recommendations on reducing of harmful influence of health risk factors were placed on the

N.I. Danilov

REGIONAL ENERGY EFFICIENCY IMPROVEMENT PROGRAM AS BASIS FOR LOW-CARBON ECONOMY

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Degree of energy efficiency of economic structure is directly related to the environmental conditions. One of the tools – regional programmes of energy efficiency improvement. In Sverdlovsk region they have been implemented since 1996. As a result energy consumption of gross regional product decreased from the year 2000 to the year 2008 at an annual rate of 5,5%. In the region there are all the necessary prerequisites for low-carbon economy, among them - valuation survey of greenhouse gases which has been carried out.

Implementation of low-carbon strategy in the region, first of all, leads to improvement of energy efficiency in enterprises. This will undoubtedly favour the environmental conditions improvement.

According to our calculations, to decrease energy consumption of gross regional product by the year 2020 by 40% in relation to the level of the year 2007 one should compensate the fuel and energy requirement growth by 90% by way of energy saving.

In 2010 we elaborated the program for energy efficiency improvement in the region as a quintessence of all the accumulated experience. The regional program is the principal

tool of energy consumption planning. The basis of the program is fuel-energy supply-demand balance of the region which gives the idea about economic processes in terms of energy units independent of inflation, market conditions and exchange rate fluctuations. Fuel-energy supply-demand balance is not new, it is the continuation of the famous model “costs-output” offered by Vasilij Leontyev, Nobel prize winner.

Fuel-energy supply-demand balance for forecast purposes allows to reconcile development of economy and energy sectors, to form energy base in time according to the needs of economy, provide energy consumption safety, improve reliability and stability of power supply systems. In Sverdlovsk region we have elaborated an economic-and-mathematical model of development of “energy sector in economy” system which serves for making fuel-energy supply-demand balances for forecast purposes. The model is “a dynamic balance of balances” and it combines interproduct balances and balances of consumption of some types of fuel and energy resources.

After having formed and verified informational background the scenario parameters of forecast are determined. After that the fuel-energy supply-demand balance for the current year (base year of the forecast period) is made up. Fuel consumption, heat consumption and electric energy consumption are balanced with respect to separate consumers or kinds of products (works or services), fuel is subdivided by types and power-intensity baselines are determined. After that, according to the earlier established scenario conditions, forecast options of fuel-energy supply-demand balance are worked out, forecast of product output (works, services) is made for a horizon period for each scenario along with the forecast of energy consumption indicators, of demand for fuel in general and for certain fuel types, for electric and heat power. Finally, summary fuel-energy supply-demand balances for the current year and for the horizon period are made up and quality ratings are calculated.

Fuel-energy supply-demand balance allows to estimate energy saving potential – it is equal to 17 mln tons of coal equivalent which could make up a whole mine field. Moreover, the “exploitation” will cost 2-6 times less than getting the same amount of energy by way of increase of energy generation capacities. According to our calculations, till year 2020 one could unleash 180 mln tons of coal equivalent. The biggest part (over 40%) could be saved in production and construction sectors, one third – in fuel and energy sector, 13% - in housing sector.

N.K. Dosmukhamedov

ENVIRONMENTAL SAFETY OPTIMIZATION FOR NON-FERROUS METALLURGY SPHERE

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Non-ferrous metallurgy is the sphere of the most extensive waste output for product unit. Projecting most part of the existing plants didn't take into account the rational

environmental requirements and requirements for reduction of industrial activity negative influence. Creation of environmentally safety plants, based on modern waste-free technologies, requires huge capital investments. The only way is the environmental approach for the existing industrial production through the set of measures, including both technology processes enhancement, and environmental measures effectiveness improvement, solid wastes utilization through implementation of the modern automatic instruments of environment monitoring.

The lead enterprise OJV “KazZink” – is the most risky Kazakhstan enterprise by the rate of influence of harmful substances on environmental pollution and by the rate of industrial waste output. Industrial data analysis showed that the old technologies, being used nowadays, do not satisfy the modern requirements, both technological and human safety on work places.

Investigation object – blast smelling process, being used by OJV “KazZink”, is the most low-technological and environmentally unsafe object in the whole scheme of lead production, as of high content of harmful substances in the melt products, as slag, matte, powder and gas. The most actual task is optimization of technological parameters in order to minimize the harmful substances concentration in working zone atmosphere through development of effective technology-environmental model.

It is stated, that the most harmful substances for blast smelling process, influencing the atmosphere and people health, are the following: sulfurous anhydride, copper, lead, arsenic, antimony and their compounds, concentrated in the melting outputs.

The mathematic modeling of the process allowed to obtaining the quantitative rates and dynamics of harmful substances motions with input and output material process flows. In order to define the optimal allocation of the mentioned harmful substances among the melting products it is the information-analytical model developed (IAM). This model sequentially, through one and the same chain, makes all the required mathematical calculations, defines optimal value of the technological parameters. The model includes the scheme of operative control and regulation of the process technological parameters. IAM is the fundamental base of the complete effective technology-environmental model (TEM) of the process.

TEM allows minimizing harmful substances influence on working conditions and environment safety. The proposed model adequately describes the industrial experiment and allows 2-2.5 times decrease of the harmful substances volume in working zone atmosphere.

Technology parameters optimization, using TEM, simultaneously supported high technological parameters of the process. Comparing with the existing technology, extraction of the copper into matte increased from 83% up to 96.6%; extraction of lead into lead bullion increased from 45% up to 60%. Extraction of arsenic into powder achieved 76%, against 43%, extracting by the existing technology.

The developed technology-environmental model can be used for the other objects of non-ferrous metallurgy, based on their specifics.

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LONG-TERM OBSERVATIONS OF PLANT DIVERSITY AND PRODUCTIVITY NEAR AN OPEN COPPER PIT

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Long-term vegetation diversity and productivity observations are rare but especially precious when anthropogenic impact onto natural ecosystems is assessed.

In this work we have an objective to describe changes of plant cover in the vicinity of Safianovskiy Open Copper Mine (Sverdlovsk Oblast, Russia) during 17-year period of its operation.

The biological investigations are the part of a complex environmental monitoring system which is implemented at Safianovskiy enterprise from the very beginning of its existing.

Study area belongs to the region of Middle Urals and to the southern taiga phytogeographical subzone.

In 1994-1996 six plots 25 x 25 m were chosen in the vicinity of Safyanovskiy open copper pit.

At that time each plot was situated in different plant communities: two formerly mowed meadows (No.1, 4) and pine (5, 6) or birch (2, 3) forests with grassy, fern, moss or dwarf herb cover.

At present plots No.1 and 2 are located along a seasonal stream containing some amount of waste water from the open pit; plots No.3 and 4 are located in the close vicinity to the waste rocks dump.

As a result of natural succession, plot No.4 turned into young birch brushwood over the time of the research.

Plots No.5 and 6 are the most distant from the open pit; No.5 suffers from medium recreational load; No.6 presents a local forest reserve with slight recreational load. In 2003 plots No.2 and 6 (and in 2010 No.6) suffered from creeping fires.

Every year (or every second year) in the middle July aboveground parts of the herb layer were cut from ca. 20 squares 50 x 50 cm in each plot. Species composition was determined and dry weight of plants was measured. According to this a dataset of the cover total dry weight, species number and biodiversity indices of each plot in each year was obtained.

To the present time, plant species number and productivity slightly decreased in the forest plots and most dramatically in plot No.1. Meanwhile productivity and species richness of the meadow plot No.4 did not change.

Considering the obtained results we come to the conclusion that plots located at different distances from the open pit, in general have similar trends in plant cover changes.

Thus, recreational load and occasional fire accidents have the same impact on vegetation as proximity to waste rock dumps of mining enterprise.

Nevertheless, waste water inflow from the open pit seems to become a cause of the plant cover degradation on plot No.1 due to mechanical damage of the soil cover as well as high water acidity.

S.G. Dyachkova

ESTIMATION OF CONDITION OF ENVIRONMENT ON OBJECTS OF USE OF OIL AND COAL TANKS

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Principal types of technogenic impact on the environment, caused by manufacture, storage and operation of the antiseptics impregnated production, are emission in an atmosphere and deposition in a soil-vegetative cover of organic compounds which have harmful effect on organisms, a biomass of plants and create serious ecological, medico-social problems. In Russia coal-tar oil (CTO) (1 class of danger) and a thermocatalytic liquid (TCL) (4 class of danger) are used as antiseptics.

We carry out for the first time the qualitative, quantitative, comparative analysis and monitoring of organic contaminants (OC) in the environmental objects (air, soil, snow) of the zones of influence of the manufactures applying antiseptics. More than 70 names of OC are identified, such as aromatic and polyaromatic hydrocarbons, N - O - S-containing heterocycles and alkanes. It is established that the most exhaustive information is received by using the sorption method of air sampling in a combination with extraction and thermosorption methods of the sample preparation. It is shown that the most polluted are the shop of impregnation and the warehouse of finished goods. The structure and concentration of OC in environmental objects depend on a type of the used antiseptics and seasonal features of distribution and deposition of the technogenic emissions.

For the first time the chemical composition of antiseptics - (CTO) and TCL - is studied. The comparative analysis of chemical composition and carcinogenic activity of the investigated antiseptics is carried out. For the first time calculation of emissions of organic compounds from the sources of manufacturing connected with application of antiseptics is carried out. It is shown that the major components in emissions are volatile compounds (benzene, benzene derivatives, indanes, phenolic compounds, naphthalene and its derivatives) which share in total emission makes more than 70 %.

Concentrations of organic substances which are part of the antiseptics that give representation about air pollution on an industrial site and in a zone of influence of manufacture are calculated by method of mathematical modelling. The list of priority organic contaminants of the impregnation manufacture including 21 names is defined.

The results obtained have allowed giving the ecological and medico-social characteristics

of the industrial enterprises using oil and coal antiseptics, to develop a complex of actions for improvement of working conditions of workers of the enterprise and an ecological situation on manufacture, to organize analytical control of OC in the environmental objects.

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DIE ÖKOLOGISCHE FACHKRÄFTE FÜR NOWOSIBIRSK

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Die moderne ökologische Bildung fordert von Fachkräften nicht nur einfache Verständnis von Gründen und Folgen ökologischer Probleme, sondern der Annahme von nicht-trivialen Lösungen, und somit der Bildung nicht-standardmäßigen Blicken auf das Problem. Es ist möglich nur mit Verwendung von verschiedenen Formen der ökologischen Bildung zu erreichen.

Eine Vorbereitung der ökologischen Fachkraft auf dem Lehrstuhl Botanik und Ökologie an unserer Universität bedeutet einem sorgfältig durchdachten und vereinbarten System von Studiendisziplinen. Eine von deren Grundlage sind tiefe Kenntnisse in dem Bereich von grundlegender Ökologie, die vor allem die Errungenschaften der russischen Schule für Biogeozönose in Grunde haben. Studenten haben die Möglichkeit, die Struktur der natürlichen Ökosysteme, die sich auf Arbeiten von der hervorragenden Wissenschaftler-Klassiker V.V. Dokuchajev, V.I.Vernadski, und V.N.Sukachev Errungenschaften der ausländischen Wissenschaftler stützen, zu studieren. Dieses Wissen schaffen einen wissenschaftlichen Weltbild und ermöglichen natürlichen Mechanismen der Aufrechterhaltung des Gleichgewichtes in der Biosphäre zu verstehen. Die Studenten studieren den angewandten Disziplinen und bilden für sich die Kompetenzbereiche, die der zukünftigen Fachkraft, sich in der Naturschutz-, Kontroll-revisions-, Forschungswissenschaftlichen Bereichen zu zeigen, ermöglichen. Diese Kompetenzbereiche zu bilden, erlaubt eine Zusammenarbeit mit den akademischen Instituten der Sibirischen Abteilung der Russischen Akademie der Wissenschaft, den staatlichen Naturschutzstrukturen, nicht kommerziellen ökologischen Organisationen.

Jedoch ist es, einen solchen traditionellen Herangehens an die Bildung zu nutzen, in diesem Fall nicht genug. Eine Besonderheit der ökologischen Bildung besteht darin, dass der Student – die zukünftige Fachkraft- klar verstehen und anderem erklären und beweisen soll, dass eine rentable wirtschaftliche Tätigkeit in diesen Moment sich im einen ernststen Schäden in nicht ferne Zukunft umwenden kann. Man muss seine berufliche Tätigkeit so bauen, um langfristige Folgen vorwegnehmend. In diesem Zusammenhang ist eine wichtigste Komponente der ökologischen Bildung eine Tätigkeit, die erstens die aktive Forschungsarbeit und zweitens eine Teilnahme von Studenten an Veranstaltungen «der Spielpädagogik» mit den Wettbewerbes Elementen vermutet. Ein Beispiel solcher

Veranstaltung ist die interhochschulische ökologisch- biosferische Olympiade, die der Lehrstuhl seit zehn Jahren durchführt. Diese großzügige Veranstaltung besteht aus folgende Wettbewerbe: Wettbewerb von Forschungsarbeiten, Trainings Seminare für Lösung der ökologischen Probleme, Demonstration des theoretischen Wissens von grundlegenden Ökologie, ökologischen Show-Wettbewerb. Später haben wir das neuen Format des studentischen Wettbewerbes angeboten – die Sommerfeldschule für Ökologie “die Neusibirische Landschaften: das Territorium der Zukunft», dessen Ziel eine Bildung bei Studenten von Grund-Kenntnissen auf dem Gebiet der Rekonstruktion und Bildung der postindustriellen Landschaften.

Lehrer und Studenten des Lehrstuhls richteten sich in die letzten Jahre nach den Prinzipien, die im Dokument “Über die Dekade der UNO über Bildung für standfeste Entwicklung seit dem 1. Januar 2005“ veröffentlicht sind. Und sie haben eine Serie der Verfasser-Lehrvideofilme «Natürliches Erbe des Gebietes Novosibirsk», die über die Denkmäler der Natur unseres Territoriums erzählen, eine Sammlung der Verfasser-Videofilme «Ökologische Probleme der Region», den multimedialen Komplex «Neues Sibirisches Klima» veröffentlicht. Es wurde möglich dank der Aneignung von Studenten der modernen multimedialen Technologien, über die das Institut der offenen Fernbildungen unserer Universität verfügt.

Infolge solchen komplexen Herangehens an die Bildung können unsere Absolventen in den industriellen- und Transportorganisationen und analytischen Zentren arbeiten, aufklärerischen Programme und Projekte, die mit der Lösung der lokalen ökologischen Probleme verbunden sind, erschaffen, sich mit dem Forschung der grundlegenden wissenschaftlichen Fragen zu beschäftigen.

G.N. Falkova
K.A. Nyanina

THE STRATEGIC MEANING OF ENVIRONMENTAL KNOWLEDGE IN THE INDUSTRIALLY DEVELOPED RAW-MATERIALS REGION OF RUSSIA

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The problems of the human interaction with the environment are becoming more and more urgent at the modern stage of development of civilization. The analysis of the environmental situation in the Kemerovo region leads to the conclusion that someone must inform the general public about the existing problems first before these problems can be reduced and solved. It is only possible with the help of the system of environmental education. That is why the politicians, who create and apply control measures in the environmental field, can and must attract the resources of the public to reach the common goal of protecting the environment, thus making the laws work for the welfare of mankind.

The ecologization of the educational system means a tendency of environmental ideas, principals and approaches to enter other subjects, as well as training of environmentally conscious specialists in different fields of industry, especially in the following areas:

- World view. Independent of the field in which the future specialist is going to work, he has to have a certain world view, certain foundation for his activity, to see his place in the biosphere and lean on the achievements of natural sciences;
- Ecological professionalism of the future specialist. This area is connected to the nature of the field in which the student is going to work, with his ability to make decisions taking into account the environmental factors;
- Training of specialists who are able to solve problems connected to the human interaction with the environment. This area makes it possible to combine the environmental knowledge with the broad training in the field of economics and law;
- Professional advancement (systems of additional professional education) of managing personnel and specialists in the industrial sector and public education.

It is impossible to overcome the environmental crisis of the biosphere by using only technical and technological means. Furthermore, it is impossible to maintain the balance between the society and nature if the human being doesn't transform himself, his morality and mentality, but only leans on scientific and technical achievements. This human transformation is hindered by the slow development of the normative-legal, methodological and technological base and inconsistencies in the financial, staff and information support of the educational system both in Russia and abroad.

As a result of joint action of governmental, non-governmental, public and international organizations, it will be possible to gather environmentally important information and take it to the public with the help of environmental education, influence the shaping of public opinion and join efforts to solve the problems of survival under conditions of the industrially developed raw-materials region.

E.P. Filimonova

ESTIMATION OF SURROUNDING ENVIRONMENT IN THE ZONE OF THE OLYMPIC OBJECTS

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City-resort of federal value Sochi – is a unique in Russia the subtropical resort located at the Black Sea coast of Caucasus. The territory of Sochi is extended along coast of Black sea on 145 km, occupying 3,5 thousand square kilometers. Population of Sochi – 406, 8 thousand people.

The basis of Sochi is made by a sanatorium complex which is the largest in Russia. In Sochi 579 various establishments of treatment and rest are located. Mineral sources of river valleys of Matsesta, Agura and the Hosta have generated balneal base of a resort. The

greatest popularity have received sulfate-chloride-sodium waters of Matsesta.

As a whole the big Sochi is ecologically safe territory with high degree of forests (95% are covered by woods) and presence of especially protected natural territories (the Caucasian biospheric reserve, the Sochi national park) which make 81,5 % from a total area.

Environmental problems are concentrated now in the Central area, in Sochi. From environmental problems of the most actual for Sochi are:

- Environmental contamination by an industrial and household waste;
- Pollution superficial and ground waters;
- Pollution of atmospheric air;
- High recreational loading;
- Infringement of modes of economic activities within zones with special conditions of use;
- Reduction of a coastal zone;
- Degradation of OOPT.

Within the limits of preparation for winter Olympic games of 2014 in Sochi building more than 200 objects are planned. The program of building of the Olympic objects and a development of the city of Sochi as mountain climatic resort was confirmed by the Government of Russia. In 2006 the Federal Target Program «Development of Sochi as mountain climatic resort (2006-2014) » has started to operate.

In this connection nature protection bodies of Krasnodar region had been spent works according to influence of projected objects of building on environment and the nature protection actions, which purpose are offered – to provide ecological safety of territory, unique under the landscape - biotic characteristics.

The territory covered by actions the Program «Development of Sochi as mountain climatic resort (2006-2014)» in the geographical relation represents two zones: mountain, dated for a valley of the river of Mzymta, and seaside, located on Imeretinsky lowland, at coast of Black sea. Within the limits of the Program building of 15 Olympic objects, including 8 objects within functional zones of territory of the Sochi national park is planned.

For each of zones possible influences on components of the surrounding environment are marked, predicted intensity of their course and offered measures on influence minimization. For the purpose of influence minimization on a soil cover after the building end, all mentioned and broken earths will be recultivated and arranged well. At a stage of carrying out of the Olympic

Games of 2014 influence on ground resources will be limited by a building zone. Regarding protection of a vegetative cover, fauna the following is provided:

- Protection of natural wood vegetation;
- Protection located within lowland in immediate proximity from constructions of vegetative objects and nature sanctuaries;
- Change in similar habitats of especially protected kinds of plants;

- Engineering protection with a view of preservation of a natural hydrological mode of habitats of unique vegetative communities;
- Creation of constantly operating system of biomonitoring of the ecosystems having unique value for preservation biovariety of natural complexes.

Influences on water bioresources is shown in possible negative influence of realization of the Program on fish resources of those reservoirs which settle down in projected territory. The influence estimation is directed on working out of the necessary mechanisms (actions) directed on prevention of such negative influence.

P.I. Gadzhiev

ECOLOGY OF MECHANICAL PROCESSING OF HEAVY AND STONE SOILS

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The article presents innovative methods of mechanical processing of soil and environmental aspects of modern agriculture.

Strategic goal of modern land-utilization is elaborating innovative soil mechanical processing technologies which preserve its original ecological characteristics and parameters. Ecological parameters of the environment have been changed dramatically through soil utilization. High-quality soil processing promotes environmental stabilization. This affects notably productivity of agricultural crops.

At present, half of croplands in Russia have an insufficient content of humus, quarter of them requires liming, over 20 mln ha require gypsuming and reclamation, almost 60% of sown areas are at risk of soil erosion. Annually, almost 3 bln tons of fertile soil are lost due to soil ablation and elation, which is equivalent to 40-42 mln tons of nutrient substances. Thus, the soil loses more nutrients than it receives with fertilizers. Gullies continue to appear at an average rate of 1-1,5 m per year. Erosion and degradation of the plough-layer leads to decrease of croplands productivity. The lost harvest on erose soils reaches 30%.

Besides, as field works in agriculture got more intense, the problem of soil thickening under influence of machine-tractor aggregates arose.

Due to quantitative increase of mobile machinery units within last 20-25 years, the soil upper layers have become 1,3-1,4 times harder, while depth of the packed layer reaches 1,5 m

Mechanical processing leads to soil structure destruction, intensification of organic matters mineralization, air and water imbalance when overdried or overwetted soils are processed. Thus, mechanical processing is a powerful regulator of not only soil-forming but also of soil-destroying processes. Hence, ecologization of mechanical processing, first

of all, means strengthening soil-forming factors, among which:

- Preservation of optimal density of the processed layer of soil;
- Optimal crumbliness of soil;
- Maximal resistance to erosive processes (wash-out and blowing);
- Preservation of structural micro- and macroaggregates to preserve mechanical strength and wash-out resistance;
- Providing the correct structure of the processed layer, making the upper bed for seeds loose and the lower one - packed;
- Conservation and accumulation of soil humus;
- Providing optimal conditions for vital activity of live soil medium;
- Decompaction of plough-layer and underplough-layer of soil;
- Expansion of root soil layer.

From the above said one can conclude that the key problem in technical solutions for environmentally friendly mechanical processing of soil is the problem of plough-layer expansion.

By ecology of plough-layer we mean degree of deviation of physical and agrobiological parameters of soil from optimal requirements of agricultural crops due to man's impact. That is why the need has appeared to establish criteria of environmentally safe mechanical loading on soil. However, so far several ecological criteria of soil processing have been taken as a basis.

Soil crumbliness degree can be offered as one of such criteria. P.U. Bakhtin offered an estimative scale of crumbliness and diffusivity of the arable land cultivated by mouldboard plough. Such arable land is considered to be very good if it contains 90-100% of lumps of size under 50 mm and under 5% of dust; good if it contains 70-90% of lumps and 5-20% of dust; satisfactory if it contains 50-70% of lumps and over 20% of dust. However, it should be recognized that soil crumbliness and diffusivity degree is far from being enough to determine ecological stability of the arable layer.

Another indicator of soil mechanical processing quality can be density (volume weight) of soil because soil density is a complex indicator which depends on soil's micro- and macrostructure, texture, humus content, structural properties, correlation of its constituent phases, etc. It was found out that each crop and each soil type requires a determinate optimal density providing the most favourable conditions for them.

But so far there are no overall indexes of optimal density for all soil types and various regions.

A new set of machines for processing heavy and stone soils before potatoes sowing and harvesting with combine has been introduced in production practice as innovative technological solution for environmentally friendly mechanical processing of soil: ridger GO-2 and separator-racker SU-1,4

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R.Sh. Gadjeva

ENVIRONMENT CONTROL IN OIL-PRODUCING COUNTRIES AS A GLOBAL ECOLOGICAL PROBLEM

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With the increasing of oil-producing, oil transportation, storing and processing of oil the ever-increasing share of ground areas and water space becomes an object of oil pollution in the process of oil outflows.

The existing various international programs on decreasing of ecological tension not always can to stop the impending anthropogenic catastrophe. The main task is that for the solve of this problem it is necessary the consolidation of scientists efforts on adoption of innovation technologies both in the field of oil-producing and in the direction of development of more effective methods which allow efficiently, competently and with high profitability to solve a problem of localization and elimination of oil outflows. The existing mechanical and biological methods for the purification of areas polluted by oil often are not effective especially at purification of water surfaces and big ground areas polluted by oil.

For last years the interest to use of various types of natural, mineral and polymeric sorbents has considerably increased. In course of several years the researches on development of new types of the high-performance foamed polymeric sorbents are being carried out at ASOA. The criteria of selection of polymeric sorbents in dependence of type of the spilled oil or oil product, scale of pollution, thickness of oil layer etc. are developed. The reason of such especial interest to the sorption methods of purification is first of all the technological effectiveness of process of spraying and collecting of sorbents from water surfaces and possibility of their regeneration for repeated use. The other feature of sorption methods is the high selectivity of sorbents on oil or oil products. Oil collected by sorbents contains not more 3-4% of water and in the oil collected by mechanical methods the content of water are being increased up to 40-80%. Solving of this problem became possible due to development of high-performance hydrophobic supersorbents on basis of various types of foamed polymeric sorbents. In contrast to other sorbents the foamed polymeric sorbents have the high sorption capacity on oil and oil products, high floatability, hydrophobicity and ability of repeated regeneration. But solving of this problem must not base only on production of high-performance sorbents. It is necessary to develop equipment and technical facilities (self-propelled floating facility, equipment for spraying sorbents and for their collecting from water surfaces; regeneration of sorbents with use of centrifuge; transportation and storing of the collected oil) which are able to maximally use the resource of the foamed polymeric materials. These questions successfully solve especially in more developed countries such as USA, Canada, Italy etc. because in these countries for realization of the abovementioned problem mainly attend to modernization of technological equipment on manufacturing and application of the

foamed polymeric sorbents. Just of that we want to achieve now in our country which has great opportunities for intensification of material and technical basis of oil industry and scientific laboratories.

R.A. Gazarov
V.G. Kantsedalov
V.N. Baltyan

GROWING RUSSIAN ECONOMY IN CONDITIONS OF TRADITIONAL AND ALTERNATIVE ENERGY SUPPLY

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In recent years Russia has seen stable growth of gross domestic product. But inability of electric-power sector to respond adequately to industrial development and sustainable growth of electric energy consumption in agricultural and household sectors can become a restrictive factor for GDP growth, first of all, because of considerable accumulated depreciation (over 70%).

The report contains the presentation of the results of prolonged complex trials and investigations aimed at growth of reliability, safety and durability of the power supply equipment used in thermoelectric power stations and nuclear power stations and having as a foreground purpose to improve effect of power stations on the environment.

The existing practice of energy balance conservation is mainly based on introduction of new high-performance equipment to thermoelectric power stations and nuclear power stations.

However, due to well-known reasons, introduction of such equipment is lagging behind the growth rates of industrial and agricultural enterprises and growth of consumers' energy consumption, which in the nearest future will lead to electric energy shortage.

Nowadays, the additional option of maintaining the equipment in the state of operability is the so called esthetic modernization, which is very expensive and low-effective.

One of the principal options of providing reliable energy supply for industrial and agricultural enterprises and consumers is becoming a task program of life cycle prolongation for power supply equipment in working power stations which is scheduled to be withdrawn due to depreciation.

The authors have elaborated the similar task program which was tested and implemented in many electric power stations and boiler plants within power industry.

The above mentioned program includes a set of research, development and innovation works, among which:

1. Elaboration and specification of individual provisions of classic theory of reliability for solving contemporary problems in this field.
2. Elaboration and implementation of synergetic principles of fracture mechanics which allow to understand in a more profound way processes of interaction between

materials used and operational factors.

3. Elaboration and implementation of new mechanisms of micro- and macrodamageability of power supply equipment structures run at the last stage of depreciation.

4. Elaboration and implementation of system for controlling power supply equipment reliability, safety and durability indicators.

5. Elaboration and implementation of procedure of creating topographic schemes of the lowest and highest reliability of power supply equipment.

6. Elaboration and implementation of procedure for calculating durability of structures, including calculating by Poisson's effective coefficient.

7. Elaboration and implementation of procedural provisions on how to create task effective operational diagnostic systems.

8. Elaboration and implementation of a set of devices and robotic systems for diagnosing almost all elements of heat-mechanic equipment of thermoelectric power stations and principal equipment of nuclear power stations.

9. Elaboration and implementation of new efficient technologies of renewal of all elements of power supply equipment without its disassembling and without big capital investments.

10. Elaboration of procedure for substantiation and optimization of power supply equipment withdrawal due to depreciation.

11. Elaboration of new technological solutions for reducing harmful emissions from working thermoelectric power stations.

For solving the above listed problems the authors have used over 40 author's inventions, the most significant of which were patented by authors from USA, England, France, Japan, Germany and Finland.

The report presents a big complex and complete research and development work, implementation of which has produced a notable economic effect and numerous social effects, prevented from withdrawal and write-off of working equipment and prolonged its life cycle for 15-20 years.

V.M. Grishagin
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TO THE PROBLEM OF MODELLING THE PROCESS OF WELDING FUMES FORMATION WHEN WELDING MINING EQUIPMENT

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According to modern physico-chemical research data (X-ray, spectrographic and other methods of analysis) the solid component of the welding fumes (SCWF) formed

in the process of welding with coated electrodes includes base (Mn, Fe, Si, K, Na, Ca, Mg, Ti, Al, Cr, Ni, F) and residual (As, Cu, Rb, Sn, Zr, Sr, Nb, Mo, Ag, Sb, Ba, Pb) components as well as compound metal mixes, simple and compound metal oxides and spinels $MnFe_2O_4$, $CaFe_2O_4$, $(Fe,Mn)O$, Fe_2O_3 , $K_2Cr_2O_7$, $Na_2Cr_2O_7$, Fe_3O_4 and other, fluorides (NaF , KF , K_3FeF_6 , K_2SiF_6 , CaF_2 and other), silicates ($CaSiO_3$, $-Si-O-Si-O-Si-$, $Fe_2[SiO_4]$, $Mn_2[SiO_4]$ and other). Use of special steels (35L, 45L, 110G13L, 35HGSL, 30XGSA) with increased manganese (11...14,5 %) and other alloying elements content for welding mining equipment makes the welding fumes especially harmful. The data on total emission of the welding fumes and their chemical composition is necessary for sanitary-hygienic assessment of labor conditions of the workers employed in the welding industry. As a rule this data is received by the method of spectrophotometrical analysis which requires much time and is rather complex; that's why it is very important to be able to assess labor conditions of the welders without completing special experiments but by creating a thermodynamic model of welding fumes formation.

In the given article we chose 30HGSA, 14XHG2ASD and 14GAS steels and electrode wire Sb -08G2S and Sb -08GSMT for assessing the composition and concentration of the welding fumes as the given steels and electrodes are most commonly used for welding mining equipment. We calculated the mass concentration of the three elements (Fe, Mn, Si) included into SCWF when welding with the given electrode wires and also estimated the intensity of the given elements emission under welding. The model allowing to calculate the SCWF composition is based on the equation which considers equilibrium vaporization of elements from the weld pool and nonequilibrium (explosive) transition of the elements into the welding fumes.

$$C_i^a = \alpha_i C_i^P + (1 - \alpha_i) C_i^n, \quad (1)$$

where C_i^a – concentration of the i^{th} element in the SCWF,

C_i^P – concentration of the i^{th} element in the melt (electrode wire),

C_i^n – concentration of the i^{th} element in the saturated vapor above the melt,

α_i – coefficient of nonequilibrium welding fumes formation which characterizes the part of non-fraction component of forming SCWF.

To calculate the concentration of the elements in the saturated vapor above the melt we apply the ratios of vapor pressure under a certain temperature of the melt. The mole composition of the saturated vapor is determined by the equation

$$M_i^n = P_i^{om} \cdot [M]_i / (\sum_i P_i^{om} \cdot [M]_i), \quad (2)$$

where $P_i^{om} = P_i^y / P_{Fe}^y$, relative vapor pressure of the i^{th} element, is considered as the ratio vapor pressure of the given element above this element melt to the vapor pressure of iron above the iron melt,

$[M]_i$ - concentration of the element in the melt (electrode wire).

Vapor pressure was calculated due to Clausius- Clapeyron ratio

$$P_i^y = \exp\left(-\frac{\Delta H_i}{RT} + C_i\right), \quad (3)$$

where $\Delta H_i, C_i$ - heat of vaporization of the element and constant of integration correspondingly which are taken from the table data or calculated due to the data on vapor pressure of elements under the given temperature.

Mole concentration is converted into mass according to the equation

$$C_i^n = M_i^n \cdot A_i / (\sum_i M_i^n \cdot A_i), \quad (4)$$

where A_i - atomic mass of the given element.

Calculation of the saturated vapor composition and SCWF elements concentrations was programmed and the program allows to estimate dependences of elements concentrations in SCWF on thickness and composition of the electrode wire which are input by the user. Two models for calculating the composition of saturated vapor above the melt were used in the process of program debugging. Consequently the model described in the first part (equations (2)-(4)) was chosen.

L.I. Gubareva

DIE PROFESSIONELLE VORBEREITUNG UND DIE ERHÖHUNG DER QUALIFIKATION DES PERSONALS IN DER SPHÄRE DER GASTFREUNDSCHAFT

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Für das Hotelbusiness ist die Ausbildung und die Erhöhung der Qualifikation des Personals das Schlüsselthema. Von der Aufmerksamkeit, die ihr zugeteilt wird, hängt das Niveau des Services in der Sphäre der Gastfreundschaft direkt ab. Deshalb wird die Nachfrage nach der Bildung auf diesem Gebiet die ganze Zeit wachsen. In Russland ist zur Gegenwart eine Menge der spezialisierten Fakultäten bei verschiedenen Hochschulen geschaffen. Jedoch kostet heutzutage neben der Frage der Vorbereitung der zukünftigen Fachkräfte die Frage über die Vorbereitung und die Ausbildung des Personals auf dem

Gebiet der Industrie der Gastfreundschaft und die Erhöhung der Qualifikation der Mitarbeiter scharf. Unter dem Bedienungspersonal sind die Programme der zweiten Hochschulbildung, die zwei bis drei Jahre dauern, besonders populär. Die Programme der Berufsvorbereitung und der Erhöhung der Qualifikation (die Ausbildung auf ihnen dauert von einem Monat bis zu anderthalb Jahren) besuchen hauptsächlich die Neulinge im Hotelbusiness und der Sphäre des Tourismus. Andere Richtung ist die Heranziehung der Trainings-Manager. Sie können jene soziale Grundlage sein, die für die Vorbereitung der Fachkräfte des höchsten Niveaus notwendig ist. Der Training-Manager in der Industrie der Gastfreundschaft ist jener, der den Service, die Standards der Bedienung, die Technik der Verkäufe, sowie die Technik der Überwindung der Konflikte vervollkommenet.

Betreffs der Ausbildung der Leiter, so ist es dem Manager viel mehr Wissens, als dem Bedienungspersonal notwendig. Für die Verwalter gibt es einige Varianten der Ausbildung. Zum Beispiel, der Zuhörer kann den Beruf des Ökonomen-Managers oder Managers-Organisatoren erlernen. "Die Ökonomen" beschäftigen sich mit der Entwicklung der Strategie und der Preispolitik. "Die Organisatoren" oder die Verwalter arbeiten mit dem Personal, gewährleisten die Arbeit des Unternehmens. Man nennt sie noch die Manager des breiten Profils. Nach den gegebenen Richtungen arbeitet die Mehrheit der Hochschulen, die die Fachleute auf dem Gebiet der Gastfreundschaft vorbereiten. Zu den führenden Ausbildungsinstitutionen in unserem Land gehören z.B. das Internationale Institut des Hotelmanagements und des Tourismus, das Institut des Tourismus und der Gastfreundschaft der Moskauer staatlichen Universität des Services, das Institut der zusätzlichen Berufsausbildung der Russischen internationalen Akademie des Tourismus, die Moskauer Akademie des touristischen und Hotel-Restaurantbusiness bei der Moskauer Stadtverwaltung u.a.

Die Programme der zweiten Hochschulbildung und der Berufsvorbereitung sind hauptsächlich auf die Top-Manager gerechnet, die den Beruf Manager der Hotelbedienung zu bekommen wünschen. Und die Berufe "das Management der Organisation" und "das Management der Gastfreundschaft" sind auf die Manager des Mittelgliedes gerechnet. Auch wird die Reihe der Kurse, wie "das Marketing und die Verkäufe in den Hotels" oder "Buchutschet und die Finanzmittel auf den Hotelunternehmen" vorgeschlagen.

In der Sphäre der Erhöhung der Qualifikation und der professionellen Vorbereitung der Fachleute existieren die Probleme und sie sind in erster Linie mit der Abwesenheit der Unifizierung der Programme der Ausbildung und der Nichtübereinstimmung der Letzten den modernen Tendenzen in der Sphäre des Tourismus und der Gastfreundschaft verbunden. Besonders stark werden solche Probleme in den russischen Regionen gezeigt, wo die Konkurrenzumgebung auf dem Markt der Ausbildungsdienstleistungen ebenso wie die Vorbereitung der Fachleute auf dem Gebiet des Tourismus weniger ausgedrückt werden.

V.I. Ilin

THE SOCIAL CONSTITUENT OF THE ENVIRONMENTAL CRISIS*Yelets Branch of the Russian New University, Yelets, Lipetsk Region, Russia*

The environmental crisis means that the contradictions between the economical interests of society in the consumption of natural resources and ecological requirements become aggravated. The notion of the environmental crisis is treated within the range of principles of both a philosophical approach and a pragmatic, applied one. Generally, one singles out a natural and a social constituent in the structure of the environmental crisis. The natural constituent consists in the degradation, destruction of the natural surroundings of man. To the social constituent often refers the inability of state and public organizations to stop the process of destroying the environment, to eliminate the negative consequences of it, to take measures improving the condition of nature. Such a treatment of the social aspect, however, appears to be in some degree limited. It is accounted by the fact that the social constituent also includes respective characteristics of the people's health influenced by the environment, by the system of measures protecting this health, by the standards of living, by medicine and other factors providing both optimum conditions of living and a healthy way of life.

Theoretical grounds for the social constituent of the ecological policy are represented by the study of V. I. Vernadsky dealing with the biosphere and inevitability of its evolutionary development into the sphere of man's mind – the noosphere. It is possible to carry out the strategy if the major processes in the biosphere are governed by mind, i.e. under the co-development of man, society and nature controlled in a reasonable way, while the satisfaction of vital demands of people taking place without damage to the interests of future generations.

Coevolution is treated as a new paradigm of the 21st century. It is supposed to affect the change of cognitive orientation and value preferences, a new perception of nature and approval of the new moral habits in the minds of people. Conceptual apparatus needs changing as well, philosophy should play here a decisive role contributing to the ecological reorientation of scientific, socio-economic and technical solutions in the field of ecology.

The problems of demography connected with the surplus growth of population in certain regions, uneven density of the population, migration make an essential component of the social constituent of the environmental crisis. These problems are complicated by numerous social factors: old-fashioned national and religious traditions, spontaneity in the allocation and use of resources, contrasts in the distribution of national wealth and so on. Thus, the social constituent of the environmental crisis is woven into the broader context of social problems of modern society. For example, the steady increase in the development of different forms of territorial migration brings about the need to consider

adaptation skills of the people who settle on new territories, the possibilities of matching and balancing ecological views of the residents and migrants. The question of influence of the character of the system of social relationship on the ecological consciousness remains less studied. It should be noted that the ethnical layers of the public consciousness also possess a certain potential to solve ecological problems.

In that way it is possible to overcome the environmental crisis provided only that the social component is comprehended and regarded.

M.S. Iskakova

INTERACTION AND INFLUENCE OF BIOMAGNETIC FIELDS ON THE HUMAN BODY

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The magnetic field of a living organism can be caused by three reasons. First of all, this is the point of the ion arising from the electrical activity of the cell membrane (mainly muscle and nerve cells). Another source of magnetic fields-tiny ferromagnetic particles, trapped or specially introduced into the body. These two sources produce their own magnetic fields. In addition, when an external magnetic field inhomogeneity of the magnetic susceptibility appear different organs, which distort the external field is imposed.

Aura - physiological and functional, the energy is essentially a function of the vital internal organs, body parts, primarily the spinal cord of man. It is caused by biological physical and chemical processes that occur in all cells and tissues.

Aura like a cocoon around the person with the increase in distance decreases in intensity. Depending on their nature, ie the physiological state of the generating body and its other special features, some people it can be seen in color, different colors and shades. According to the intensity and spectrum of radiation energy bio-field background can be seen on the physiological state of a whole organism, and its individual organs in diagnostic terms.

A similar pattern is observed in the nature of the biofield. With the presence of human internal and external biofield particularly associated with many wonderful events. Outset that its intensity is directly related to the degree of intracerebral organization and efficiency. The lack of intelligence began in animals, leads to a lack of bio.

Generating internal and external biofield, the human brain works on the one hand and the transmitter as a source of bio in the space surrounding it. On the other hand, as a receiver of information from other sources, bio, ie from other people. For generating its own bio-field, receiving information and biological fields of other sources, their amplification and generation of secondary information into the environment of these fields correspond to the neutral domains. They are therefore called so, that by its very nature the organization they are completely indifferent to what they come to strengthen the signals, whether the signals from their neighbors the active-working domains, or bio-

fields signals coming from the outside.

A remarkable property of the neutral domain, and, consequently, the whole brain, is that their work is no selectivity. This means that the full range of increases they have taken the waves of internal and external biological fields. This work of neutral domains, with the imposition of the priorities of their own internal fields should influence domains of regulators. But the degree of perfection of the inner self of the human brain is still quite low and therefore this process is largely uncontrolled at a level which we call the unconscious state. Due to the bio, the man must eventually emerge and develop to perfection, except for the five senses of existing new qualities.

The state of biofield have and environmental factors. Global human intervention in nature leads to disruption of the natural balance, resulting in a violation occurring planetary atmospheric, geo-and gidrotokov. But the greatest harm to a person brings to himself. War, hate, greed, selfishness, and all other human vices find their information on a global map of the biofield. You can imagine the extent to which it is clogged, and continues to clog. The sooner people understand and are aware of it, the better for themselves and for future generations.

N.Ya. Kirilenko

SOFTWARE CLIMATE FOR TEXTILE MILLS

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In the maquiladoras high requirements to the temperature and relative humidity. This is due to the need to maintain the required technology moisture state of processed fibers and ensure the quality of the percolation process, and also due to the sanitary requirements.

For these purposes, are requested to apply a fundamentally new system of local air-conditioning technology with the distribution of incoming air, pre-treated in air conditioners, and then in the terminal unit air humidity directly into process equipment.

In the spinning department of supply fresh air to the parameters that meet the requirements of technology, provided through the air dispenser mounted on the frame of the spinning machine. As a result of the collision counter flows in the diffuser spinning machine drops the velocity of the total flux, formed fading air stream that evenly with a given low-speed technology fills the area around the roving packages.

For example, on the machine hardware spinning air conditioned, comes to the roving devices with a speed of 0.5 m/s at the temperature of 19 degrees C and relative air humidity of 75%. Acting on roving, the air flow increases its moisture content of up to 15-17%. Ensuring the required humidity roving leads to a decrease in filament thread to 35%. Then the air, interacting with internal air the premises of the shop, comes in the area of service of the machine and ensures that there is movement of air in 0.2-0.3 m/s, the temperature of 20-25 degrees C and a relative humidity between 45 and 50%. Supply conditioned air with

a velocity of 0.5 m/s and the mobility of the air in the working zone of 0.2-0.3 m/s provides the conditions under which the textile dust settling on spinning machine, is not disturbed. Air is drawn into the process and a working zone of the service, not dirt textile dust. If the supply air with the help of air curtains of dust reaches 10 mg/m, then when the air is fading jets in the service area and in the technological area does not exceed 4 mg/m³.

The proposed system has allowed to provide at the same time the required temperature and the relative air humidity and hygienic working conditions in the workplace, as well as to reduce the power consumption of the air conditioning and the exchange of air in the premises.

An important problem in the textile industry is the problem of keeping and disposal of wastes of production, the solution of which has an influence on sanitary-and-hygienic, and on the technological conditions of work. When this is required to ensure the capture and processing of waste with a simultaneous dedusting in air of the working zone.

To improve the quality of removal of the fibrous dust with textile machinery has developed the design of pneumatic devices, with the help of which the destruction of hazards is achieved by ensuring a uniform local supply of air at a height, subsequent transportation of these hazards of exhaust systems in recycling bins and cleaning of the removed air.

A means of leveling the flow is performed in various ways: by turbulization welling up the flow of the collision of jets, the breaking of the flow in a number of individual streams of like when the air is frontal, so and under textile machinery. The proposed pneumatic devices are effective when used as part of without ventilation.

For the collection and disposal waste on scratch car invited to pneumatic device, the application of which allows to increase the range of ventilation and the quality of removal due to the directional air supply.

The new ventilation systems provide the optimal solution of the issues of ecology, energy saving and economy of material resources. The final choice of a particular type and design of the device is made on the basis of knowledge of the physical laws of leakage of gas-dynamic processes for a comprehensive account of the specific requirements for the operation and requirements of the technical performance with the observance of the criteria of reliability, fuel efficiency, technology of the manufacture and installation.

N.V. Krauze

ECONOMIC CONTROL TECHNIQUES IN MANAGEMENT EXPLOITATION OF RESIDENTIAL REAL ESTATE

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Housing reform in the Republic of Kazakhstan is one of the most important direction of socio-economic transformation. An important sector in the housing sector is housing, which is leading in the technological chain of housing and communal services.

Ultimately, improving the housing stock exploitation level, within the category of real estate, provides an immediate increase in quality of life. It should be noted that the consideration of economic issues in this area is highly relevant in the implementation of the “Concept of modernization and development of housing and communal services in 2010 - 2014”, approved by the Government of the Republic of Kazakhstan in 2009. The author of this study has attempted to compile, organize and process the material, accumulated during the formation and development of market relations in the housing sector.

The main purpose of this scientific and practical work was the development of regulatory and procedural framework for information-analytical support of the housing management of the city. Database for analysis was data from the whole population of cooperatives of apartment owners in Ust-Kamenogorsk town with a population of about 300 thousand people. Cooperative of apartment owners (CAO) – is a special public association of apartments (rooms) owners, condominium participants, formed in accordance with the Law “For housing relations” to protect the rights and interests of condominium participants and co-housing maintenance. Methods of trend, cluster analysis, multivariate regression modeling were used as the research tools.

Analysis of correlation relation between main economic indicators of the housing organization - running costs and performance of the exploited area, number of served houses, number of served apartments has allowed to determine the criteria for the formation of CAO standard sizes. Based on trend analysis fitting curve equation was derived, it describes relationship between unit costs for 1m^2 and the number of served apartments, simulates as a polynomial trend of third degree. Size range for CAO grouping on six types were defined at cubic parabola's inflection points. CAO sizes are small, lesser, medium, large, big, biggest.

Using a multivariate regression model a CAO resource costs formation models were built. These models were the basis for calculating averaged smoothed values of operating costs for standard sized CAO, which in turn can be considered as economic norms of minimum levels of differentiated service costs of residential buildings in the city. The basis of the minimum level are in fact established funding of residential real estate services in CAO with the relevant technical and economic indicators, corresponding to the current level of organization technology, production and labor in the housing sector. If we assume that the minimum (standard) service quality of the housing stock should be the same for all types of CAO, the degree of actual costs deviation from a normal costs will indirectly reflect variations in the standard of service quality, as well as in the efficiency of business and financial activities of CAO. Thus, a database of differential standards of resource costs for different types of CAO was developed for the Ust-Kamenogorsk, namely the specific operating costs, including materials, wages, standards of the workforce. Rules and regulations are developed to be a reliable base for the organization of settlements for housing services and economic guidelines in the

organization, analysis, evaluation, planning and forecasting operations of residential real estate.

Results of theoretical and practical work are assigned for CAO managers and specialists, as well as for local authorities to coordinate the activities of CAO and indicative housing management using economic levers of regulation.

V.N. Kurochkin

IMPROVING OF THE LAGOONS REMEDIATION IN THE BIOLOGICAL SEWAGE TREATMENT WITH MICROBIAL PRODUCTS BIOMIX

LLS Ecbit, Kiev, Ukraine

Today the biological sewage treatment is one of the most frequently used method of the wastewater treating. The final link in the treatment system, as a rule, is lagoons. In these lagoons the finishing wastewater post-treatment is done to reach to the required standards of the treated water under the natural remediation. If pollution of inflowing to lagoons treated water exceeds allowable limits, there is no time to purify water in a natural way under the influence of existing biocenosis. The result is lagoon sedimentation. Thus lagoon as the treatment element in the system becomes a source of additional stress on the environment.

To solve the problem with overloaded lagoons, we apply the biological products BIOMIX. These products are blends of the bacteria that are specially selected for their capability to mineralize a number of organic substances. The organisms present in our products exhibit a higher preference for particular organic compounds and have superior remediation capabilities. Organic pollutants are first liquefied and then converted into CO₂ and water.

Having a positive experience with BIOMIX for treating wastewater at municipal, poultry and pig farms treatment systems, our company has come to conclusions about the technological and economic efficiency of this method.

There are laboratories on the treatment plants which on a regular basis spend measurements of sewage ratio in the system. With increasing pollution of inflowing waste water to lagoons for a long time, and as a consequence, the deterioration of water in lagoon, the timely application of microbial product BIOMIX prevents emergencies. For example, applying of a biological product can reduce COD\BOD by 60-80%.

From the existing number of biologics BIOMIX, which differ in composition and concentration of bacteria, the most suitable product should be selected for the related pollution. Knowing the specifics of local industrial plants, it is usually sufficient to apply one or two types of biologic products.

Y.G. Kutinov
Z.B. Chistova

MODEL OF REFLECTION OF TECTONIC STRUCTURES OF PLATFORM COVER OF THE NORTH OF RUSSIAN PLATE IN ATMOSPHERIC FIELD, CHARACTER OF GEOMAGNETIC VARIATIONS AND DEEP'S DECONTAMINATION

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Our data testify to presence of influence of tectonic infringements on Environment due to occurrence induced currents, deep decontamination and change of structure atmospheric fields. The counter system "influence - response" is observed, i.e. not only change of a geomagnetic field and atmospheric pressure influence on is intense - deformed a condition of the geological Environment, but also the Environment influences sun-meteorological parameters. I.e., in area of tectonic units vertical through channels difficult geospheres interactions, fascinating lithosphere, hydrosphere, biosphere and an atmosphere are formed. The model of lithosphere, hydrosphere, atmosphere and biosphere interactions in areas of fault-crossing is developed (fig.1).

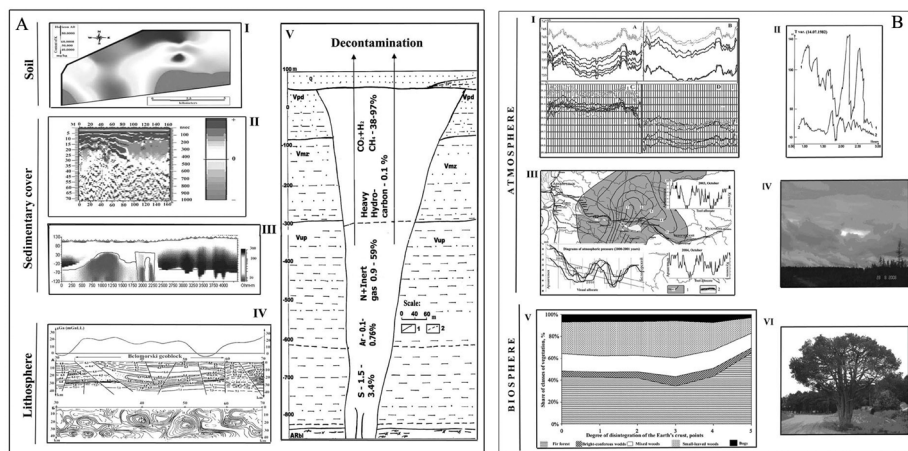


Fig. 1. Model of Geospheres interactions on the area of fault-crossing:

A - Geological medium: I - contents K in horizon A0; II - results of georadar-tracking researches; III - geoelectric section; IV - section on data DSZ; V - section of fault-crossing (geological boundary: 1 - established, 2 - assumed);

B - Atmosphere, biosphere: I - diagrams of atmospheric pressure (A, B) and contents of oxygen (C, D); II - diagrams of magnetic variations in fault-crossing and behind its limits; III - structure of atmospheric minimum (1- isolines of density of faults; 2 - anomalies of "deficiency" of atmospheric pressure); IV - structure of overcast; V - structure of vegetative

cover; VI - dichotomy of trees

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I.V. Lantsova

ECOLOGICAL RISKS AND ECOLOGICAL-SEISMIC SAFETY

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Recently in a society comprehension of vital importance and a sharpness of environmental problems which actually accompany all natural-anthropogenous processes at last began to become stronger. In offered work possible kinds of the ecological risks connected with seismicity of territories, their potential danger and prevention possibility are considered.

All natural processes share on endogenous, caused internal forces of the Earth, and exogenous, connected with external factors. The brightest display of tectonic motions is the seismic activity shown in the form of earthquakes of various activity.

Seismic danger is treated by experts, as probability of display of seismic influences of certain intensity on the set area during the set interval of time. Seismic processes are characterized by various capacity, and, hence, and different activity of their displays that is expressed in points of seismic intensity, in the amplitudes of fluctuations of a ground used at designing of buildings and constructions.

Seismicity of territory is defined by intensity of course endogenous processes which, in turn, make active also set dangerous exogenous processes (geological, hydrological, geomorphological etc.). In this connection there are various kinds of the potential dangers, different object of defeat and characterized by various intensity and display degree.

Seismic activity concerns a category of natural risks which depending on its intensity provoke technogenic, natural and ecological dangers. At display of seismic activity all anthropogenous both natural objects and territories are exposed to influence. Character of display can be to straight lines (direct destruction of object of seismic influence) and indirect or mediated (occurrence of emergencies and activation dangerous activation of dangerous exogenous processes provoked by seismic activity and destruction of objects of seismic influence).

At seismic influence there is a weight of ecological consequences of various intensity, level of the changed or changeable geoecosystems and their ecological condition. Thus potential ecological danger is caused as at seismic influence on natural geoecosystems, and at infringement of technogenic geosystems.

The probability and scales of the ecological risks arising at activation of seismic activity, sharply increase depending on objects of display of influence of seismic activity.

So, the most scale and heavy ecological consequences are marked at seismic influence on industrial targets and territories.

Ecological risks are classified on scale (global, regional, local) and display degrees (the insignificant and raised ecological danger, extremely dangerous, ecological disaster), to object of influence (separate components of environment, ecosystem and ecosystem elements as a whole etc.), durations of a brave situation, influence kinds on the nature and the person, degrees of an admissibility and forecasting, prevention possibility.

Ecological risks can be shown in various forms, on all taxonomic levels of geoecosystems and mention any components of environment. One of forms of display of ecological risk is loss or change of separate properties and qualities of components and-or objects of the nature. Thus depending on character and intensity of changes of a consequence can be from insignificant to catastrophic.

Potential ecological danger is formed as a result of infringement of the natural and technical geosystems leading to sharp deterioration of a condition of inhabitancy of live organisms and, in particular, of the person. From these positions display of ecological consequences of seismic activity is shown as follows:

1 – at catastrophic and strong seismic influences sharp deterioration of an ecological condition of territories that does them for some time unsuitable for representatives biota as a result is noticed:

- Changes of habitats of live organisms because of geomorphological changes of territories (landslips, collapses, tectonic procorfs, etc.);
- Losses of a fertile layer of soils;
- Washout and flooding of territories;
- Smoke blanketing and pollution of atmospheric air,
- Deterioration of chemical and bacteriological quality of superficial and underground waters, and also their mechanical pollution;
- Increase of a radiating background of sites of territory owing to deep breaks of earth crust etc.;
- Infringements of integrity and a condition of a soil cover;
- Mass destruction of representatives etc.;

2 – at insignificant damages of natural and technogenic systems there can be the situations connected with formation of adverse ecological conditions, leading to deterioration of conditions for ability to live of live organisms as a result:

- Occurrence of local failures (floods of oil products, leak of chemical substances of radiological and toxic action, etc.);
- Occurrence of emergency situations (natural fires, landfall and landslide processes, etc.);

3 – deterioration of ecological conditions as a result of activization of seismic activity can create situations at which buildings in the absence of destructions and constructions, they become unsuitable for use as a result of increase in level of radiation and concentration of toxic substances in all components of environment.

Owing to an occurrence high probability at seismic activity of heavy ecological consequences for life and health of people authors offer to enter concept «ecological-seismic safety». Ecological-seismic safety – a direction in the seismology, allowing to estimate ecological consequences of seismic activity of territories and to develop recommendations about decrease in ecological risks and damages.

The direction ecological-seismic safety is included by drawing up of the forecast of possibility of occurrence of ecological consequences of technogenic and natural genesis, definition of their character and an orientation and working out of recommendations about decrease in ecological risks in seismodangerous regions at design stages, building and operation of objects.

Apparently from definition, ecological-seismic safety consists of several large-size blocks of researches, namely:

1. An estimation of ecological vulnerability of seismodangerous territories.
2. An estimation of potential ecological danger at a seismic estimation industrial, agricultural, residential, transport and natural objects and territories.
3. Drawing up of look-ahead scenarios of development of a situation at various intensity of seismic influence and probability of ecological risks.
4. Working out of recommendations and actions for decrease in ecological risks in seismodangerous regions.
5. Calculation of ecological damages as a result of negative influence on components of environment of the factors caused by seismic influence on natural and technogenic geosystems.
6. Working out of criteria and a choice of objects for carrying out of monitoring of an estimation monitoring of territories with a focus on ecological-seismic safety territories.
7. Working out of a complex of the is standard-methodical documents, allowing to receive the adequate information on all seismodangerous regions and to spend division into districts by uniform criteria of an estimation ecological-seismic safety.

S.V. Lushnikov
N.N. Tereshenko

ÖKOLOGISCHE BIOTECHNOLOGIEN ALS AUSSICHTS- REICHER INSTRUMENT DER REGENERATION DER DURCH DAS ERDÖL UND ERDÖLPRODUKTE VERUNREINIGTEN LAND- UND WASSERÖKOSYSTEME

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Laut Einschätzungen von unterschiedlichen und voneinander unabhängigen Expertenorganisationen wird die wissenschaftlich-technische Revolution des letzten

Jahrhunderts das 21. Jahrhundert mit dem Status des „goldenen Zeitalters der Biotechnologie“ versehen. Leider ist aus der Geschichte bekannt, dass großwissenschaftliche Erfolge mehrmals massenhafte Zerstörungen der Umwelt verursachten, ebenso wie die Sozialrevolutionen zu globalen Erschütterungen der Gesellschaft führten. Ein solcher „Nebeneffekt“ des wissenschaftlich-technischen Fortschrittes war die massenhafte und allgemeine Degradation der natürlichen Ökosysteme infolge der barbarischen Ausbeutung von Bodenschätzen.

Es ist bekannt, dass das Erdöl und die Erdölprodukte einige der meist verbreiteten Verschmutzter in den Erdölgewinnungsgebieten sind. Insgesamt erreichen die jährlichen durch die Technologie und Unfälle verursachten Erdölverluste in Russland 4,8 Mio. Tonnen. In den Gebieten nahe der Ölfeldern und Ölleitungen fließt jährlich im Durchschnitt 0,02 Tonnen Öl pro Quadratkilometer aus. Das Ausmaß der Verschmutzung weltweit ist noch beeindruckender. Laut den veröffentlichten Daten übersteigen jährlich die bei der Gewinnung, Verarbeitung und Verwendung vorkommende Erdölverluste 45 Mio. Tonnen weltweit, was circa 2% der jährlichen Erdölgewinnung ausmacht. Laut den Berichten von 1993 wurde Rekultivierung für mindestens 1,2 Mio. Hektar in Russland benötigt.

Die vieljährige Praxis der Bioremediation zeigt, dass die vollständigste Regeneration von Ökosystemen nur durch die biologischen Methoden gewährleistet wird, die auf der funktionalen Aktivität der Öl oxidierenden Mikroflora basieren. Die Komplextechnologie der Bioremediation des ölverunreinigten Bodens, die von der „Proborservis“ GmbH entwickelt wurde, setzt die Verwendung von des ökologisch und wirtschaftlich bewährten Schemas der Mineraldüngergabe, der ökologisch gefahrlosen Sorptions- und Bodenstrukturverbesserungsmitteln für die Aktivitätsstimulierung der lokalen kohlenwasserstoffoxidierenden Mikroflora, sowohl der einzigartigen Mikroorganismen, die die Pflanzenresistenz gegenüber den toxischen Stoffen während der Phytoremediation erhöhen, voraus. Die Technologie garantiert den Reinigungsgrad des ölverunreinigten Bodens bis 65-85 Prozent während einer Vegetationszeit in Abhängigkeit vom Bodentyp und des ursprünglichen Verschmutzungsniveau. Falls der Verschmutzungsgrad des Bodens mit hohem Lehmgehalt im zweiten Jahr der Remediation 25-30 oder mehr Prozent erreicht, gewährleistet diese Technologie einen Reinigungsgrad des Bodens von höher als 80-85 Prozent, und eine erhebliche (mehr als 30-40 Prozent) Reduzierung seines Phytotoxizitätsniveaus.

Außerdem gewährleistet die Verwendung der Methoden der technischen Rekultivierung, natürlichen Sorptionsmitteln und Biopräparaten, die von „Priborservis“ speziell für die Reinigung von Wasserökosystemen entwickelt wurden, einen Reinigungsgrad des Gewässers, des Gebiets nahe dem Gewässergrund und der Wassertiefe von höher als 70-80 Prozent innerhalb von 1-2 Vegetationszeiten (in Abhängigkeit von den klimatischen Bedingungen der Region, des Geländereiefs und Verwendungszwecks des Gewässers). In den vorläufigen Modellversuchen zur Reinigung der Wasseroberfläche vom Öl hat sich die Verwendung von einem neuen bakteriellen Präparates auf der Basis vom kohlenwasserstoffoxidierenden Stamm *Pseudomonas putida* gut erwiesen, der die Biodegradation der Ölhaut auf der Wasseroberfläche um mehr als 30 Prozent beschleunigt. Dabei hat die

Praxis gezeigt, dass die gemeinsame Verwendung von Mikroorganismen und natürlichen Tonmineralen, die gleichzeitig sowohl als Sorptionsmittel der Erdölprodukte als auch Träger der kohlenwasserstoffoxidierenden Mikroorganismen agieren, am effektivsten ist. Die „Priborservis“ GmbH hat eine große Erfahrung im Bereich der Rekultivierung der natürlichen und industriellen Objekten in verschiedenen Regionen Russlands und im Ausland. Das geistige Eigentum von „Priborservis“ ist durch die russischen und eurasischen Patente geschützt. Jährlich bietet das Unternehmen mehrere Praktikumsstellen für Studenten der Umweltwissenschaften/Ökologie und Doktoranden.

V.V. Markhinin

SCIENTIFIC ECOLOGICAL ETHICS. CONTRIBUTION OF N. N. MOISEEV

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Ecological ethics emerged as a relatively self-defined form in the 1970s. Socially, however, its appearance was conditioned by the need to search for and identify a way to resolve the global ecological crisis, which was rooted in the middle of the previous century. One of the founding fathers of ecological ethics is Vladimir Ivanovich Vernadsky (1863 - 1945), a Russian scientist who authored the doctrine on biogeosphere and noosphere. In Russian science, the thoughts of V. I. Vernadsky concerning the need for a new ethics as a means of moral regulation in the transition of the “biosphere” into the state of “noosphere” developed into the concept of noospherogenesis on the path of implementing the social, organizational and moral principles of the co-evolution of man (society) and biosphere (nature).

Nikita Nikolayevich Moiseev (1917 - 2000), an eminent scientist in the area of general mechanics and applied mathematics, president of the Moscow Independent Ecological and Political University (since 1986) and editor of the Ecology and Life magazine (since 1995), made the greatest contribution to the development of this concept. In the 1970s, Moiseev, as a member of the team of researchers from the Academy of Sciences of the USSR, was involved in the creation of a computer model of the biosphere. In 1983, this model was applied to a quantitative check of the hypothesis of the American astrophysicist Carl Sagan (born in 1934) about the probable “nuclear winter” on the planet following an exchange of nuclear strikes between the USA and the USSR. The hypothesis had been confirmed, and the quantitative assessments of the nuclear-winter effect were given. (See: N. N. Moiseev, V. V. Alexandrov, A. M. Tarko, “Man and the Biosphere,” Moscow, 1985 [in Russian]). The results were then reported at a scientific congress in Washington, D.C. Thus the mathematical justification of the theoretical model of the biosphere makes the concept of noospherogenesis, as developed by N. N. Moiseev, all the more convincing.

The epoch of noospheregenesis is, according to Moiseev, a stage of the history of mankind when its collective reason and resolve will become capable of providing for the joint development (co-evolution) of nature and society. The question, however, remains as to whether mankind will manage to coordinate its traditions and behavior, i.e. its development strategy, with the direction of the development of the biosphere.

Accordingly, the co-evolution of man and the biosphere requires further research in order to establish that the characteristics of the biosphere depend on man's activity. Only on this condition does it seem possible to formulate those restrictions with respect to man's activity, which would be necessary to guarantee his future. In a conceptual plan, there is a particularly interesting question as to the stability of the biosphere, specifically its capacity to react to perturbation so that the established quasi-equilibrium is not interrupted. Because the biosphere is essentially a non-linear system, N. N. Moiseev, in his model, uses the mechanism of synergetic approach. A full-fledged biosphere development theory presumes the study of a multitude of bifurcational states, i.e. the conditions of the transitions from one state to another and the structure of attractors, i.e. the proximities of its relatively stable states. The model research has shown that over a certain threshold of perturbative influence (the energy of influence approximately two to three thousand megatons) the biosphere does not return to its initial state: the circulation of the atmosphere changes radically, the structure of oceanic currents, the structure of precipitation, the distribution of temperatures and, hence, the distribution of biota (if it survives the cataclysm). Notably, this effect takes place both during a powerful perturbative influence (e.g., the aforementioned exchange of nuclear strikes) as well as during less powerful, albeit constant, perturbations. The earth after similar cataclysms could not serve as the oecumene of mankind, as the biota will be severely depleted.

"It appears that," writes Moiseev, "the biosphere can have several quasi-stationary modes or, in other words, an entire row of different attractors. It cannot be excluded that the biota's evolutionary process, which resulted in the appearance of *Homo sapiens*, could have taken place only in the vicinity of one attractor. The transition to the vicinity of another attractor would exclude the possibility for intelligent life to exist on the planet" (N. N. Moiseev, "Co-evolution of Nature and Society: The Paths of Noospheregenesis" [In Russian]; Internet, access mode: http://spkurdyumov.narod.ru/Moiseev/KOEVOLYU_CIIYAPRIRODIOBSHESYVA.htm).

The situation of the ecological crisis comprises the serious threat that the biosphere will be "dragged" into the vicinity of the attractor in which intelligent life will become impossible to sustain, that mankind must use collective efforts to resolve not only certain technical tasks but also to "put in the head of the corner of all scientific activity the problems of the co-evolution of nature and society, must start seriously developing a new structure of public relations in the unitary planetary community and change the structure of public values" (Ibid). Moiseev, however, does not undertake to give the exact social and political characteristics of the future society. Nevertheless, it is clear that he speaks about a society of social justice on a planetary scale (Ibid).

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NATURAL MODELING IN ECOLOGICAL RESEARCHES

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One of the optimal variants of researching the ecological state of water and soil is natural modeling. In Ryazan region there is a large-scale model of the secluded drained area of the Oka river basin – an ecological range (ecorange) including different elements of natural landscape and anthropogenic objects of industrial, social and cultural use. It is situated on the territory of about 3 thousand hectares. The ecorange was created for large-scale researching of the influence of anthropogenic load on the dynamics of the state of anthropogenic ecosystems and getting information of regional importance for solving problems of the national nature management on local and global scale. There are researches of different fields of science (ecology, biology, landscape science, soil science, hydrology, hydrochemistry, groundwater hydrology, melioration) and of different scientific directions (ecology of landscape, and its revolution under influence of anthropogenic load, physical modeling and modeling on location of the processes of migration and transformation of substance and energy in biogeosystems) on the ecorange. Saturation of the ecorange with modern devices and equipment, presence of constantly functioning staff of scientists form complexes unique in their capacities.

Additional capabilities and perspectives of researches are connected with the usage of geoinformative systems and complex regional models for imitational and scenery researches of the influence of different kinds of anthropogenic activity on the quality of soil and the study of migration of pollutants in surface and subsoil water.

A.N. Medvedev

ENVIRONMENTAL ASSESSMENT IN URBAN AREAS OF RUSSIAN FAR NORTH

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Based on own methodology, Institute of Industrial Ecology of Ural Branch of Russian Academy of Sciences conducted series of interdisciplinary environmental studies in the urban areas of the Yamal-Nenets Autonomous District of Russia.

On the first stage there was fulfilled a complex study of environmental pollutants in two cities (Salehard and Noyabrsk) having different levels of anthropogenic pressure. Besides, a lot of information was collected regarding actual environmental conditions and population health.

Terrain surveying was conducted in the mentioned cities including sampling of natural environment for chemical analysis and straight measuring of some environmental parameters. Pollution of atmosphere, water and soil was studied as well as radiation environment.

On the second stage, the results obtained were compared with population health data using risk assessment methodology from chemical pollution of atmosphere, drinking water and soil. The risk assessment was implemented for children attending kindergarten, because children are most sensitive to environmental factors.

On the third stage all the results of research and analyses, involving a few additional aggregative indicators of ecological condition, were used for environmental priorities identifying for the investigated cities. Also, the overall estimation of the environmental situation in the District was given and some measures were proposed for environmental condition improving and environmental health risk mitigating.

Some of the main outcomes of the study are as follows.

The atmospheric air pollution is the priority environmental factor having an adverse impact on public health. In urban areas the main source of emissions is motor transport. Concentrations of pollutants in the atmosphere near highways and intersections are about 2.5 - 3 MAC.

The drinking water contamination stands at the second place considering the impact. The main drinking water pollutants with concentrations about 1 - 1.5 MAC are silicon, iron, manganese, phenol. In addition, an unfavorable factor is the shortage of several elements in drinking water (such as calcium, magnesium, sodium, potassium, chloride, sulfate, fluorine, iodine), that makes the water physiologically unbalanced, especially for children.

The results of risk assessment for children confirm that atmospheric pollution is the main unfavorable environmental factor. The level of carcinogenic risk from exposure to air pollutants in cities of Salehard and Noyabrsk corresponds to "middle risk level" that requires developing and systematic implementation of health-improving measures.

Calculated level of risk to child health from drinking water pollution is assessed as acceptable and does not require taking any immediate action; though, improving of the drinking water quality remains one of the priority tasks of the municipalities. The risk level due to the soil pollution is also assessed as acceptable.

Total individual carcinogenic risk due to combined exposure to chemical pollutants in the air, water and soil does not exceed the upper limit of "acceptable risk" (according to the World Health Organization's classification). This level of risk does not require the adoption of urgent measures for its reduction.

O.V. Mezinova

ECOLOGICAL ASPECTS OF REGIONAL STUDIES

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During the last decades the problem of educating a man of high ecological culture has become especially urgent since the relationships between man and nature bring out the links between man and society. One of the most important ways of solving the problem can be the activities related to tourism and regional studies. A man lives not only in the natural, but

also in the technological, economical and cultural environment, that is why the study of the forms of interaction of man and environment with respect to different territories represents a scientific and research interest. Regional studies of ecological character are designed to solve the following tasks:

- bringing out social and economic causes of ecological problems;
- analysis of the alteration processes in the natural surroundings due to man's activities;
- bringing out the factors threatening the environment;
- bringing out the potential of ecological resources of the locality;
- systematization of ecological and regional information reflecting the natural, social and economic peculiarities of a certain locality;
- analysis of possibilities of introducing health protection and health recovery technologies in the region;
- developing an ecologically competent attitude;
- learning to appreciate the natural, social and cultural surroundings, and man as part of nature;
- developing a responsible attitude towards the natural space of a region.

Research of this kind contributes to preservation of biological varieties of habitats, a rise in the level of ecological culture of the individual, promotion of the ideas of public organizations on issues related to ecology of man and surroundings.

Of great importance for the activities dealing with regional studies is organizational work which consists in seeking and conservation of natural relics, research into the region by way of organizing ecological excursions, outings, hikes, expeditions, establishing unions and clubs, museums and so on.

Stating and processing scientific data related to the condition of the ecosystem of a certain territory at some definite period of time represents not only a research interest under the synchronic aspect, but testifies the fact historically by the local document of the epoch addressed to next generations , i.e. the procedure is also important under the diachronic aspect.

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ON-BOARD CONVERTER FOR EXHAUST GASES OF GASOLINE ENGINES

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Increasing number of vehicles equipped with gasoline and diesel engines may now be responsible for more than 60% of total atmosphere pollution in large cities. An effective

abatement of main constituents of automobile exhaust gases, such as NO_x , CO and hydrocarbons, today is considered to be one of the most important ecologic issue.

Catalytic on-board neutralization system (convertor) is already used widely in many countries to reduce the level of toxic compounds released with exhaust gases. It consists of metal or ceramic substrate with supported washcoat - layered active component. Typically washcoat comprises metal oxides serving as support for dispersed particles of noble metals (Pd, Pt, Rh).

During the working cycle automotive convertors are exposed to rather high temperatures and sudden temperature oscillations which may lead to quick deactivation of catalyst. At temperature of 900°C and above the alumina surface area drops down, and the sintering of noble metal particles occurs, too. Both processes result in catalytic activity decline. Dispersed Pd particles readily undergo sintering into agglomerates; rhodium gets oxidized from Rh^0 to Rh^{3+} state followed by diffusion of the Rh^{3+} ions into the support bulk.

Bimetallic Pd-Rh and Pt-Rh systems are known to be more stable and catalytically active than the corresponding monometallic catalysts. In this work, bimetallic Pd-Rh alloy particles were synthesized by deposition on support. The catalyst containing $\text{Pd}_x\text{Rh}_{1-x}$ ($x=0.5, 0.6$) solid solution as an active component was shown to be both thermally and chemically stable under red-ox conditions. It has been elucidated that the formation of Pd-Rh alloy particles on the catalyst surface prevents Rh diffusion into the bulk of support. In addition, Pd-Rh alloy species are more stable towards aggregation and sintering. The results presented in this work also suggest that catalytic performance of the resulted catalyst strongly depends on preparation procedure.

This study was carried out in the framework of Scientific Educational Centre "Catalysis" between Boreskov Institute of catalysis SB RAS, Novosibirsk State University and Novosibirsk State Technical University.

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CATALYTIC PROCESSING OF ORGANOCHLORINE WASTES INTO HIGH SURFACE AREA CARBON NANOFIBERS

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Russian industry of the chlorine chemistry has accumulated over 1.5 million tons of extremely dangerous chloroorganic wastes left without being engaged into recycling process. The recycling of such wastes is considered to be rather challenge and important ecologic task/ Catalytic pyrolysis of chlorinated hydrocarbons (Cl-HC) over nickel catalysts is considered to be an effective approach for abatement of such wastes. It was early shown that the decomposition of Cl-HCs results in formation of so-called "feathery" carbon nanofibers (CNF) characterized by the very defective structure and high surface area (300-

400 m²/g)]. Here we present the proposed method for decomposition over supported and bulk nickel-containing catalysts.

Decomposition of individual Cl-HC (1,2-dichloroethane, DCE) and their mixes (real wastes) was carried out in a flow quartz reactor equipped with McBain balances at 500-600°C. Ni foil and Ni-Cr wire (80 wt.% Ni, 20 wt.% Cr) were used as bulk catalysts. It was found that decomposition of DCE on bulk Ni catalysts appears more intensively than in case of common Ni supported ones. It was also established that the rate of CNF growth on bulk catalysts is more than one order of magnitude higher than that corresponding to conventional supported catalysts.

It has been then revealed that the exposure of bulk nickel-containing alloy results in rather fast and profound reconstruction of surface. This process is believed to be driven by so-called “carbon erosion” which ends up with formation of separated self-operated active particles. The developed approach has been recently tested on real wastes. It was confirmed that 1 kg of bulk Ni is able to convert about 1000 kg of wastes into 200 kg of nano-structured carbon fibers. The mechanism of CNF formation during the decomposition process will be discussed in details.

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ECOLOGICAL ADVANTAGES OF HIGH PURITY SILICON CARBOTHERMAL PRODUCTION

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High purity silicon is the basic material photoelectrical converters. The traditional methods of its production are expensive and ecology hazard. Numerous investigations show that high quality silicon production by carbonthermal process is economically and ecologically profitable.

The direct reduction technology of high-quality silicon-containing feedstock by carbon reductant in ore-thermal furnace among alternative technology of Solar grade silicon (SoG-Si) receipt occupies special position in gaining certain purity-degree silicon, from what after further refining by crystallization method it’s possible to get the material having characteristics and chemical composition closed to SoG-Si.

Nonstandart semi-conducting silicon (scrap), mono- and multisilicon recieved from polysilicon for semiconductor industry, and polysilicon recieved by simplified technology of “Siemens” are used for production of photoelectric converter. Low production volumn and high cost of those by SoG-Si (“solar” grade silicon) method are the constraint for more intensive growth of PEC output. The direct reduction technology of high-

quality silicon-containing feedstock by carbon reductant in ore-thermal furnace among alternative technology of SoG-Si receipt occupies special position in gaining certain purity-degree silicon, from what after further refining by crystallization method it's possible to get the material having characteristics and chemical composition closed to SoG-Si.

The aim of our investigations was to examine the principle possibility of high purity silicon carbonothermal production using the high quality quartz from Eastern Siberia region.

Refining by air blowing in the bucket, increasing rating of output final production-refined industrial silicon (Si_{ref}) after melting is applied in unique industrial enterprise close corporation "Kremnii", outputting metallurgical-sort silicon in Russia; in this process the concentration of Al, Ca and a part of other impurities substantially decrease in the finished product Si_{ref} . Literature data analysis about type and task of crystallization methods for purification (oriented crystallization and zone melting) testify to their possible effective use in metallurgical-sort silicon refining with the decrease of impurity concentration and simultaneous columnar structure formation, which can guarantee subsequently optimal electrophysical properties of crystals.

Enlarged-laboratory tests were conducted by zone melting method for multisilicon gaining from Si_{ref} in Co. Ltd KM – "Kvarevaya palitra" by the apparatus "Sapphire – 2MG" in the graphite heat block at 0.0067 Pa. In order to get strictly-oriented crystal on the top of container (quartz boat) seed from monocrystal silicon was set up.

Double-ply recrystallization was conducted for the purpose of maximum silicon refining from impurities: the first – at transport speed 3 cm/h; recieved ingot was released from quartz boat by dissolving hydrofluoric acid, ingot then is etched in HCl and the last quarter of ingot was separated, where the impurities are forced out; the second was conducted on the base of purified ingot (after the first recrystallization) at 1 cm/h transport speed.

Conducted enlarged-laboratory tests for purification of refined industrial silicon by zone melting method showed high grade purity, %, respectively, for: Al - 93,85; Ca - 68,84; Mg - 29,17; Fe - 96,81; Cu - 81; Ti - 98,0; Mn - 92,25; Ni - 88,24; Co - 96,25; V - 97,37; Cr - 30; Zr - 97,47; B - 33,33; P - 88,67; Zn - 10,0; Pb - 81,82; Na - 80,75. It is confirmed that for increasing the effectiveness of Si_{ref} it is reasonable to conduct double-ply recrystallization of the material.

Metallurgical silicon refining by zone melting method (following Bagdasarov) gave the high enough effectiveness after double-ply recrystallization conducting; recieved values of reflex coefficient of experimental samples closed to the values of semiconductor silicon analogous characteristic.

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**ECOLOGICALLY SAFE AND RESOURCE-SAVING METHODS
FOR RECYCLING WASTE TUNGSTEN, NIOBIUM CARBIDE-
COBALT CERMETS AND EXTRACTION OF TUNGSTEN
AND NIOBIUM FROM CONCENTRATES**

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Tungsten WC-Co and niobium NbC-Co hard alloys were first cermets that found an industrial application. The high importance of these materials has not become lower until now. To return the valuable components of hard alloys to the production industry, it is necessary to find a way of recycling the waste materials containing these components [1,2]. Because of the high cost and, sometimes, deficit of tungsten, niobium and cobalt, the problems of developing new methods of recycling lumps of waste hard alloys have become of high concern recently.

High-temperature selective extraction compounds of niobium and tungsten in nonaggressive salt melts can be suggested as a resource-saving, high-tech and ecologically safe method.

In the present paper, we will study the method of high-temperature selective extraction of niobium and tungsten from its concentrates and determine the most effective conditions (temperature, melt composition, extraction duration) for operating the process.

The high technological effectiveness of high-temperature selective extraction may be attributed to the:

- 1) capability of sodium tungstate and sodium niobium to mix with sodium chloride in any proportions;
- 2) immiscibility of the silicate phase having a melting point lower than 1000°C with the halide-tungstate and halide-niobium phase.

Concerning, for example, of tungstate, the most effective method of processing scheelite concentrates is the high-temperature selective extraction of its mixture with wolframite in the proportion from 1 : 4 to 2 : 1. The use of these mixtures makes it possible to effect the process of high-temperature selective extraction without introduction of fluxes (usually used in the form of alkaline-earth metals and aluminum oxide, which is necessary for the processing of scheelite). The use of the mixture composed in the indicated proportions makes it possible to extract more than 96% of WO_3 into the halide-tungstate phase. The content of calcium, iron, and manganese oxides in the latter was less than 2.5 wt %. The halide-tungstate phase for the combined concentrates contained (wt %) 29–32 WO_3 , 0.03–0.12 CaO, 0.02–0.05 Fe_2O_3 , and 0.01–0.04 MnO_2 .

Thus, a potential region in which the phase of cobalt-tungsten, (-niobium) alloy is selective with the forming of soluble compounds of these metals and tungsten (niobium)

carbide phase remains in deposit is determined. It was shown that tungsten (niobium) ores and concentrates at 1050-1100°C decompose in sodium chloride–sodium metasilicate with forming two unmixing phases: halide-tungstate (halide-niobium) and silicate. The first phase contains 96-99% of tungsten (niobium), the second – more than 90% of different composites.

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ENVIRONMENTAL MANAGEMENT SYSTEM

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In the «Review of the Russian Environmental Management System and Possible Ways of its Modernization» (March 2009) World Bank experts compared Russian ecological policy to the practice of the developed and large developing countries and pointed out major differences between Russian and international practices:

- inefficient instruments of environmental protection policy;
- restricted and inefficient application of economic mechanisms;
- lack of mechanisms and target programs to solve national priorities in the field of environmental protection.

Land is an indispensable resource for the most essential human activities. It provides the basis for the agricultural and forests production, water catchment, recreation, and settlement. The range of land utilization for human needs is limited by the environmental factors. In the course of land redistribution, serving the basis for the Agrarian Reform, major violations in the reproduction of land, material and technical resources have occurred. As a result, the soil fertility continues to decrease, the land environmental conditions are deteriorating, and the main reproduction funds are not being renovated. In the 90's the process of land degradation has strengthened. The crop rotations were devastated which lead to the intensive soil erosion as well as its dehumification. The reduction in reclamation works has resulted in increasing proportions of acidic, waterlogged and saline soils. The problem is to leverage the increasing level of food production and the need for soil conservation and improvement. This is the only way to guarantee the agricultural development without violating the environmental conditions. Both agricultural and ecological land structure optimization will provide nature with the initial impetus to begin self-healing. It also involves economic mechanisms of managing land system.

We offer using the regional system of economic encouragement for conserving and increasing the soil fertility. It includes land tax, irrational land use fee, land insurance fee, and mortgage.

Receipts and expenditure of the land uses, million roubles

Activity	Kind of reproduction of the soil fertility			Distance
	Constricted	Simple	Enhanced	
Receipts				
“Nazarovskoe” Joint Stock Company	1,672	1,865	2,066	394
Educational farm “Minderlinskoe”	114	126	139	25
Private farm K – 16	3	4	4	0.911
Expenditure				
“Nazarovskoe” Joint Stock Company	364	213	166	-196
Educational farm “Minderlinskoe”	34	19	15	-18
Private farm K – 16	0.148	0.089	0.078	- 0.070
Distance				
“Nazarovskoe” Joint Stock Company	1,308	1,652	1,900	
Educational farm “Minderlinskoe”	80	107	124	
Private farm K – 16	3	4	4	

These calculations show the stimulating function of the suggested system for the soil fertility reproduction on the regional level. The system will positively affect the agrarian enterprises of different types of ownership, production volume, technical resources, and food production efficiency.

E.V. Peregudova

ECOLOGICAL FEDERALISM IN RUSSIA: STATUS AND PROBLEMS OF DEVELOPMENT

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Providing the steady development based on the theory of environmental protection is the main direction of the ecological policy of Russia. At present the task of developing a strategy for solving ecological problems at each level of power appears to be topical. It should basically envisage the necessary division of funds and powers, the principles of which are established in the conception of financial federalism, and namely in such a branch as ecological federalism. This conception grounds which level of power is capable of rendering efficiently different ecological services and solving ecological problems in question.

Providing local public services should be organized properly. The services that cannot be offered at the local level must be rendered at the federal one since each service has its own range of benefits. The more diverse ecological demands in different administrative

districts are, the greater the loss in prosperity caused by the centralized system of services is.

The most efficient solution of ecological problems at the respective level of power (federal or regional) is closely connected with the matter of division concerning the issues of responsibility and the powers between the bodies of the state power of the Centre and the subjects. According to the Constitution of the Russian Federation the nature protection activities are a joint responsibility of the federal and the regional power. However, a more accurate division between the bodies of the state power of the Russian Federation and the bodies of the state power of the subjects of the Russian Federation in the sphere is not stated. A few variants of dividing ecological functions between different levels of power are suggested as possible. Under the first variant the ecological function is perceived as pure public good. When the ecological quality is spread throughout the whole of the state and local authorities are unable to influence the level of this quality within their territory, it is more efficient to establish the standards at the central level. In this case the module of pollution proves to be equal for both the state as a whole and any of its regions. The change of climate on a global scale, the ozone layer becoming thin and other changes may serve as examples. Under the second variant the ecological function is a kind of local public good, and the negative consequences of pollutants released spread exclusively on the territory of a separate subject of the federation. In this case the most efficient way of solving ecological problems is at the regional level. The most frequent situation is that of even distribution of negative effects caused by the worsening of the ecological situation both in the region, where the problem evolved, and in the neighbouring regions. In this case the problem can be solved by way of establishing differentiated rates of ecological taxes, introducing pollution quotas, toughening general ecological standards.

Thus, the federal ecological policy must be based on the balanced involvement of authorities at national, regional and local levels, distribution by mutual concessions of positive and negative effects between the actors of the federative relationships.

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ECOLOGICAL PECULIARITIES OF GROWING NON-NATIVE SPECIES IN URBANIZED ENVIRONMENT

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Plant introduction solves a very important problem of introducing economically valuable species into the culture. Only thorough study of introduced species in new environmental and climatic conditions makes it possible to effectively solve this problem. According to this principle, stability evaluation and selection of species and forms, that are most perspective for cultivation in the introduction area, is made.

The ability of exotics to bearing is the most important factor of their adaptation to new conditions, as there appear an opportunity to consolidate acquired in the process of ontogenesis characteristics, and generative sphere is the most responsive to environmental change.

In northern conditions the most of introduced species have longer juvenile periods of ontogenesis. Exotics' seeds can be absolutely unfruitful during the first 3-4 years after generative phase (Orlov, Tarabrin, Malahovets, 1969).

The abundance of blooming and bearing in dendrology garden of Northern Arctic Federal University is evaluated according to V.G. Kapper's scale. 64.5% of species in the collection fructify, 2.2% only blossom and 33.3% do not blossom.

The group of species that blossom but do not give good seeds includes non-native species, that want sun radiation to go through generative cycle or their development do not correspond to a changed vegetation period.

After the introduced species come into the period of steady bearing, some species (68.5%) blossom and fructify annually or almost annually; others (20%) blossom and fructify from time to time, still others (11.5%) blossom and fructify only at times of favourable meteorological conditions. The first group consists mostly of shrubs and such species of trees as *Betula ulmifolia* Sieb et zuce., *Crataegus nigra* Waldster Kit., *C. schroederi* (Rgl) Koehne, *C. chlorosarca* Maxim., *Ulmus laevis* Pall. etc. The second group includes *Quercus robur* L., *Abies sibirica* Ledel., *Tilia caucasica* Rupr., *Acer negundo* L., and *A. californicum* (Torr. Et Cray Dietz.). The third group includes *Syringa vulgaris* L., *Rosa rugosa* Thunb., *Rhamnus japonica* Maxim. etc.

A considerable part of introduced species fructify regularly with an average intensiveness of 3 points and higher (63.7% of total number of introduced species), less than 3 points (36.4%). Some species do not blossom or fructify as they have low winter resistance and vegetation period is not warm enough.

Winter resistance is a key factor to success of introduction work in new conditions.

Most species in dendrology garden are winter resistant as trees and shrubs of the garden are in more favourable conditions (due to special care and microclimate). Winter resistance of tree species during some years depends on a number of reasons and can change. Warm weather with rains at the end of summer, after the period when shoots stopped growing, has negative impact on overwintering of species. In this case buds can start unfolding.

Winter resistance of introduced species in dendrology garden was evaluated according to the scale recommended by the Council of botanical gardens of our country.

Data analysis showed that most species from the garden collection have 1 point of winter resistance (52.8% of total number of species). 4.7% of species absolutely failed to adapt to new conditions and as a result died (black locust, horse chestnut). At older age winter resistance rate of non-native species to low temperatures increases.

Winter resistance rate of introduced species considerably varies according to their geographical origin. Tree species with wide habitat have the highest winter resistance rate. (*Pentaphylloides fruticosa* (L.) Rydb., *Cornus alba* L., *C. tatarica* Mill.).

It is proved that non-native species at older age become more resistant to low temperatures. For example, winter resistance rate of such species as *Cornus alba* L., *Crataegus punctata* Jacq. and *C. sanguinea* Pall. etc. increased from III-IV to I-II points as they became older.

In conclusion it is possible to say that more than a half of species in the collection of the garden can be evaluated as quite winter resistant. Others can be damaged after overwintering. That is why one of the most important tasks in experimental work on introduction is to select resistant forms and increase winter resistance rate.

Due to the research made in dendrology garden, many non-native species made green zones in the city and the Arkhangelsk region more diverse. There are such species as *Tilia cordata* Mill., *Ulmus laevis* Pall., *U. scabra* Mill., *Acer tataricum* L., *A. negundo* L., *A. platanoides* L., *Fraxinus excelsior* L., *Populus alba* L. etc. There are shrubs that give very beautiful blossoming such as a rose, a lilac, a hawthorn, a spiraea, a honeysuckle, a cotoneaster, a nine-bark, a snowberry, a *Philadelphus*, a prairie weed, etc. (Malahovets, Tissova, 1999).

At present the studying period of plants, introduced by the dendrology garden for years of its work, reaches 77 years in Arkhangelsk. It made it possible to summarize the material, obtained as a result of long observations of introduced species' ability to resist winter, their seasonal development, the ability to blossom and fructify in local conditions.

Dendrology garden has scientific, experimental and practical, cultural meaning and it also plays an important part in developing environmentally friendly attitude to nature.

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ECOLOGICAL AND ECONOMIC VALUE OF NATURAL RESOURCES

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More and more attention is paid to the evaluation of ecological assets and services and the influence of change in environmental quality. As a rule, the problem is being able to understand that it is necessary to include indexes of cost effectiveness on restoration, stabilization and protection of environmental systems.

At present there applied several methods to evaluate economic effectiveness of utilization, restoration and protection of natural resources. They are common market evaluation methods, indirect methods, contingent valuation methods, multiple test methods, linear programming methods, network analysis and others.

Application of these methods in forestry has its peculiarities and is different from other fields of the national economy. Most often valuation effectiveness of business-making decisions is based on commensuration of incomes and expenses, costs and benefits.

First of all, multiple use of forest lands and resources is important. From the economic point of view it means that it is possible to make business decisions with different degree of effectiveness. Wood can be harvested and used in different ways, for example for

production of timber, paper or fuel.

In the Arkhangelsk region a spruce is inferior to a pine according to its sort structure.

An output of large-sized timber decreases by 17% and that of small-sized timber increases by 9%, thus an output of saw logs and construction timber is decreased by 2% and 9% respectively.

It is necessary to note that the decrease in the output of commercial timber is not only connected with less stock of spruce stand per hectare but also with defectiveness.

In taiga spruce forest pine fungus, spruce polypore, crook, intensive branchness, large splay knot, fire wound, frost crack, resin on tree trunks and other types of defectiveness, that do not seriously influence an output of commercial timber (except pine fungus and spruce polypore), but they can considerably degrade timber.

Rotation of one species to another is not very dangerous for the economy if there are no considerable differences between quantity and quality.

However, the data obtained show that there are considerable differences. An average price of an undressed cubic meter of commercial pine wood stand is 15-17% higher than that of spruce.

Economic loss from rotation of pine to spruce stand per hectare result in the situation when the local and regional budgets do not get 20-40% of their funds. At the stage of logging similar losses are faced.

The data obtained show that rotation of pine to spruce causes a considerable damage to the economy of the region. In terms of one hectare of forested area, we do not get from 15 to 20% of funds. And if we consider that at the stage of bucking spruce 30 more % serves as firewood it means that losses reach 40%. Analyzing operating costs on logging, it is possible to say that logging of pine is cheaper. Evaluating logging according to the available data, the following spruce cost coefficients are obtained: logging cost of 1 m³ of wood is 1136 times as expensive as that of pine, and capital expenditure per unit is 1087 times as expensive. Thus, logging and bucking of 1 m³ of wood is 1,048 times more expensive for us in terms of 1 ha of forested area. On the whole, economic loss from rotation of pine to spruce stands is from 40 to 50%.

At present not all vitally important for people forest functions can be evaluated in terms of money. However, it is possible to evaluate some important forest functions by evaluating available benefits. Such functions, for example, as protection of soils and mountains from weathering, river flow regulation, spawning streams protection, protection of railroads and motorways from snow and sand, climate protection function of tundra forests, aesthetic meaning of suburban forests, protection of mineral waters discharge, protection of natural flora and fauna and so on.

Ecological and economic analysis makes it possible to come to the conclusion that it is necessary to take into consideration all direct and indirect factors that influence economic decision making about a natural object.

DAS WESEN UND DIE STRUKTUR DES WIRTSCHAFTSPOTENTIALS DER REGION

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Das Wirtschaftspotential als eine Wirtschaftskategorie spiegelt die komplizierten, mehrdimensionalen, aggregierten und konsolidierten Wirtschaftsprozesse, Wirtschaftsverbindungen und Wirtschaftsbeziehungen wider. Infolge dieser Vielseitigkeit und Komplexität ist die Kategorie des Wirtschaftspotentials ungenügend untersucht und wird hauptsächlich nicht als Objekt und Gegenstand der selbständigen und zielgerichteten Forschung, sondern im Zielkurs der Analyse anderer Wirtschaftsprobleme und Wirtschaftskategorien betrachtet.

Das Wirtschaftspotential spielt im System der Organisation der nationalen Wirtschaft, der Regional- und Produktionsorganisation eine besondere Rolle, indem es als seine materielle Grundlage auftritt. Die Größe des Wirtschaftspotentials charakterisiert das Entwicklungsniveau der Produktivkräfte, bestimmt die Konkurrenzfähigkeit des Landes, die Stufe der Kapitalisierung der Betriebe. Inzwischen ist die Kategorie des Wirtschaftspotentials im wissenschaftlich-theoretischen Aspekt ungenügend untersucht. Es gibt keine Systemvision des vorliegenden Problems sowie in Bezug auf das Wirtschaftspotential des Staates, als auch in Bezug auf die Wirtschaftspotentiale der Subjekte der Russischen Föderation. Außerdem ist die Frage über die Wechselwirkung des allgemeinen Potentials des Staates und der Wirtschaftspotentiale der Subjekte der Föderation und der großen Regionen gespannt.

Das Wirtschaftspotential als eine Wirtschaftskategorie spiegelt die komplizierten, mehrdimensionalen, aggregierten und konsolidierten Wirtschaftsprozesse, Wirtschaftsverbindungen und Wirtschaftsbeziehungen wider. Infolge dieser Vielseitigkeit und Komplexität ist die Kategorie des Wirtschaftspotentials ungenügend untersucht und wird hauptsächlich nicht als Objekt und Gegenstand der selbständigen und zielgerichteten Forschung, sondern im Zielkurs der Analyse anderer Wirtschaftsprobleme und Wirtschaftskategorien betrachtet.

Der Begriff "das Wirtschaftspotential" vereinigt die allgemeine Deutung des Begriffes "das Potential" und des Begriffes "wirtschaftlich". Eine andere Komplexität in der systematischen wissenschaftlichen Forschung ist die Entdeckung der Besonderheiten des regionalen Inhaltes vom Wirtschaftspotential in der Struktur der Mehrebenenbeziehungen, der Verbindungen, der Proportionen und der regulierenden Mechanismen der Nationalwirtschaft, des Finanz-, Haushaltssystems und der Richtungen der staatlichen Wirtschafts-, Finanz- und Haushaltspolitik, der Systemwechselbeziehungen des Haushaltsföderalismus.

Im methodologischen Aspekt wird das Fachwort "das Potential" in der wissenschaftlichen Literatur von verschiedenen Standpunkten gedeutet, und zwar mittels solcher Begriffe oder Identitäten wie "die Kraft", "die Macht", "die Leistung", "die maximale Möglichkeit", "die Konfinalität", "die Ressourcen".

Das Potential (vom Lateinischen potentia – die Kraft) ist die Quellen, die Möglichkeiten, die Mittel, die Vorräte, die für die Lösung irgendwelcher Aufgabe, die Erreichung des bestimmten Ziels verwendet sein können; die Möglichkeiten der abgesonderten Person, der Gesellschaft, des Staates auf dem bestimmten Gebiet.

Insgesamt wird unter dem Wirtschaftspotential der Region die vereinte Fähigkeit der Wirtschaft der Region, ihrer Zweige, Betriebe, Haushalte verstanden, die produktionsökonomische Tätigkeit zu verwirklichen, die Erzeugnisse, die Waren, die Dienstleistung herzustellen, die Bedürfnisse der Bevölkerung, die öffentlichen Bedürfnisse zu befriedigen, die Produktionsentwicklung und die Konsumtionsentwicklung zu gewährleisten. Das Wirtschaftspotential der Region ist ein vereinter Ausdruck der materiellen Basis der Region, der den Umfang des innerhalb der gegebenen territorialen Formation gelegenen Eigentums, das in den qualitativen Kennziffern geäußert ist, sowie die qualitativen Charakteristiken berücksichtigt, die die Möglichkeiten der Realisation dieses Eigentums in der Region vorherbestimmen.

Einige Forscher bestimmen das Wirtschaftspotential als die Fähigkeit des sozialökonomischen Systems der Region auf Kosten von der Nutzung der eigenen regionalen Ressourcen, die Erreichung in den Grenzen der isolierten Systemgruppe des Staates und der nationalen Wirtschaft, die die Region ist, des langfristigen, stabilen Wirtschaftswachstums, das der Bevölkerung der Region zulässt, solchen Lebensstandard zu gewährleisten, der den Standards der entwickelten Länder der Welt entspricht.

Neben dieser Definition wird in der Wirtschaftsliteratur das Potential der Region auch als die Fähigkeit der existierenden Ressourcen der gegebenen Region betrachtet, verschiedenen Wirtschaftssubjekten den Gewinn in eine bestimmte Zeitperiode zu bringen

Es gibt einige methodologische Ansätze zur Bestimmung des Wesens des Wirtschaftspotentials der Region: die Betrachtung des Wirtschaftspotentials der Region als der Gesamtheit der Wirtschaftspotentiale der Subjekte der Russischen Föderationen, die in die Region eingehen (die Region tritt als ein Föderationskreis oder eine große Wirtschaftsregion auf); die Offenbarung des Wirtschaftspotentials als einer komplizierten strukturierten Wirtschaftskategorie, die die Naturschätze, das Produktions-, Arbeits- und Innovationspotential, die Anlage- und Haushaltsressourcen, das Steuerpotential u.a. aufnimmt; die Begründung der Systemproportionalität des Wirtschaftspotentials; die Forschung der systemfunktionalen Wechselwirkung des Wirtschaftspotentials der Region mit der äußerlichen Umgebung (dem Finanz-, Haushalts-, Steuersystem, den Ressourcenmärkten, dem russischen Banksystem); die Erfassung der differenzierten Struktur des Wirtschaftspotentials der Region, der Besonderheiten der Subjekte der Föderation als Spender oder Empfänger.

Wenn wir diese methodologischen Ansätze (Prinzipien) formulieren, betrachten wir sie als die Richtungen der Forschung. Dabei wird die Aufgabe nicht gestellt, den Inhalt jeder Richtung vollständig aufzudecken. Die Betonung ist auf der Entdeckung der meisten Wesensaspekte der bezeichneten Richtungen der Forschung des Problems gemacht.

Die angegebenen methodologischen Ansätze sind verbunden und werden inhaltlich überquert und ergänzen einander, denn sie spiegeln den Inhalt einer und der selben Kategorie wider. Die gegebenen methodologischen Ansätze bedingen die Prinzipien der Bildung des systemstrukturellen Inhaltes des Wirtschaftspotentials der Region.

Man schlägt vor, den ersten methodologischen Ansatz als Bundesstaatlichkeitsprinzip des systemstrukturellen Inhaltes des Finanzpotentials zu formulieren. In der Russischen Föderation funktioniert das föderative Staatssystem, das das föderale Zentrum und die Subjekte der Russischen Föderation teilt und sie in den einheitlichen Bundesstaat vereinigt. Entsprechend dem föderativen Aufbau sind die Vollmachten und die Rechte der Zuständigkeit der Russischen Föderation, die gemeinsame Zuständigkeit Russlands und der Subjekte der Russischen Föderation und die Vollmachten und die Rechte der Zuständigkeit der Subjekte der Russischen Föderation geteilt. Außerhalb der Zuständigkeit der Russischen Föderation und der Vollmachten der Russischen Föderation in den Gegenständen der gemeinsamen Zuständigkeit der Russischen Föderation verfügen die Subjekte der Russischen Föderation über die ganze Fülle der Staatsmacht (Artikel 73 der Verfassung der Russischen Föderation). Innerhalb der Zuständigkeit der Russischen Föderation und der Vollmachten der Russischen Föderation in den Gegenständen der gemeinsamen Zuständigkeit der Russischen Föderation und der Subjekte der Russischen Föderation bilden die föderalen Exekutivorgane und die Exekutivorgane der Subjekte der Russischen Föderation ein Einheitssystem der Exekutive in der Russischen Föderation (Artikel 77 der Verfassung der Russischen Föderation).

Die gegebenen Leitsätze der Verfassung der Russischen Föderation haben eine prinzipielle Bedeutung. So gehört die Erfüllung der Budgets zu den Vollmachten der Exekutivorgane – der Regierung der Russischen Föderation, der Verwaltungen der Subjekte der Russischen Föderation. So entwickelt sich infolge der Einheit des ganzen Systems der Exekutive die Haushaltsvertikale in Bezug auf den Hauptteil der Haushaltseinkommen und der Haushaltskosten im Land. Man muss diesen Aspekt der Einheit des Haushaltsprozesses und des Haushaltssystems (Artikel 29 des Haushaltsgesetzbuches der Russischen Föderation) auch in Bezug auf die Einheit des Wirtschaftspotentials der großen Region, besonders im Teil seiner Haushaltskomponente verwenden. Das Prinzip der Einheit des Haushaltssystems der Russischen Föderation bedeutet entsprechend dem Haushaltsgesetzbuch die Einheit der Haushaltsgesetzgebung der Russischen Föderation, der Prinzipien der Organisation und des Funktionierens des Haushaltssystems der Russischen Föderation, der Formen der Haushaltsdokumentation und des Berichtswesens, der Haushaltsklassifikation des Haushaltssystems der Russischen Föderation, der Sanktionen für die Verletzung der Haushaltsgesetzgebung der Russischen Föderation, die einheitliche Ordnung der Feststellung und der Erfüllung der Ausgabeverpflichtungen, der Einkommensbildung und der Kostenverwirklichung der Budgets des Haushaltssystems der Russischen Föderation, der

Leitung der Haushaltserfassung und des Berichtswesens der Budgets des Haushaltssystems der Russischen Föderation und der Haushaltsanstalten, die Einheit des Verfahrens der Vollstreckung der gerichtlichen Akte nach dem Umlauf der Beitreibung für die Mittel der Budgets des Haushaltssystems der Russischen Föderation.

So verbreitet das Haushaltsgesetzbuch der Russischen Föderation das Prinzip der Einheit nicht nur auf die Vollmachten der Russischen Föderation, sondern auch auf die ganze Organisation und das Funktionieren des Haushaltssystems des Landes, auf die Budgets aller Niveaus.

Das Wirtschaftspotential der Region nimmt nicht nur das Haushaltspotential auf. Er wird von den realen Finanzbeziehungen in der Region, einschließlich der Steuerbeziehungen sowie der Finanzen der Betriebe, von den Effektenbörsen, den Banken und anderen finanziellen Organisationen und ihren Ressourcen systematisch strukturiert. Deshalb gibt es die Gründe, über das Prinzip der Konsolidierung der Wirtschaftsressourcen der Subjekte der Wirtschaftsbeziehungen im konsolidierten Wirtschaftspotential der großen Region (des Föderationskreises) zu sagen. Der Prozess der Konsolidierung der Wirtschaftsressourcen der Region kann in verschiedenen Formen und zu verschiedenen funktionalen Zielen verwirklicht werden. Es ist die Bestimmung der Rechenindikatoren, der quantitativen Wirtschaftsparemeter der Region und ihre Nutzung in den analytischen Zielen; die Entwicklung der sozialökonomischen Programme und der Prognosen der Region; die allgemeine Einschätzung der Lage der Region in der Wirtschaft und dem Finanzsystem des Landes und des Staates; die Bildung der Elemente des regionalen zwingenden Planes und des Mechanismus der Regulierung; die Entwicklung des perspektivischen Finanzplanes und "des Zeitraums von drei Jahren für den Haushalt" im Rahmen der Subjekte der Russischen Föderation und der ganzen Region.

Wie wir die Sache ansehen, werden die objektive Charakteristik des Wirtschaftspotentials der Region und seine Besonderheiten in verschiedenen Proportionen, die sich in der Region entwickeln, in ihrer Dynamik und auch darin gezeigt, inwiefern sie zur Lösung der strategischen Aufgaben des Wirtschaftswachstums der Region, der sozialen Orientierung ihrer Wirtschaftsentwicklung beitragen. In der Regulierung und der regionalen Politik muss man also das Prinzip der regionalen Proportionalität verwenden, auf dessen Grundlage man die Aufgabe der allmählichen Optimierung der Wirtschaftsproportionen der Region nach den Kriterien des Wirtschaftswachstums, der Innovationen und der sozialen Entwicklung lösen muss.

In der Politik der Regulierung der Wirtschaftsproportionen in der Region ist es unmöglich, den Einfluss des Faktors der äußerlichen Umgebung nicht zu berücksichtigen. Man muss sich auf die Optimierung der äußerlichen Einwirkungen auf die inneren Prozesse orientieren, die nur in der großen Region geschehen. Das Problem der äußerlichen Einwirkung auf die inneren Prozesse ist ein Gegenstand der Theorie der äußerlichen Effekte (der Externalien). Jedoch ist die Theorie der äußerlichen Effekte ausgearbeitet und wird in der Mikrowirtschaft, sondern nicht in der Theorie der Wirtschaftsprozesse und ihrer Regulierung verwendet. In der Theorie der äußerlichen Effekte, die in der Mikrowirtschaft

verwendet wird, werden die negativen und positiven Externalien betrachtet. Der negative äußerliche Effekt wird als zusätzliche Kosten formuliert, die sich im Marktpreis nicht widerspiegeln. Die positiven äußerlichen Effekte sind die zusätzliche Nützlichkeit, die infolge der Nutzung irgendwelchen Wohls (der Ware, der Dienstleistung) entsteht und in seinem Marktpreis nicht widerspiegelt. Der Grund der äußerlichen Effekte liegt in der Abwesenheit der legitimen Eigentumsrechte auf die Ressourcen. Da die äußerlichen Effekte die Einteilung der Ressourcen und die Effektivität ihrer Nutzung negativ beeinflussen, entsteht die Notwendigkeit in ihrer Regulierung und Optimierung. Dabei werden sowie Markt-, als auch Nichtmarktmethode der Regulierung, die Beschränkungen oder die Stimuli kombiniert, die vom Staat eingesetzt werden.

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ON GEOLOGICAL RISK OF DISPLAY OF KARST-SUFFOZION PROCESSES IN THE TERRITORY OF MOSCOW UNDER STANDARD DOCUMENTS

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Various definitions of the concept "risk" are known. In most general view the risk can be defined as probability of realization of some undesirable event. «Risk are losses (victims, wounded, a damage to property and economic activities failure), expected in connection with concrete danger. The risk is a function of danger and vulnerability», such definition is given by us in work «Management in emergency situations» which leaves this year as the manual for students of a building profile. It is necessary to tell that this one of very great number of definitions of this all-important concept, attention to which becomes more and more appreciable recently. Building as the major kind of human activity is directed on creation of the greatest possible comfortable and safe conditions of ability to live. However, achievement of this purpose is interfaced to the considerable difficulties connected first of all with complexities in engineering-geological conditions around building. Here the leading part is played by geological risk. The concept of geological risk for the present "has not got accustomed" in the geological literature and in practice isn't standard. Various researchers understand as it not absolutely alone and the same. The geological risk at an estimation of local object can be defined as probability of that real geological conditions will appear much more difficult rather than it have been estimated at engineering-geological researches. The geological risk associated with local object, and degrees of its level of scrutiny are connected by inverse relationship. The above mentioned level of scrutiny indicates the risk to receive incorrect estimation of resource potential of object. On the other hand, the risk is an uncertainty measure: it is more uncertainty of an estimation of parameters - more risk and on the contrary, that is here dependence a straight line. It is known that the estimation of geological risk is in Russia a compulsory procedure at a substantiation of all kinds of building and economic activities, agrees Standard „Engineering investigations

for Construction” and Federal laws “About industrial safety” and “About safety of hydraulic engineering constructions”. As it is marked by leading experts, the estimation of geological risk represents the modern mechanism of acceptance of scientifically well-founded administrative decisions under the prevention of negative consequences at building and operation of buildings, constructions and their complexes with use for experts and the persons, making the decisions, clear indicators of possible losses. Doubtless achievement of an engineering-geological science in practical area of an estimation of geological risk are «Recommendations according to geological risk in territory of Moscow» which are widely enough used in work of the prospecting and design organizations. Last decade has shown that the basic methodical approach accepted in «Recommendations ...», to an estimation of geological risk with use of economic indicators is quite justified. However for its realization rather careful spadework actually in «Recommendations ...» is required and it is probable their actualization. On the first place necessity of updating of a card of division into districts of a city of Moscow on development of adverse geological processes is put forward. The second prominent aspect which should be considered at the ripened necessity of actualization considered «Recommendations ...», change of actually theoretical approach to concept «engineering-geological processes» in city territories is. It means that «Recommendations ...» involuntarily consider the created natural-technogenic system (NTS) and moreover it is represented that there has already come the moment, on volume of the saved up results of researches in city territories, transition to an estimation of negative processes in city NTS as geoecological. In favor of it tells quite an established fact of complex influence of features of a condition of atmosphere, superficial and underground hydrosphere and, naturally, geological environment on behavior created NTS in a city (buildings, constructions, their complexes, including an engineering infrastructure). Thus, karstic and suffusion processes in the negative display concerning city NTS as local level (separate buildings and constructions on a concrete platform of building development or building of inhabited microdistrict), and higher hierarchical levels, up to regional if it is a question of building of city areas, are typical geoecological. The third aspect which should be reflected in a new wording «Recommendations...», necessity of greatest possible “coverage” of modern constructive decisions on buildings and constructions in created city NTS is. Speech, first of all goes about widely projected and erected high-rise buildings where in work NTS from created loadings it is involved deep enough horizons of the soil bases, and the height of buildings at wind influence inevitably forms the vibrating loadings transferred to the basis. Simultaneously with it one of the main concepts of development of Moscow is development of underground space, and it anymore only underground with constantly operating system of interaction with underground hydrosphere, but underground parking places in five and more levels which are not regulated on a design by operating standard documents, and demanding workings out of special specifications/ These design decisions also create new interaction with underground hydrosphere, but other, than the underground, namely local water fall or local barrage effect that negatively affects development karst and suffusion processes. All it hasn't found reflection in «Recommendations ...» and moreover, in them interaction of

a construction with surrounding buildings isn't considered, that is corresponding expected changes in underground hydrosphere, creation of temperature inversions etc. are ignored. The fourth circumstance is connected by that in a modern city any building is carried out or in the technogen-polluted territories, or on technogenic soils. It isn't considered in operating «Recommendations ...». At presence in a geological cut technogenic soils, building, as a rule, is spent after their removal from a zone of interaction with a construction, that is they are simply withdrawn and only are in rare instances estimated on aggression to concrete of designs or on activity to metals. Though in most cases with reference to an estimation of risk of development karst and suffusion this circumstance like the direct relation wouldn't have processes, the situation considerably changes, when building is conducted in the technogen-polluted territories. In this case the soil basis considerably is changed in comparison with natural, in particular, it concerns structure, a structure and, the main thing, conditions soils that, as it is known, defines also their properties so in many respects influences development and character of displays of geological processes. Thus the considerable role is played by changes in underground hydrosphere (a chemical compound of water, its temperature, viscosity etc.). Now the project new «Recommendations ...» it is developed in MSUCE and in the near future it will be directed for examination to the leading prospecting and design organizations.

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ENVIRONMENTALLY-ORIENTED PROGRAMS FOR REHABILITATION MEDICINE

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Life in the modern world is impossible without a sharp climatic contrasts, changing light and temperature conditions, solar and ultraviolet insolation. All this leads to failures in the systems of regulation and interaction of cellular structures of the body. On the other hand, our time is marked by a sharp deterioration of the human-made and man-made human environment. The growth of the technological base is directly related to the reduction of "natural capital".

Fundamental parameters of human health caused by the deep relationship of ecology and ecology of living space internal environment - endoecology: changes in the external ecological environment causes a reaction inside the body of Ecology. One of the goals of regenerative medicine as an innovative health care section is to develop a systematic approach to normalization endoecological space by reducing the negative impact of extreme natural and man-made and they cause psychiatric factors on the body and social status.

ANS "Institute of Rehabilitation Medicine" (IRM) is the largest educational institution specialized in regenerative medicine of Russia, occupying a leading position

in the market for additional vocational training. The basic framework for IRM in the developed environment-friendly educational programs were the data statistical analysis of health parameters, which revealed that the vast majority of people are in the borderline between health and disease - under status prior to disease. To increase the functional reserves, reduced as a result of adverse environmental factors and human activities in the IRM developed set of techniques applied preventive and correction ecodependent pathogenic conditions - diseases of the musculoskeletal system, nervous system, alimentary tract. For people who are in the stage of the disease in the IRM developed and included in the program cycles of improvement in regenerative medicine for doctors and nurses technologies aimed at enhancing mechanisms intracorporal detoxification and, consequently, the reduction of endogenous intoxication that accompanies most chronic diseases of internal organs.

In order to maintain occupational health and professional longevity in the IRM developed and offered as an educational product technology, health-focused adaptation of relaxing in the case of chronic fatigue syndrome and accumulated stress. In order to improve the educational programs created in IRM Scientific Research Center (SRC) for authoring ways to reducing the impact of physical factors and resources of traditional medicine in adaptive self-regulation functions of the body to form a corrective technologies in complex and individual wellness programs.

In the SRC at IRM rector of the Scientific Council established freelance leading scientists and experts in regenerative medicine and health resort in Russia and abroad. The Scientific Council is a freelance SRC IRM collegiate scientific advisory and consultative body designed to help improve the scientific activity IRM, strengthen and expand ties with the institute of scientific and educational community in Russia and abroad.

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PROBLEM OF NOISE ABATEMENT IN CITIES

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Noise pollution in cities is almost always local and is mainly caused by transport vehicles – urban transport, railway transport and air transport. At present, the noise level along major highways in big cities exceeds 90 dB and tends to grow every year by 0,5 dB. This is the biggest hazard for the environment around busy highways. As medical research shows, excessive level of noise initiates neuropsychic diseases and essential hypertension.

Among three main modes of transport, motor transport is the one which has the most unfavourable acoustic effect. Cars are the principal source of intense and lengthy noise which cannot be compared to any other sources. The noise created by a moving

car is a part of the noise of the traffic stream. Usually, the maximal noise is generated by heavy load trucks.

It is difficult to fight against noise in central areas of cities because of building density which impedes implementation of measures lowering the noise level along highways, such as building noise screens, broadening highways, planting trees. Thus, the most promising solutions for this problem are reducing noises produced by vehicles and use of new noise absorbing materials, vertical verdurization and triple glazing of windows (along with forced ventilation) in the buildings facing busy highways.

A particular problem is rise of vibration level in cities where the principal source of vibration is transport. This problem is little investigated but for sure its relevance is going to grow. Vibration causes quicker deterioration of buildings and constructions, but the most essential thing is that it can negatively affect the most precise engineering processes. It is particularly important to emphasize that vibration most of all damages high-technology industries and correspondingly vibration level rise can limit the capabilities of scientific and technical advance in cities.

Generally speaking, methods of transport noise reduction can be classified by three parameters: reduction of noise in the source of its origin, including putting vehicles out of operation and changing traffic routes; reduction of noise along the ways of its spreading; use of noise protection facilities. Use of any method or of combination of methods largely depends on the degree and character of required reduction of noise with account for both economic and operating limits.

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ESTIMATION OF MEDICAL AND ECOLOGICAL CONDITIONS IN THE IRKUTSK REGION

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Public health estimation remains urgent for the development of measures for the rehabilitation of areas with high pollution levels evaluation of medical and ecological situation in the administrative areas (cities and districts) of the Irkutsk region was constructed with help of levels of epidemiological risk of morbidity (general and for individual classes of diseases), using the criteria set out in the methodical recommendations "Comprehensive evaluation of the intensity of medical and ecological situation of the various areas caused by toxicant pollution" (1997) and criteria taking into consideration the variability to morbidity of background areas (method of sigma deviations).

To estimate the degree of ecological well-being / distress all administrative territories are divided into two groups: industrialized (or "industrial") and the conventionally "non-industrial". The group of industrialized territories includes 10 cities and districts that

host the enterprises of heat power engineer, oil refining and petrochemistry, chemical, pulp and paper and woodworking industries, non-ferrous metallurgy, including the regional center – city of Irkutsk and which, according to the Roshydromet there is higher concentration of harmful substances in the air. The second group is conventionally “non-industrial” and contains all other territories (21 districts).

Among the “industrial” areas according to the criteria guidelines (1997) condition of 4 areas is considered as ecological disaster, condition of 2 - as a critical state (ecological emergency). If we use sigma deviations method, one area will be considered as having environmental emergency, four - as a critical ecological situation (crisis).

“Non-industrial” areas was divided into 3 subgroups: with high-risk to children - five territories, with the unsatisfactory state – 9, in a satisfactory condition - 7. Data analysis showed that four of five areas with a high risk to children according to guidelines (1997) are estimateed as an ecological disaster, and 1 is in a critical condition. according to the method of sigma deviations 2 areas are in ecological disaster, and two - critical (crisis) ecological situation. The criteria guidelines (1997) identified: from nine areas with the unsatisfactory state of risk only one territory - the situation of ecological disaster, and two - both critical (crisis) ecological situation.

Analyzing data of “non-industrial” areas indicates that high risk areas received about the same difference between the estimates obtained by two groups of criteria, as well as for “industrial” sites.

Research has shown that the risk of ecologically caused morbidity prevalence in the “industrial” and “non-industrial” areas is a nonspecific response - the result of varying degrees of tension of adaptation mechanisms under the influence of both anthropogenic and other (natural and others) adverse factors.

Monitoring of the relative risks of morbidity (by referral) of the population allow to identify the critical points of their impact and detect areas of organizational development and health prevention activities to improve the ecological status of the territories.

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ADVANCED WAVE SKIMMERS

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Collection of oil spilled over the water surface becomes a major issue to be resolved. Most of the existing devices intended for collection of oil spills from water (skimmers) are mechanical or electric pumps for operation of which the traditional energy sources are required. Such devices are usually expensive, bulky, require constant maintenance, communications supply and may not be quickly delivered to the site of an oil spill and

used along the coasts in shallow areas.

We have developed a device that uses the energy of the surface waves of water bodies to collect oil spills from water (RF patent No. 6809). The unit is a tank opened at both ends with a circular rim at the upper end to which the floating valve of spherical shape is connected. The tank is suspended from the sides of the subjects swaying on the waves (from a boat, raft, etc.) or from fixed ones (from a pier, berth). When moving up and down on the waves the upper edge of the device's tank periodically crosses the water edge - goes over the surface of the tank and then dips into the water. Following up and down movements of the tank, the floating valve opens the tank allowing oil pollution from the water surface to enter into it, then it closes the tank and prevents contamination of leakage from the tank to the surface. The water that entered into the tank together with oil contamination from the water surface, is poured over the lower edge of the tank, and the oil pollution is accumulated under the floating valve.

In order to improve the design, we have developed devices characterized by the presence of rails inside the tank (RF patent No. 77 297), ensuring smooth running of floating valve and its close fit to the seat, preventing distortions of the valve and the possibility its sticking, and by presence of viewing windows (RF patent No. 76 349), allowing for visual control over filling of the tank with oil pollution.

Another our device has a floating valve with a hole in the center, which is closed with screw cup (RF patent No. 76 350), which is designed to pump the oil pollution tank into any floating vessel. It is proposed to install sensors on the inner wall of the tank in our next device in order to transmit the information about filling of the tank and the need to pump the oil pollution out of it (RF patent No. 90 807).

To increase the area of collection of oil pollution, it is proposed to equip the tank of other device for the collection of oil pollution with ring bell mouth (RF patent No. 89 537), which allows to increase productivity by 10-20%.

We have developed another device for collecting oil pollution from the surface of water bodies that also uses the wave energy, the tank of which is retained on the surface of the water reservoir by floating belt (RF patent No. 81 970). The advantage of this device is that it should not be hung from any subject. Such a device could be "thrown" in the oil spill, for example, from a ship or helicopter.

All of the above devices are simple in design, do not require traditional energy sources, and require no maintenance and communications; besides, they do not pollute the environment. They can be used to collect the oil pollution and floating debris from water, as well as to collect the sorbents used to eliminate contaminants. Such devices can be used on the high seas and in the coastal areas, in shallow waters, at ports and at the tank farms.

K.A. Romanova

REDUCING THE NEGATIVE EFFECT ON THE NATURAL ENVIRONMENT AT THE EXPENSE OF MINIMIZING WASTE OF THE EMISSION SOURCE

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Nowadays the assessment of environmental impact is in the basis of payment calculations for exploitation of natural resources and environmental pollution. The data to do the assessment of the impact of economic agents' activity on the environment are taken mainly from monitoring of production control, calculated regulatory data. Neither of the above mentioned indicators reflects the real picture of the environmental pollution. Besides, production control is carried out irregularly and the impact is measured in terms of emission concentration of harmful substances. The payments are calculated taking into account the total amount of pollutants emitted into the environment. As a result there is no clear picture of the impact of economic agents' activity on the environment. This situation in its turn generates the following problems:

- ineffectiveness of economic mechanism to provide ecological safety of the society and the natural environment;
- inefficiency of natural management because state inspectors cannot assess the efficiency of use of natural resources and managers of business entities do not know how to do it;
- overstated figures of environmental capacity of Russian enterprises in comparison with foreign ones.

To overcome these contradictions it is necessary to raise the effectiveness of economic mechanism which will provide ecological safety of the society and the nature and improve efficiency of the use of natural resources.

We reckon that it is possible at the expense of the increasing effectiveness of the economy- natural environment interaction due to the implementation of the software product based on the material balance method

Two theoretic-methodical principles are at the foundation of this statement:

1. the model of the economy-natural environment interaction
2. the material balance method to assess the impact on the natural environment

The implementation of this solution is supposed to be carried out in three stages:

- 1 stage- working out of the software to estimate the negative influence of the industrial enterprises on the environment
- 2 stage- working out of the software to estimate the negative influence of municipal unions on the environment
- 3 stage- working out of the software of to estimate the negative influence of the regions on the environment

The results of the implementation will be the following:

1. For the industry

- assessment of the negative environmental impact of individual structural units;
- assessment of nature intensity of individual structural units;
- detection of violations of technological requirements of individual departments;
- introduction of the internal economic mechanism of nature exploitation in the

company, which will lead to the responsibility of managers in the field of environmental protection

- implementation of a formalized approach to the development and implementation of environmental policies within the enterprise.

2. For the state environmental agencies:

- improving the efficiency of the state environmental control while reducing the number of state inspectors;

- improving environmental management of enterprises;

- increasing the effectiveness of the environmental policy at the municipality, region

- switching to green taxes.

But most importantly, in our opinion, this proposal will actually allow to reduce the negative environmental impact of economic entities, to improve the environmental responsibility of all managers in the field of environmental management as it will provide an opportunity to determine the degree of inefficient utilization of raw products, materials and energy by particular industries, as well as an overvalued raw material component in the price structure of the products.

A.A. Rublyovskaja

STRATEGIC MANAGEMENT OF REGIONAL SYSTEM FORMATION

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Now the regional education system concerns type of open systems, functioning and which development depends in a greater degree on an environment condition. For a regional education system environment are, first of all, legislative and the regulatory legal acts regulating rendering of educational services, and also the socially-demographic and economic processes defining character of behavior of educational institutions in the branch market.

To the factors causing necessity in a greater degree of strategic management by a regional education system, conservatism of formation as branches, priority a development of education as leader of maintenance of quality of life of the population and competitiveness of national economy and other factors besides concerns.

The mission of strategic management consists in maintenance of a survival of the

managing subject in the future by the organization of effective interaction with environment on the basis of search of new possibilities in competitive struggle, tracing and adaptation to changes in an environment.

The regional education system of the Voronezh region has the difficult structure including federal, regional and municipal level, and also level of management of educational institution. Each of these levels of management contains the state and public component.

Management of a regional education system at each level includes the following processes making a uniform contour of management: revealing of deviations of actual results of educational process from the target; development of decisions on elimination of these deviations; realization of the operating influences directed on elimination of deviations.

The higher, an ultimate goal of management of the regional education system expressed in the most general form, is optimization of functioning of system, achievement is possible (achievement) of possibly greater effect useful effect at the least efforts and expenses. Discrepancy of an actual state of system with set to it is that a signal which causes system reorganization so that it functioned in the set direction.

F.I. Samedova

THE ORGANIC PART OF OIL-SATURATED EARTH - ALTERNATIVE HYDROCARBONS

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The urgency of training programs for alternative sources of hydrocarbon raw material is dictated by the decreasing oil reserves and growing global energy needs.

It is therefore very promising to involve oil-saturated earth in the processing.

In this regard, research is required to fulfill the specific conditions.

In the IPCP Azerbaijan National Academy of Sciences research on the rational use of oil-saturated earth of Azerbaijan to produce valuable petroleum products, including base oils, has been carried out.

By the method of solvent extraction from oil-saturated sand deposits of Balakhany and Mashtaga organic part was isolated, which has a high density (1143.9 kg/m³ at 20°C), high resin-asphaltene substances (14.2%) and low (0.906) paraffin contents. It contains Ni; Fe; Zn; Mn; Cr; Mg; Pb; Co, etc.

As a result of the fractionation of extraction products and compounding following narrow fractions of oil products were obtained, % (w): boiling up to 180°C - 13; 180-240°C - 7.5; 240-350°C - 4.3; 350-500°C - 32.6; above 500°C - 42.6. These yields and qualities are similar to those of analogical fractions of heavy Balakhany oil except oil fraction viscosity index, which is 44 instead of 14.4 from the natural oil.

The possibility was shown for obtaining from an organic part of these oil-saturated sands of fuels, lubricants and bitumen. The quality of them is at the level of oil products from Balakhany heavy oil, and they can be processed jointly with this oil.

By catalytic processing of oil fraction, boiling at 350-500°C, in two stages with olefins in the presence of $AlCl_3$ the possibility of using this fraction as an alternative raw material for the base oil with viscosity index 80-97 units was revealed.

However, this method of processing the oil-saturated earth energy consuming and environmentally unsafe because of the use of large amounts of toxic solvent.

In this regard, a new method, has been worked out which provides oil-saturated earth hydroforming without prior separation of the organic part of it, which is loaded into the reactor of pilot plant and processed with flow of hydrogen.

Study showed that in the process of cultivation with hydrogen hydroforming of the organic part contained in the earth takes place simultaneously that is isolated. In this process earth replaces the catalyst.

The group composition of oil extracted from the earth after hydroforming is similar to that of oil fields in Azerbaijan. Processing of oil fraction of hydroformed crude oil can improve viscosity index of base oils up to 100 and above.

Thus, the methods of processing the organic part of oil-saturated earth were developed, which allow to get petroleum products, including base oils, with a high degree of saturation.

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KOSMISCHER MÜLL IST EINE ÖKOLOGISCHE BEDROHUNG FÜR DIE ERDE

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Am 10. Februar 2009 ist der Satellit NASA Iridium33 mit den abgesehenen in 1995 russischen Kommunikationssatelliten Kosmos2251 mit relativen Geschwindigkeit 11,6 km/s auf Höhe 790 km zusammengestoßen. Der russische Apparat wog fast 900 kg, und amerikanische - 450 kg. Infolge des Zusammenstoßes hat sich zwei Bruchstück-Wolken mit gemeinsamen Massen etwa 1350 kg gebildet. Manche von denen können anderen Satelliten gefährden. Die tieffliegenden Fragmente des Satelliten Kosmos gehen von Zeit zu Zeit in die dichten Schichten der Atmosphäre ein.

Dieser Ereignis war der erste registrierte Zusammenstoß auf Umlaufbahn der Satelliten, jedoch weit nicht erster Zusammenstoß von Menschenhand geschaffenen Gegenstände im Kosmos. Zusammenstöße von künstlichen Objekten auf der Umlaufbahn geschahen auch früher, und auf alle Fälle waren die Zusammenstöße von Satelliten oder letzten Stufen von Raketen mit Fragmenten der zerstörten künstlichen Objekte vorhanden. Der gefährlichste Vorfall, der das Erscheinen «des kosmischen Mülls» verursachte, war

die Vernichtung von China des eigenen Satelliten in 2007. Damals hat sich auf der Umlaufbahn mehr als 2500 neuer Bruchstücke gebildet.

Des kosmischen Mülls wurde so viel angesammelt, dass er schon als einen gefährlichen Hauptfaktor bei Verwirklichung der bemannten Flüge in den Kosmos anerkannt ist. Da immer mehr Staaten die von Menschenhand geschaffenen Objekte im Kosmos lassen, und «der kosmische Müll» ist auch zur «Selbstvermehrung» begabt (zusammenstoßenden Bruchstücke teilen sich auf kleinere Elementen), wird das Problem einer Unreinheit des erdnahen Raumes in der allernächsten Zeit sich verschärfen.

Das Problem des Kampfes mit «kosmischen Müll» und einer Suche der Antwort auf die Frage «Wer ist schuldig?» im Falle des Auftragens von diesem Müll eines Schadens wird von ungenügender Entwicklung der internationalen Gesetzgebung auf vorliegenden Gebiet des kosmischen Rechtes kompliziert. Zurzeit gibt es nur zwei Dokumente.

Erster ist der Vertrag über den Kosmos vom 1967. Der Artikel VII dieses Dokumentes sieht gewisse «internationale Verantwortung» (nicht berichtend, was es genau gemeint ist) für einen Schaden, der einem Staat von kosmischen Objekten oder von ihren Bestandteilen anderen Staates auf der Erde, in luftig oder im kosmischen Raum, einschließlich den Mond und andere himmlische Körper verursacht ist, vor.

Zweiter ist die Konvention über eine internationale Verantwortung für einen Schaden, der von kosmischen Objekten verursacht ist. Es war am 29. März 1972 in Moskau, London und Washington geschlossen. Laut dem Artikel II dieser Konvention «trägt der startende Staat die absolute Verantwortung für die Auszahlung einer Kompensation für den Schaden, der von seinem kosmischen Objekt verursacht ist», aber nur «auf der Erdoberfläche oder dem Luftfahrzeug im Flug». Was den Schaden betrifft, der einem kosmischen Objekt eines Staates vom kosmischen Objekt anderen Staates verursacht ist, so haftet, laut dem Artikel III der Konvention, «das Letzte nur für den Fall, wenn der Schaden nach seiner Schuld oder durch Verschulden der Personen verursacht ist, für die es verantwortet ist».

Das Problem «des kosmischen Mülls» zu lösen, ist aus politischen Gründen notwendig.

Zurzeit ist eine wirksamste Weise beim Kämpfen mit «kosmischen Müll» nach dem Prinzip: «Es ist nicht dort sauber, wo aufgeräumt ist, sondern dort, wo nicht schmutzig ist». Es bedeutet das Folgende – man muss rechtzeitig durcharbeitende Satelliten und Stufe der Trägerraketen von Umlaufbahn zurückführen oder sie auf hohen «Parkumlaufbahnen» fortzuführen, wo sie tausenden Jahren existieren können. Perspektiv wird eine Nutzung für diese Ziele der wiederverwendbaren Transportschlepper mit hocheffektiven motorischen Elektroraketenanlagen vorgestellt.

Es sind schon einige internationale Regeln der Verwertung ausgenutzten Satelliten produziert. Betreffs des schon existierenden erdnahen «Mülls» gibt es so was wie Vernichtung der größten und gefährlichen Bruchstücke mit Raketenschlägen von der Erde und sogar der Start auf die Umlaufbahn einen riesigen Helium Wolken, wo Fragmente des «Mülls» gebremst werden und auf die Erde fallen lassen.

G.S. Samigullina

ECOLOGICAL PARADIGM TO ENHANCE THE SKILLS OF TEACHERS OF GEOGRAPHY THROUGH CREATION AND USE OF ENVIRONMENTAL PATHWAYS

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In order to implement the ecological paradigm in the professional development of teachers of geography were established course “Methods of creating and using ecological path”, a didactic guide trips on the biological sewage treatment plant, “High Mountain”, interdisciplinary research on environmental issues.

Formation of the design competence of teachers of geography we looked through the creation and use of ecological trails in Lakeland rural small schools Vysokogorsky region of Tatarstan.

Nature trail is located in picturesque countryside, which is dominated agroecology in the neighborhood of multimillion-dollar city. Creating it is compatible with the forest district and local government chairman Kadyshchevskii Vysokogorsky area. Withstand all the organizational and methodological requirements: form trails, have a passport, stations, billboards, and natural and man-made objects. Particular attention was paid to the justification of rules of behavior in nature, strengthening the skills of their performance, familiarize students with environmental regulations and ways mushrooms, berries, flowers and herbs, local regulations for hunting and fishing; skills in the safe use of fire wood, the use of simple measures to prevent and extinguishing forest fires, habitat conservation of birds and animals, removal and disposal of debris, proper use of ecological and water springs, etc.

Since small-size school and the teacher has to combine the teaching of several subjects, we are faced with the problem of streamlining the training process, coordinated the study subjects, versatility, and environmental issues of interdisciplinarity, problem-solving capabilities dissociation of subject learning with a view to forming a unified scientific world.

In order to streamline the learning process in addition to the known methods of determining the properties and degree of contamination of soil, air, etc., we have used the research methods developed by scientists at KSU.

When planning a scientific experiment, we used the following form to complement the traditional class-the appointed form: themed tours, talks, forming the ideological position of nature protection, practical program of work (study and description of the topography, ravine, rivers, lakes, soils, flora and fauna, etc. etc.).

In essence, nature trail - is training and education “cabinet” in nature.

In choosing the route into account the following principles: access route for rapid attendance, availability of human impact, sufficient attendance zone route trails local people, emotional richness and the information capacity of the route.

Testing of special courses in teacher training “method of creating and using ecological path” made it possible to trace the didactic possibilities of ecological trails in the educational process in school and college, earn a corporate experience of the school and university, to track the use of ecological rationality trails in the rural small schools provide the general audience of environmental and educational competence.

Methods, forms, didactic support professional development of teachers of geography through the feedback will be incorporated into a continuous ecological education.

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MICROBIAL ACTIVITY OF GREY FOREST SOIL CONTAMINATED BY OILY WASTE

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Soil contamination by petroleum wastes is a wide-spread problem. These wastes contain different concentrations of waste oil 40–60%, waste water 30–90% and mineral particles 5–40%. Total petroleum hydrocarbons (TH) are the most deleterious components in oily waste, because of their potential hazard to human health and the environment. Part of the oily wastes generated during oil extraction and production can also contain naturally occurring radionuclides (uranium, thorium, radium and other natural radionuclides). Biological indicators have become increasingly important in hazard assessment and remediation for determining clean-up end-points. Microorganisms are widely used to assess ecological health because they respond relatively quickly to the bioavailable fraction of contaminants.

The current study was conducted to evaluate the effects of oily wastes contained natural radionuclides on microbial activity of the grey forest soil. Changes in hydrocarbon concentration, the activity concentrations of radionuclides and the accompanying changes in soil microbial population size and activity with time were measured.

The experiment consisted of laboratory incubation under control temperature (25°C) and humidity. The treatment was the incorporation of the waste to soil. For this soil was mixed with waste (TH - $720.5 \pm 21.46 \text{ g kg}^{-1}$; moisture - $64.91 \pm 0.16\%$. The activity concentrations of ^{226}Ra , ^{232}Th and ^{40}K were 2739 ± 180 , 916 ± 56 and $271 \pm 51 \text{ Bq kg}^{-1}$ correspondingly) at rate 4:1. Untreated soils were used as control. The incubation was performed in triplicate for 120 days. The initial contamination level of the soil mixed with the waste was found to be 156 g kg^{-1} . The TH level was reduced to 54 g kg^{-1} of soil after 120 days respectively. The degradation percent was relatively low in the first month (20%) but increased gradually with time and reached 65% after 120 days of incubation. The addition of the waste to soil resulted in the increase of activity concentrations up to 643 ± 127 , 254 ± 56 and 49 ± 9 for ^{226}Ra , ^{232}Th and ^{40}K which were 36 and 9 times higher for ^{226}Ra , and ^{232}Th than its natural background of the soil. The content of the radionuclides

was not changed significantly after the 120 days of incubation and remained 30 and 7 times higher for ^{226}Ra , ^{232}Th than in control soil.

Waste application generally decreased soil microbial biomass carbon. On the first day after application, the value of this parameter is found to be $345 \text{ mgC}_{\text{mic}} \text{ kg}^{-1}$ for soils treated with the waste. The appropriate value for the control soil is found $672 \text{ mgC}_{\text{mic}} \text{ kg}^{-1}$. It means that some sort of inhibition that affects C_{mic} seems to exist. The high content of hydrocarbon added could be responsible for the inhibition observed in biomass value. Besides the reason for inhibition could be the toxicity of different hydrocarbons, e.g. short chain n-alkanes. Over time, the differences between the mean values of microbial biomass in the soils treated with the waste, and the control soil became lower. This may be explained by the degradation of hydrocarbon particularly its toxic compounds to simpler, less toxic compounds. However, even at the period of 120 days in the soil treated with the waste, the biomass was found significantly ($P < 0.05$) lower by a factor 1,3 than that determined in the control soil. A significant decrease in microbial respiration was observed during incubation, since the hydrocarbon content continuously fell. At the end of the incubation period (120 days) its level was even lower (74%) than that of the control soil. Results obtained show that the time necessary for the microbial community to recover its initial status in the term of activity, comes to 120 days of the experiment after the addition of the waste. The value of qCO_2 increased significantly in the soil after the addition of the waste. The qCO_2 of the treated soil are 3,1 and 3,8 times higher than that of control soil at 1st and 30th days of incubation correspondingly. During the next months, the values of qCO_2 of treated soils tended to fall and at the end of incubation were similar to those of the control soil. The absence of significant effects at the end of incubation reflected in the qCO_2 values indicates the least alteration of the ecosystem.

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STRATEGIE DER VERWALTUNGSBERATUNG

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Die Vertreter der Makromacht meinen, dass man solche Strategie bevorzugen muss, die erstens den Anfragen der äußerlichen Teilnehmer antwortet und zweitens zulässt, die Letzten in den Interessen der Organisation zu verwenden. So stellt die strategische Auswahl für die gegebene Richtung des strategischen Managements die Auswahl des strategischen Schemas der Handlungen dar, die von den herrschsüchtigen und politischen Kräften bestimmt wird. Dazu können die Prozesse innerhalb der Organisation oder der Handlung der Organisation in der äußerlichen Umgebung gehören. Dabei trägt die strategische Auswahl den spontanen Charakter und nimmt die Form einer Position, sondern nicht einer strategischen Perspektive an.

Die gegebene strategische Richtung hat solche Begriffe des strategischen Managements wie "die Koalition", "die politischen Spiele", "die kollektive Strategie" eingesetzt. Die Machtschule hat auch die Wichtigkeit der Nutzung der politischen Methoden für die Verwirklichung der strategischen Veränderungen betont. Die kritische Betrachtung der Machtschule erlaubt zu behaupten, dass die Vertreter der gegebenen Richtung die Bedeutung der Macht während der Bildung der strategischen Alternativen etwas übertreiben und die Rolle der übrigen, nicht weniger wesentlichen Faktoren unterschätzen, die den gegebenen Prozess beeinflussen.

Die Kulturschule betrachtet die Organisation im Unterschied zur Machtschule, die die Organisation in die oft befeindenden Gruppen und Gruppierungen teilt, als eine einheitliche Mannschaft der Gleichgesinnten. Die Bildung und die Auswahl der Strategie wird laut der Konzeption der Kulturschule als ein Prozess der sozialen Wechselwirkung vorgestellt, der auf den allgemeinen Überzeugungen und dem Verständnis der strategischen Perspektiven der Entwicklung vom Kollektiv der Organisation gegründet ist. Deshalb nimmt die Strategie die Form einer Perspektive und später einer Position im Unterschied zur Machtschule an, die sich in den kollektiven Bestrebungen eingebürgert ist. Und als Hauptcharakteristik der Strategie tritt die Vorbestimmung auf.

Ein wesentlicher Nachteil der Kulturschule ist erstens die Feststellung der Abwesenheit der Notwendigkeit der Veränderungen. Zweitens stellen die Vertreter der gegebenen Richtung den strategischen Vorteil der Organisation ihrer Einmaligkeit gleich. Das ist völlig falsch, denn die Gesellschaft kann diesen Vorteil leicht verlieren.

Die Vertreter der Schule der äußerlichen Umgebung sind geneigt, der Organisation eine passive Rolle zuzuweisen, die nur in der Reaktion auf die in der äußerlichen Umgebung geschehenden Veränderungen besteht. In diesem Zusammenhang wird die Möglichkeit der Gesellschaft vollständig ausgeschlossen, die selbständige strategische Auswahl zu machen. Laut der Vorstellungen der Schule der äußerlichen Umgebung kann man die strategische Auswahl als ein passives Element des strategischen Prozesses bestimmen, das darin besteht, dass die strategische Auswahl die äußerliche Umgebung macht, und die Organisation auf diese Auswahl, d.h. die äußerliche Umgebung adäquat reagieren soll. Aber das rationale Korn ist auch in diesem Ansatz versetzt. Zum Beispiel stößt die Organisation auf der Stufe der Reife des Lebenszyklus auf die maximal begrenzte strategische Auswahl. Und sie muss auf die Veränderungen der äußerlichen Umgebung schnell und deutlich reagieren. Andererseits ist der Blick der Vertreter der Schule der äußerlichen Umgebung auf die strategische Auswahl sehr beschränkt, denn die äußerliche Umgebung kann an und für sich günstig oder feindselig nicht sein. Das hängt von den konkreten Zielen und Aufgaben der Organisation ab.

Die Erkenntnisschule oder die kognitive Schule betont den Prozess der Strategiebildung der Organisation. Wenn man von der vorliegenden Konzeption ausgeht, stellt die strategische Auswahl den Erkenntnisprozess der strategischen Perspektiven (in Form von den Schemen, den Karten, den Konzeptionen, den Frames) vor, die die Weisen der Informationsgewinnung aus der Umwelt und die Auswahl der produktivsten Information

vorschreiben. Unserer Meinung nach, übertrifft das Potential der gegebenen Schule den wissenschaftlichen Beitrag ihrer Vertreter. Die Erkenntnisschule achtet auf die konkreten Stadien des Prozesses der Strategiebildung, besonders auf das ursprüngliche Verständnis der Strategie und der Umdeutung der gewählten strategischen Richtung.

Die Konfigurationsschule ist keinem der früher betrachteten Ansätze des strategischen Managements ähnlich, denn sie schließt alle vorhergehenden Richtungen ein. Ihre Vertreter versuchen, den Prozess der Strategiebildung, den Inhalt der Strategie, die Organisationsstruktur und die Umgebung der Gesellschaft zusammen zu verbinden.

Die Vertreter der Konfigurationsschule sind überzeugt, dass die Organisation meistens als die gewisse stabile Konfiguration ihrer Bestandteile beschrieben sein kann. Solche Perioden der Stabilität werden von der Transformation von Zeit zu Zeit unterbrochen. Der Wechsel der Perioden des stabilen Zustandes der Konfiguration und des Übergangsprozesses der Transformation wird mit der Zeit in die schematische Reihenfolge aufgebaut (die Konzeption der Lebenszyklen der Organisationen). So besteht das Hauptziel der strategischen Auswahl im Rahmen der Konfigurationsschule in der Aufrechterhaltung der Stabilität der Organisation in verhältnismäßig langwierigen Zeitspannen oder mindestens der Veränderungen, die ihre Strategie eingeschrieben werden. In den Perioden des Entstehens des Bedürfnisses nach der Transformation soll die strategische Auswahl die Verwaltung des Prozesses des Überganges und die Erhaltung der Lebensfähigkeit der Organisation gewährleisten. Entsprechend wird der Prozess der Strategiebildung auf die Entwicklung der Konzeptionen oder die formale Planung, auf die systematische Analyse oder die Auffassung der Leitung, auf die Kooperationsausbildung oder die Konkurrenzpolitik, die Konzentriertheit auf der individuellen Ausbildung, die kollektive Sozialisierung zurückgeführt oder von den Reaktionen auf die Einwirkungen der äußerlichen Umgebung beschränkt. Als seine obligatorische Bedingung treten jedoch die Rechtzeitigkeit der unternommenen Handlungen und ihre Angemessenheit der äußerlichen und inneren Drohungen und den Möglichkeiten der Organisation auf. Die resultierenden Strategien nehmen die Formen der Pläne oder der Schemen, der Positionen, der Perspektiven an, aber jede zu seiner Zeit und entsprechend der Situation.

Vom Gesichtspunkt der Konfigurationsschule stellt also die strategische Auswahl die Suche nach einer richtigen strategischen Konfiguration dar, die erlauben wird, die Organisation in die Gleichgewichtslage beizubehalten oder zurückzuholen.

Die Transformation des Wirtschaftssystems Russlands hat die Rolle und die Stelle der Handelsorganisation unter den Bedingungen der Marktverhältnisse geändert und die Leiter des Betriebes vor die Notwendigkeit gestellt, die selbständigen strategischen Entscheidungen zu treffen, die strategische Auswahl zu machen. In diesem Zusammenhang ist das Interesse für die Probleme der strategischen Planung und der strategischen Auswahl gesetzmäßig gewachsen. Nach der Analyse der Arbeiten der einheimischen Wirtschaftler sind wir zum Schluss gekommen, dass die Autoren mit der seltenen Ausnahme die neuen begrifflichen Ansätze nicht anbieten. Sie versuchen, zu den Bedürfnissen der russischen Praxis die schon existierenden Konzeptionen, hauptsächlich die Ansätze der Schulen der strategischen

Planung zu verwenden, indem sie ihre Methoden, Methodiken und Annahmen genauer formulieren und ergänzen.

G.S. Sergeyeva
T. Krasnova

ECOLOGY OF CULTURE IN THE CONTEXT OF THE CONTEMPORARY CRISIS PROCESSES

Yelets Branch of the Russian New University, Yelets, Lipetsk Region, Russia

At present the system “man-nature-society” is affected by the crisis on a global scale. In this respect urgent remain the problems linked with “ecology of culture”, following the definition be D. S. Lichatchev, “the ecology of the soul”. The academician D.S. Lichatchev emphasized in his book “Russian culture” that ecology cannot be restricted to the tasks of preserving the natural biological environment. To preserve man’s life the environment created by the culture of his ancestors and by his own efforts is not less important. Preservation of the cultural environment is the task which is not less significant than preservation of the natural surroundings.

Ecology of culture becomes a leading factor providing the balance between man and nature, man and society, man and civilization. Conceptual unity of ecology of culture and environmental protection is conditioned by the fact that the activities of man are the source of the environmental crisis. The contradiction between man’s efforts to transform natural systems and to introduce as a result new parameters of the natural environment, not fitting for life, can provoke in the end effect the destruction of the ecosystems that are of vital significance.

The newest technologies equipping the anthropogenic activities, on the one side, bring about the growth of production and consumption, and on the other side, destroy irreversibly the balance of the biological bases of existence. Violating the principles of ecological ethics based on the moral attitude of man towards nature results into the loss of cultural values. Cultural and ecological, cultural and creative activities of a man should be aimed, first of all, at self-development, self-perfection in accordance with the basic anthropologic ideas composing the basis of cultural consciousness.

The evolution of culture as a complicatedly structured, self-developing system is based on global interchanges with the environment. Ecology of culture and ecology of nature prove to be interconnected through the principle link – man being part of nature. One should not underestimate the moral significance and impact upon man of entire cultural environment with all its relationships. Ecology of culture means conscious and purposeful efforts of the society to reproduce the diversity of the cultural environment.

Technical progress, abundance of material things in themselves do not mean cultural, spiritual efflorescence proper, they cannot be defined as moral or unmoral: they are neutral.

Cultural significance of technical achievements depends on the context of values in which they are used.

The present crisis embraces financial, economic, political, ecological and cultural spheres. Having covered all the fields of human activities, the crisis affected, to a greater extent, the human individual himself. An obviously pragmatic character of life gives rise to disintegration of personality, destruction of its integrity, general amoral attitude, indifference, loss of moral convictions. All this gives cause for the scientists to speak about an anthropologic crisis, about the destruction of the human in an individual, about the loss of value reference-points, about the vanishing of harmonious relationships between the men and the environment. In respect of the latter, environmental issues are becoming an important constituent of contemporary cultural consciousness.

A.A. Shalaginov

HEAVY-CURRENT CONTACT SYSTEMS WITH COMPOSITE LIQUID-METAL CONTACTS OF THE ELECTRICAL APPARATUSES OF SHALAGINOV

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The aim of the present study is the development of new designs for heavy-current contact systems (HCS) with composite liquid-metal contacts (CLC) for electrical apparatuses.

It is known, that CLCs possess a great number of advantages:

- operational life - 3000-5000 and even more switch on/switch off operations (on-off);
- 100% savings on silver;
- Savings on liquid metal;
- Minimum transient resistance,
- Minimum electrical power loss,
- Minimum press force,
- Absence of electrodynamic kickback forces,
- Absence of such phenomena, as welding, vibration and sealing of contacts;
- Increase in inclination angle relative to horizon does not influences the CLC resistance greatly;
- Easy to use in conjunction with existing electrical apparatus;
- Easy to operate and maintain;

Because of the above, the task of developing new design of HCS with CLC for modern electrical apparatus appears to be of high priority. Shalaginov's designs of HCS Nos. 4 - 6 are presented in the present study. These HCS designs were developed to ensure further increase in rated current value, decrease of transient resistance, growing reliability,

simplified design and longer operational lifetime. In this regard, the electrical contact between the side surfaces of the inner cavities of the fixed bridge and the contact element in these systems is performed in different ways: For HCS No. 4 this is realized by means of roller contacts and for HCS No. 5 - via liquid metal, for HCS No. 6 - by means of flexible metallic bonding.

Based on the results of the research accomplished these designs of HCS with CLC may be recommended for application in electrical apparatus, specified for chemical industry, metallurgy and other segments of industry. This year we received three new patents for utility models. It Russian patent No. 105 069 heavy-current contact system N 4 Shalaginov; Russian patent N 105 070 heavy-current contact system N5 Shalaginov and Russian patent N 102 841 heavy-current contact system N 6 Shalaginov.

S.G. Sheina
L. Nikulshina
S. Nedelko

DEVELOPMENT OF SANITARY PURIFICATION SCHEME OF ROSTOV-ON-DON

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It is annually produced 400 thousand tons of solid waste in the city of Rostov-on-Don, which are taken to landfill for disposal to the Northwest industrial area of the city. Nearly 60 tons of waste per year enters Rostov Material Reclamation Facility for the sorting, extracting commercially attractive factions, pressing, briquetting and subsequent transportation of "residue tail" to the landfill.

The average increase of waste storage for the recent years is rather steady, averaging 4-5% annually. It has a negative impact on the environment, covering more and more vast territories under landfill for disposal.

The key problems affecting the management of all types of waste streams in the city are:

- imperfection of the existing urban transport scheme of waste from collection sites to processing facilities or disposal;
- a large amount of waste with low level of recovery, which is sent for disposal at landfill;
- misunderstanding of the concept of waste management (instead of practice of sanitary purification of territory should be established municipal waste management economics).

The above shortcomings caused the development of strategies for dealing with Rostov-on-Don municipal solid waste through the use of geographic information technologies. This will solve the following issues:

1. Determine the prospects for the municipal solid waste management in the medium and long term relation. It is necessary for stable operation of enterprises and to

attract the appropriate scope of its investments.

2. Establish a continuous process of information provision of solid waste.
3. Increase the supply of raw materials of economic complex of the region through increased use of recycled materials.
4. Improve the environmental situation in the region and the surrounding areas by increasing the volume of recyclable waste and improve existing technologies.
5. Improve the rationality of land use by reducing the areas occupied by illegal dumps, and increasing the proportion of recyclable waste.

Administration of Rostov-on-Don, introduced a system of solid waste management in the city in accordance with the "Phased program of the creation of a new waste management system in the city of Rostov-on-Don." Under this system, a municipal agency "Clean City" provides the management: a recycling service for the collection of paper, cans, glass and plastic; the bulk collection service is free of charge; two-stages of transportation through the operation of transfer stations; Material reclamation Facility; operated landfill site and monitoring others which are closed now.

The advantage of the current municipal solid waste management system in Rostov-on-Don is an implementation of interactive management system at the landfill site and Material recovery facility. This system includes automatic control system of transportation, registration and waste allocation.

Thus, the management system of solid waste that exists in Rostov-on-Don, has many advantages, but does not solve all the problems existing in the city and region. For their successful resolution is necessary to introduce an integrated system of solid waste management.

At present the main areas of interests, connecting with collection and recycling in the city of Rostov-on-Don, in our opinion, are following:

- the introduction of integrated mechanization of municipal solid waste management;
- the lowest rate of residue after waste recovering;
- the highest rate of recycling;
- ecofriendly processing and storing the remainder of the waste;
- development of operated market of waste and recycled material;
- adoption of tax remissions; lax credit and acquisition of license;
- optimization of rate prices for waste disposal, implementation of a new strategy "Pay as you throw" (PAYT), which would encourage citizens to reduce their individual waste because of financial incentives.

These recommendations will help municipal government to improve the system of waste management in Rostov-on-Don. This will lead to improved living standards and improving financial sustainability of the urban economy that is important in the present circumstance

S.V. Shmanev

MANAGEMENT OF ECONOMIC SYSTEMS ON THE BASIS OF THE CONCEPT OF THE STRATIFIED SPACES

OrelGIET, Orel, Russia

Nowadays the economics is closely related with other sciences, including the natural one. This fact is caused, on the one hand, by intensive development of the economic science itself, on the other hand, partly, by expansion of using sections of mathematical science for the description of economic processes, and, therefore, a merger of experts of social and natural sciences.

This merger has caused a splash in interesting scientific works in economic researches. As a result old economic representations had to break intensively for the arising of the new one. Quickly proceeding processes of these reorganizations direct development of economic sciences under the same laws of realization on what there was a development of natural sciences. We also should notice that synthesis of sciences generates something new, distinct from the methodology making a basis of natural sciences. It is connected with the factor synergistic influences of the person on this process.

On the basis of above-named reasons, we offer qualitatively different approach to managerial process research by economic development. At the heart of this approach, the author's concept of the stratified economic space with attraction of mathematical apparatus which is claimed for many real processes taking place in modern astable conditions lies.

Modern economic space with complicated structure and system of interactions is rising. In view of it the influence the volume and density of information on the subjects of management decision-making is rising exponentially. The problem of the analysis of management efficiency consists of the fact that it is always difficult in the economy to separate effects on reflected in the economic plane, associated with a "purely objective" laws and "purely subjective" dependent on feelings (representations) of a person or group of people. In addition, the economic situation is largely politicized, and the politicization of the process is determined by the subjective factor.

In association with those methods of the analysis which are based not on division of objective and subjective factors, and on their consideration as equivalent, being in difficult interaction, elements in the system analysis are represented perspective.

In information technology such approach is already applied. The concept of system as sets of elements, moving to a definite purpose, allows to consider mathematical designs slightly more widely in the system analysis as aim defines this or that mechanism of research.

We suggest to consider the general observable phenomena of system as the phenomena of one layer named us conditionally "laboratory" space, and hidden, proceeding in system (in its subsystems), as the phenomena proceeding in other layers, named us "imaginary". It is necessary to consider that processes of imaginary layers are reflected in laboratory space.

Imaginary concepts are defined here from a position of the observer on a laboratory layer. The events for the researcher are proceeding only on this layer, and hidden ones connected with subsystem processes action and the reason of these events are accessible, are perceived by laboratory space as projections (visualization) of processes of subsystems. Therefore managerial process reminds work with virtual spaces more and more and carries a likelihood basis as administrative actions are carried out in imaginary spaces which are only display of objective economic processes of a laboratory layer and to neglect communications present at it is impossible.

L.V. Shmaneva

MODELLING OF MANAGERIAL PROCESSES ON THE BASIS OF THE SYSTEM APPROACH

OrelGIET, Orel, Russia

In social and economic management sphere the key factor which is denying or justifying concrete methods and the forms of activity, is traditionally a considered efficiency. Owing to the practical and theoretical importance, the questions connected with conceptualizing of this concept, working out of methods of its increase and measurement, are studied rather widely, but a common opinion is not developed yet. As a whole within the limits of realization of administrative function the majority of private problems can be united into one, the most general and actual. It is a search of new theoretical models and practical techniques of construction of an effective control system or the universal algorithm, providing the expected result corresponding to look-ahead variants.

Timely, correct and whenever possible the fullest information allows not only to make correct and effective administrative decisions at occurrence of problems, but also quickly in favor of the enterprise or the organization to solve them with the least losses. Such situation is predetermined by that the essence of management consists in preparation, development of decisions and realization of a chain of consecutive actions by operating system on the basis of the information received by the observer reflecting a condition of operated object and environment, and also execution level (or defaults) the accepted administrative decisions.

At that, the way of optimization is more varied and the search problem is wider than operating actions when input parameters of the system causing changes in its various states are more diversified.

Invariants are under construction, proceeding from real operating conditions of object, on the basis of the general functions and management problems to which carry:

1. The System of organization is a definition of subsystems and the analysis of structural interactions (hierarchical and linear).
2. Forecasting of the future behavior of system.
3. Calculation, distribution and the account of resources and elements, and also their coordination in time and in the space, characterizing desirable conditions of system, and

timely updating at environment changes.

4. Realization of the planned decisions and system leading to prospective conditions.

Anyway, the necessary information put he basis for management actions, whose utility and efficiency is estimated on degree of its influence on change of conditions of operated object.

Construction of a control system demands simultaneous consideration of set of parameters and it is impossible without definition of interrelations between them. Application of the system approach and attraction of information and logical structures on its basis to modeling of administrative processes and forecasting of the future conditions of operated objects, from our point of view, opens new vision of problems in management of the enterprises and the organizations in the conditions of radical changes of the social and economic environment.

First of all, information and logical structures allow to present detailed hierarchy of administrative processes, cover multi-level socio-economic systems and ensure the consistency of the interacting subsystems, implementing the full system approach that boils down to what each subsystem work which is optimized to be viewed as part of a larger system. Owing to information and logical models it is visually shown how does work of the given subsystem is influencing to the work of all system.

E.W. Sibirskaja

DIE UMLAUFKOSTENPLANUNG UND DIE GEWINNPLANUNG DES HANDELSBETRIEBES

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Der Prozess der Warenbewegung von der Produktion bis zum Kunden ist mit verschiedenen in der geldlichen Form geäußerten Aufwendungen der lebendigen und objektivierten Arbeit verbunden. Die Kosten für die Warenproduktion (die Erfüllung der Arbeiten, der Dienstleistungen) stellen die tatsächlichen Selbstkosten dar. Unter den Selbstkosten der Operationen, die mit der Realisation der eingekauften Waren verbunden sind, werden die Umlaufkosten für den Warenverkauf verstanden. Das sind die Transportkosten, die Aufbewahrungskosten, die Nachbearbeitungskosten, die Abpackkosten, die Lohnkosten der Handelsarbeiter, die Zuführungen in die staatlichen außeretatmäßigen Fonds mit der sozialen Zweckbestimmung, die Abschreibung der Grundfonds und der immateriellen Aktiva u.a.

Nach dem Wirtschaftsinhalt nehmen nicht alle Kosten des Handelsbetriebes an den Umlaufkosten teil. So werden die Kreditzahlungen innerhalb der von der Gesetzgebung festgelegten Rate im Bestande von den Umlaufkosten berücksichtigt. Die Kreditkosten über die Rate gehören zu den Finanzergebnissen und werden vom Betrieb aus dem Reingewinn bezahlt. Auf Kosten vom Reingewinn werden die Strafen, die Vertragsstrafe für die unzeitige Überweisung der Steuern ins Budget bezahlt und die obligatorischen Zahlungen in die

außeretatmäßigen Fonds der Sozialversicherung verwirklicht.

Entsprechend der geltenden Gesetzgebung stellt der zu den Selbstkosten gehörten Aufwand (im Handel – die Umlaufkosten) die wertmäßige Einschätzung der materiellen, werktätigen und anderen Kosten dar. Zu Zwecken der Besteuerung wird sie unter Berücksichtigung der in vorgeschriebener Ordnung behaupteten Limite, Normen und Richardsätze korrigiert.

Der Aufwand des Handelsbetriebes, der zu den Umlaufkosten gehört und in seinem Bestand nicht berücksichtigt wird, bildet die Wirtschaftskosten, d.h. er charakterisiert die summarische Kostenhöhe.

Der Hauptunterschied der Umlaufkosten von den Selbstkosten besteht darin, dass der Wert der eingekauften Waren im Aufwand des Handelsbetriebes fehlt. Der Handelsbetrieb kauft die schon erzeugten Waren ein, indem er die Mittel nur für ihre Übergabe den Kunden ausgibt. Die Kosten, die nicht in die Kosten des Handelsbetriebes aufgenommen werden, werden aus seinem Gewinn bezahlt.

Der Aufwand des Betriebes ist im weiten Sinne ein mannigfaltiger Begriff. Man muss die Warenbezugskosten des Betriebes, die Kapitalinvestitionen in die ausgedehnte Grundfondsreproduktion und die laufenden Kosten für die Organisation des Handelsumlaufsprozesses unterscheiden. Die Mittel für den Warenbezug sind für die Realisation und die Vorratsbildung vorbestimmt. Sie werden nicht verbraucht, sondern vorgeschossen, d.h. sie befinden sich ständig im Betriebsumlauf. Sie werden auf Kosten vom eigenen Umsatzkapital und den kurzfristigen Krediten der Bank erstattet. Die Kapitalinvestitionen sind einmalige Aufwendungen, die auf Kosten von den eigenen Mitteln, vom langfristigen Kredit der Bank, der Kreditanstalten, der Organisationen und von den von anderen Betrieben gewährten Mitteln erstattet werden. Der nach den Prinzipien der Marktwirtschaft arbeitende Handelsbetrieb soll sich die Effektivität jeder Art des Aufwandes und ihren Einfluss auf die Kostenhöhe ganz klar vorstellen.

Die Teilung der Kosten nach den Elementen lässt die Aufwendungen der objektivierten und lebendigen Arbeit auswählen und hat deswegen bei der Einschätzung des Betriebsergebnisses eine große Bedeutung.

In der weltweiten Praxis werden aus dem Bestand der übrigen Kosten die Finanzaufwendungen und die Kosten der zukünftigen Perioden in die selbständigen Gruppen der Betriebskosten ausgewählt. Das wäre auch für unsere Betriebe zweckmäßig. Zu den Finanzaufwendungen des Betriebes gehören die Steuern, die Gebühren, die Zuführungen in die Reisefonds, die von der Gesetzgebung festgelegten Kreditzahlungen, die Pflichtversicherungszahlungen des im Bestande von den Produktionsfonds berücksichtigten Betriebsvermögens.

Alle im Bestande von den Umlaufkosten berücksichtigten Aufwendungen und die zu den Finanzbetriebsergebnissen gehörten Aufwendungen werden in der Buchführung vollständig widerspiegelt. In der ausländischen Praxis heißen sie die offenbaren Kosten, weil sie die Form der Geldzahlungen annehmen. Neben den offenbaren (Buchhaltungs-) Kosten gibt es auch implizite Kosten (so heißen sie in der ausländischen Wirtschaft), d.h. die Kosten der

verpassten Möglichkeiten (der entgangene Gewinn).

Die Gruppierung nach den Elementen lässt die Richtung und die Zweckbestimmung der abgesonderten Kosten nicht zeigen. Deshalb entsteht die Notwendigkeit der Erfassung, der Analyse und der Planung der Umlaufkosten nach den Artikeln. So werden die Materialkosten in den Handelsbetrieben in die folgenden Artikel geteilt: die Warenverluste und die technologischen Abfälle; der Verschleiß der speziellen Sanitärkleidung, der minderwertigen und schnell verschleißenden Gegenstände; die Aufbewahrungskosten, die Nachbearbeitungskosten, die Vorsortierungskosten, die Verpackungskosten und die Instandhaltungskosten für den Kühlanlagen. Die Nomenklatur der Ausgabenposten kann ausgedehnt sein. Bei der Konstruktion der Nomenklatur der Ausgabenposten sollen die allgemeine Bedeutung des Artikels, die Gebrauchsfrequenz und ihre Wichtigkeit in der Erfassung, der Analyse und der Planung; die technische Zweckmäßigkeit, der Arbeitsaufwand und die Möglichkeit seiner deutlichen Absonderung (die Berechnung seines Anteils) in der Gesamtsumme der Umlaufkosten berücksichtigt werden.

E.W. Sibirskaia

DER AUFBAU DES ANALYTISCHEN SYSTEMS DER WARENBEWEGUNG

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Im System der Marktverhältnisse hängt das standfeste Funktionieren der Apothekenorganisationen in erster Linie vom Bestand und von der Struktur der Warenbestände und von der Methodik der Verwaltung ihrer Bewegung, sowie vom Handelssortiment ab, das der Bevölkerung zum Verkauf im Einzelhandel angeboten wird und den Erwartungen und den Vorstellungen der zweckbestimmten Zuhörerschaft entsprechen und als der Schlüsselfaktor der Konkurrenzfähigkeit des wirtschaftenden Subjektes auftreten soll.

Die Erhaltung und die Stärkung der Marktpositionen zwingen jedoch unter den Bedingungen der Sättigung, der ständigen Veränderung des Sortiments, des Wachstums der Bedürfnisse der Käufer und der Verstärkung der Konkurrenz sowie zwischen den Einzelhandelsbetrieben, die die abgesonderten Gruppen der parapharmazeutischen Waren realisieren, als auch den Apothekenorganisationen die Letzten, die neuen Methodiken der Verwaltungserfassung für die Entwicklung in der Konkurrenzumgebung zu suchen.

Eine der solchen Richtungen ist der Aufbau des Systems der Verwaltungserfassung und der Analyse der Warenbewegung in der Handelstätigkeit einer Apothekenanstalt. Der wirkungsvolle Aufbau solchen Systems lässt den Apothekenorganisationen in Anbetracht der Anfragen und der Präferenzen der Kunden zu, die standfesten Konkurrenzpositionen zu erobern.

Der Betrieb Deine Gesundheit GmbH verwirklicht die pharmazeutische Tätigkeit, die den Großhandel und Einzelhandel von den Heilmitteln und den Erzeugnissen der

medizinischen Zweckbestimmung einschließt. Die Hauptobjekte der Buchführung des studierten Betriebes sind die Waren. Von der Stufe und der Rhythmik der Ausführung der Planaufgaben nach der Realisation der Warenbestände hängt das Umlaufkostenniveau und der Gewinn der betrachteten Organisation ab.

Im Betrieb Deine Gesundheit GmbH verwirklicht sich die Kontrolle über die Warenbewegung mit Hilfe der Bildung der Register in der operativen Erfassung und der Buchführung, die in den Programmen "1S: Der Betrieb 7.7 Der Handel und das Lager" und "1S: Der Betrieb 7.7 Die Buchführung" geschaffen wurden.

Ein Bestandteil des Mechanismus der Warenbewegung ist im Betrieb Deine Gesundheit GmbH die Verfahrensregelung der Warenbewegung, die die Konkurrenzfähigkeit der Waren und die Wechselwirkung mit der äußerlichen Umgebung gewährleistet.

Das Steuersystem fängt mit der Angebotsmarktanalyse und der Analyse der Kosten und der Zuverlässigkeit der Lieferungen an. Die Marktanalyse des Angebots schließt die Auswahl der am meisten optimalen Lieferanten der Waren im Betrieb Deine Gesundheit GmbH ein. Dazu studiert der Apothekenleiter täglich die Preislisten einiger Lieferanten zwecks der Entdeckung der minimalen Preise der für den Einkauf notwendigen Waren. Die Preislisten werden in elektronischer Form durch das System des Internets gewährt und periodisch erneuert.

So verfügt der Verwaltungsapparat des Betriebes Deine Gesundheit GmbH täglich über die termingemäßen und letzten Informationen über den Angebotsmarkt für die Waren, die für den Verkauf notwendig sind, sowie über ihr Wert.

Zugrunde der Aufgabe nach dem Einkauf der am meisten wirtschaftlich wirkungsvollen mengengerechten Heilmittel liegt die Zusammenstellung der Liste der wichtigsten Heilmittel und der Mittel der medizinischen Zweckbestimmung und die Bedarfsermittlung nach jeder Position. Zugrunde der Versorgung der termingemäßen Lieferung liegt die mengengerechte Beförderung der Warenbestände auf das Lager des Betriebes Deine Gesundheit GmbH entsprechend dem Lieferungsvertrag. Für die Versorgung der niedrigsten summarischen Versorgungskosten berücksichtigt der Betrieb Deine Gesundheit GmbH nicht nur die tatsächlichen Ankaufspreise, sondern auch die verborgenen Verluste wegen der Nichterfüllung der Lieferungen, der Beschränkungen nach den Gebrauchsfristen und die Lagerkosten.

N.V. Sirotkina
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FORMATION OF A MOTIVATIONAL SUSCEPTIBILITY OF HUMAN RESOURCES

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Modern level of a competition demands from the enterprises and the organizations of use new high-efficiency technologies, the modern equipment, and the main thing of the qualified personnel, capable to carry out manufacture of competitive production with the

least costs and with high economic benefit.

There is a set of approaches to classification of methods of motivation. The most widespread is allocation of administrative, economic and socially-psychological methods of motivation. Administrative methods have direct character of influence on the person in the organization as mean obligatory execution of orders, instructions, orders. They are focused on such motives as call of duty, the aspiration to work in the certain organization etc. By means of economic methods is carried out process of material stimulation.

Socially-psychological methods assume two directions of influence on behavior of the worker. On the one hand, they are directed on formation of a favorable moral and psychological climate, with another – on disclosing of abilities and potential of each worker.

With a view of research we had been analyzed motivation of workers of the metallurgical enterprises belonging to various social groups. As a result of poll it has been established that the motivation reflecting values of market economy (strengthening of communication of earnings with results of work), is characteristic for men 25-39-летнего age. The youth gives more value of a creative part of work. For women at the age of 40-49 years narrowing of motivational sphere is marked, for them absence of threat of dismissal, hence, the basic motivational requirement of this group - safety and security becomes valuable motive of labor activity.

More than 40 % of the interrogated workers of the basic and auxiliary manufacture have answered what to work better and with more return by it also would help confidence of stability of the workplace and absence of threat of reduction. It isn't casual, as the market, creating flexible system of motivational mechanisms of intensive and high-efficiency work, at the same time doesn't guarantee the right to work, the income and social protection.

The general law which is traced at all groups of respondents, presence of strongly pronounced material requirements is, but not less important place is occupied with the guarantees of safety especially peculiar to workers and employees, begun the labor activity at a planned economy of the USSR.

Considering developed on the branch enterprises the motivational environment, heads of the enterprises should use three major factors in the activity:

- 1) satisfaction of material requirements, that is provision of economic incentives;
- 2) positive or negative stimulus depending on the concrete situation connected with motives of safety, - staff reduction or, on the contrary, satisfaction of requirement of workers in confidence of the employment at the enterprise.
- 3) social adaptation, satisfaction of social requirements and requirements for participation, respect and self-expression.

The technology of creation of the motivational mechanism should include an estimation of factors internal and environment; modeling of prospects of development of motivational system of the organization; selection of methods of motivational influence; working out of recommendations about their use.

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TO THE QUESTION OF STRATEGY CHOICE FOR INNOVATIVE DEVELOPMENT OF A FOOD FACTORY

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To provide effective factory's innovative development it's necessary to take such measures as planning of innovation processes, it's system organization, exercising control over making innovation decisions and appraisal of obtained results with a glance of plenty of endogenous and exogenous factors of development. The integrated measure, which provide long-term development and harmonization of economic-organizing activity, is formation and realization of innovative development's strategy.

According to the authors' opinion, the choice of rational strategy of factory's innovative development combines the system of views on factory's strategic innovative development management process as efficient combination of managerial impact on innovative activity's dynamics in spatio-temporal aspect with allotment of innovative strategy's genesis, it's purposes and problems, essence and substance, and also principles, forms and methods of it's realization on basis of innovative activity's development.

The choice procedure of effective strategy of factory's innovative development (ID) consists of different stages which starts with awareness of necessity of strategy generation and ends with measures of appraisal of it's effectiveness and provision of it's permanent development. The procedure is presented generally and may be adapted to any economic system. It's necessary to take into account some specifics for food factory's operation during realization of the chosen strategy of ID: 1. Quality improvement of new production by force of permanent renewal of norms and standards of food production and usage of foreign experience. 2. Implementation of management innovations in food factories on basis of process control of new production output, control automation and wide using of information technologies. 3. Implementation of technical innovations guiding to reduction of production cycle's duration, reduction of waste products and increase of effectiveness of waste treatment without quality degradation of food production and production's expiration dates. 4. Improvement of provision of food processing with raw material on basis of implementation of logistics' principles in direction control and flow control. 5. Application of resource-saving technologies (innovative methods of microbiological and biochemical treatment) for reduction of operating charges of food factories. 6. Improvement of technologies of food stuffs' keeping, prepacking, container and packing for the purpose of damage minimization during storage and transportation of raw material for food processing and finally for cost reduction. 7. Improvement of environmental safety of food processing (mass and medioprophyllactic) in the refusal to use genetically modified ingredients but with a glance of modern biomedical requirements. 8. Production of "healthy" food and development of bio clean food factories as competitive advantage in holding, expansion of trade area on basis of implementation and diffusion

of innovations. 9. Application of organizational innovations in food factories by force of clusterization, combination of integration principles, specialization, cooperation, integration of commodity producers, suppliers, consumers. 10. Attraction of investment resources for the purpose of financing of modernization and renewal of basic capital of food factory.

The authors sorted out the following stages which allow to identify the procedure of choice of rational strategy of ID: 1 stage. Genesis of strategy of factory's ID. 2 stage. Analysis and choice of strategical alternatives. 3 stage. Determination of innovative field and separation of basic strategical and tactical elements. 4 stage. Formation of strategical innovative field and determination of the strategy. 5 stage. Formation of tactical innovative field and working-out of tactics. 6 stage. Rationalization of strategy of factory's ID in economics' modernization. 7 stage. Realization of measures of food factory's permanent ID.

The basic points of the strategy's choice are goal-setting, formulation of strategy of ID, strategy's modelling, it's realization with a glance of development of innovations, increase of effectiveness of strategical innovative development.

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DEVELOPMENT OF THE CONCEPT OF CLIMATE CHANGE AND ITS EFFECTS ON HEALTH OF THE POPULATION OF THE REPUBLIC OF KAZAKHSTAN IN THE XXI CENTURY

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The change of climate is a problem not only for today, but perhaps more largely a problem of the future. Compared to other environmental hazards this type of "environmental burden of disease" is much more difficult to monitor and evaluate. Climate change has caused approximately 150 000 deaths and a loss of approximately 5.5 million life years, disability-adjusted (index DALY-Disability Adjusted Life Years) in the world, in this case took into account only the effect of acute intestinal diseases (dysentery and other diarrhea) malaria, as well as deaths and injuries as a result of flooding. In 2000, the share of climate change accounted for approximately 2.4% of cases of acute intestinal diseases worldwide and 6% in some middle-income countries. According to internationally based data on disasters and catastrophes OFDA/SRED, from 1975 to 2000 during periods of extreme heat killed approximately 2,000 people. Prolonged heat in the summer of 2003 in Europe has caused deaths in many countries. During this time, according to WHO, the number of excess deaths had reached 14 thousand in France, 4 thousand in Italy, 6 thousand in Spain, more than a thousand in Portugal. Suffered from the heat and residents of Germany and the UK, but quantitative estimates have not yet been published. Now consider the global

warming, along with such well-known risk factors for health such as smoking, drinking, overweight, low physical activity, etc.

In order to develop the state programs for the prevention of the adverse effects of climate change on the health of population of the Republic of Kazakhstan and adaptation requires the combined efforts of doctors, ecologists, climatologists, meteorologists, hydrologists and experts in modeling and forecasting. In this study, the priorities are as follows:

- The development of National Plan of measures to reduce the negative impacts of climate change on public health in Kazakhstan.
- The assessing of the impact of climate warming on the ecology of infectious and parasitic diseases that pose the greatest threat to the health of the population of Kazakhstan, their vectors and reservoir hosts based on a special monitoring carried out at points of constant observation.
- Organization of special studies on the effects of climate changes on epidemic process and to identify features of infectious and parasitic diseases (malaria, encephalitis, ixode borreliosis, rickettsial, hemorrhagic fevers, parasites and other infectious diseases).
- The assessing of the impact of climate change on air quality and drinking water in regions of Kazakhstan.
- The assessment of the impact of high air temperatures on human health, the flow-tion of diseases, the study of pathogenetic mechanisms of development of pathological conditions and their treatment.
- The assessing of the impact of high temperatures on the health of the population, the frequency of uptake of ambulance services, the frequency of hospitalization for the disease, the causes of deaths from coronary heart disease (CHD), diabetes, respiratory diseases, accidents, suicides and murders.
- The assessment of the impact of launch vehicles launch from the cosmodrome "Baikonur" on climate change and health along the route of flight
- The assessing of the impact of changes in tropospheric ozone on human health.
- Improving of education and training specialists, systems epidemiological surveillance, training of medical personnel.
- Development of new methods of diagnosis, treatment and prevention of most weight-cial conditions in the changing climatic conditions. Assessment of the economic consequences of climate change impacts on the health of the population of Kazakhstan in the whole country, in the most troubled regions and risk groups (age, social, professional and other).
- The assessment of the impact of climate warming on the maintenance of air-pollution substances, especially in cities located in unfavorable environmental conditions (ex, Karaganda, Ust-Kamenogorsk, Shymkent, etc..) and having the largest sources of pollution.
- The evaluation of tropospheric ozone in urban areas with significant sources of pollution, and located in the south.
- Participation of Kazakhstan scientists in projects on evaluation of negative impact

of climate change on human health, carried out by WHO, the World Bank, the UNO Environment Program.

The meeting of these challenges will promote the active involvement of science in preserving the health and quality of life of citizens of the Republic of Kazakhstan.

In the first report of the Intergovernmental Panel on Climate Change (1991) on threats to health mentioned only in passing, but in the Third Report of 2001 [2] and in the fourth to be prepared at the present time, health issues are considered along with other key topics. In October 2003 in Moscow at the World Conference on Climate Change, representatives of WHO presented the main results of an international project to study the effect of warming on human health. On behalf of WHO Dr A. Haynes said: "We must recognize the higher priority issues in health policy debates on climate change".

In Kazakhstan, the data of climate change and its effects on health are not available. There are only a few data on warming and flooding in Almaty, East Kazakhstan oblasts in 2010, which determines the need for research in this direction. The data of KAZHYDROMET about temperature change and other parameters, as well as study and analysis of morbidity regions of Kazakhstan will allow the timely development and implementation of preventive measures.

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ECOLOGICAL-AND-HYGIENIC ASPECTS OF SOIL PROTECTION PROBLEMS

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During a long period of time a proper attention was not paid to the fulfillment of the hygienic standardization of the content of the contaminants in soils.

At present there are the most severe standard requirements to the agricultural soils because in case of the over standard contamination they become the powerful sources of the intake of dangerous substances into the plants and later through the food chains to a human and an animal. That's why the present elaborated standards for chemical contaminants in a soil regard only the agricultural lands.

Though, a soil, as a depot of the accumulation of chemical ingredients and products of their transformation which can affect directly and indirectly both health, conditions of the population residence and natural environments adjoining to it, should be considered as the most significant component that needs a wider investigation and study.

Sanitary soil state at the territories of the inhabited localities of Ukraine of non-agricultural purpose largely complies with the environmental state of a definite place and depends upon the levels of anthropogenic-and-technogenic load of negative factors and therefore cannot be assessed by such severe criteria for the soil for the growing of the agricultural crop existing today.

Accumulation of the contaminants in soils largely depends not only upon the sources of the emissions of these substances but upon such soil indices as a content of organic substance, capacity of cation exchange, pH value, granulometric content, and also upon natural conditions of localities etc.

In this connection standardization of the contaminants in the soils of urban localities needs the new approaches taking into account physical-and-chemical properties of soils (content of organic substance, capacity of cation change, pH value, granulometric content etc.) for the creation of the safe conditions for vital functions and maintenance of the quality of the environment by means of the determination of soil categories. It will allow to use more rationally existing free territories and releasing territories of sanitary-and-protective zones for industrial or civic building, creation of park zones, children's playgrounds etc.

We have determined that under modern conditions heavy metal salts, oil products, biological factor (geohelminth eggs) are the prior soil contaminants.

One of the most morbid problems for Ukraine, where there are about two-thirds of the world fund of black earth, is a decrease of the fertility of agricultural soils. It stipulates by a loss of the humus component in a soil composition. For the recovery of this important soil function it is necessary to fill up the content of the organic component. One of the possible way for the solution of the problem is a use of both organic manures of a sludge, especially of large cities, where the largest number of the population is accumulated, and also organic waste (manure, excrement etc.) of the large cattle-breeding enterprises and the poultry farms which are being developed very actively in Ukraine.

All mentioned above testifies about the necessity of the revision of the standard indices for the content of the contaminants in soils at the territory of the urban inhabited localities because under modern conditions it is impossible to maintain the established standards for agricultural soils.

T.D. Strelnikova

ENERGY SAVING BULBS UTILIZATION POSES A SERIOUS PROBLEM IN LIPETSK

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Power consumption and energy efficiency in the state sector — business, social service and housing — is one of the Government's top priorities. The Federal Act of November 23, 2009 stipulates step-by-step replacement of incandescent bulbs with energy saving ones.

The survey of 2008 shows that the use of incandescent bulbs amounts to 52% of the total number of bulbs used in Russia. Apart from halogen bulbs making 1% of

the remainder, energy saving mercury bulbs make 47% of this amount. They include low pressure straight fluorescent tubes used for indoor lighting (30%), high pressure mercury bulbs (DLR, DNaT lamp types), used outdoors (10%), and compact energy saving incandescent bulbs (6%).

In Russia and abroad much attention is attached to the development of a special mercury waste utilization network enabling to remove mercury waste from the waste flow to be later processed at specialized facilities. However of the 70 mln burnt-out mercury bulbs only 40% are processed annually. Some regions like Moscow and the Moscow region are exceptions: there 85% of mercury bulbs are processed. According to public opinion polls, 80% of Russians realize the significance of the power efficiency issue and 55% support the president's initiative aiming at transition to the use of energy saving bulbs.

In a standard apartment if not regularly aired (for example in winter) one damaged energy saving bulb may cause 160 times temporary increase of an admissible concentration limit.

We have been facing the problem of mercury bulbs collection and utilization for a number of years now. Over the last decades we have been trying to arrange collection of burnt-out fluorescent bulbs.

Though the Act was passed and the President called upon the population to start replacing old bulbs with new ones its negative effect has never mentioned.

Nowadays burnt-out bulbs are thrown away together with household waste and then disposed off at solid waste landfills due to the irresponsibility of people, lack of relevant information and absence of centralized processing network.

As specialized collection centres are not available in a requested quantity burnt-out compact fluorescent mercury bulbs are disposed off together with garbage polluting chutes, dumps and the environment with mercury.

Like other fluorescent bulbs broken compact energy saving bulbs containing around 2 to 7 mgs of mercury pose a serious threat to the environment and people as the admissible concentration level of mercury in the atmosphere of populated areas amounts to 0,0003mg/m³.

An environmentally friendly lifestyle involves responsibility and concern about natural resources. Energy saving bulbs and compact fluorescent bulbs have a lot of advantages over standard incandescent bulbs. A higher price of energy saving bulbs quickly pays its way thanks to saving a fivefold amount of energy and a long lifetime (up to 8 years) when used 3 hours per day. It is also believed that power saving bulbs tend to distribute light more evenly.

Transportation of bulbs must be carried out by professionals, in compliance with the guidelines for dangerous goods handling. Mercury bulbs must be transported in special containers. Collection of mercury bulbs must be organized in all federal subjects and financing must be provided by regional budgets.

The Federal Act doesn't cover the issue of material incentives for taking mercury bulbs to collection facilities. It doesn't regulate the arrangement of burnt-out fluorescent lamps collection by community facilities.

The lifetime of energy saving bulbs depends on operating regime. Frequent switching "off" and "on" damages them. Their construction doesn't allow them to be used in lamps with a brightness level regulator. If line voltage is more than 10% lower than standard energy saving bulbs don't work.

One of their drawbacks is that they contain, though in small amounts, mercury and phosphorus which doesn't affect one when a bulb is switched on but may appear dangerous if a bulb is broken. It is what makes energy saving bulbs environmentally harmful, requiring a special utilization system. They must not be thrown into chutes and garbage containers.

Energy saving bulbs utilization poses a serious problem in Lipetsk. How do people utilize a burnt-out mercury bulb? I am certain they simply put it into their garbage can.

There are usually no less than 4 lamps in an apartment depending on the number of rooms. Roughly, 15 thousand mercury bulbs per month are sold in the town every year. It's a large number. And in a year or two they will be taken to a dump close to your house.

The consumer, though, should not to be blamed as no information about mercury bulb utilization rules is available (it applies both to fluorescent and smaller energy saving bulbs).

People seem to realize that there is mercury, a highly toxic substance in the bulbs, and they must not be put in the garbage. But where are they to be disposed off? There are no guidelines, salespeople keep silent about the danger of the bulbs so as to sell more of them, there are no signs on garbage containers and utility companies are not interested in anything except bills being paid. Therefore the grave problem is hushed up.

The biggest problem is that there are no mercury bulbs collection facilities where any person can take them to free of charge. You can take them to the «Util» company for 20 roubles a piece. Thus buying a bulb at a price 60 roubles a piece, you are to spend extra 20 roubles so that it could be later utilized properly. It means that you are to pay for the utilization of highly expensive bulbs which are forced over the population in accordance with the Federal Act, banning traditional bulbs. Currently a brand new demercurization facility is under construction in Lipetsk. Now people in Lipetsk have to either throw them away or sell them to the «Ecoprom» company.

Paying lip service to environmental protection the local authorities are reluctant to contribute to construction of mercury bulbs collection facilities.

A possible reason for this is that energy saving bulbs are being promoted by at the federal level to reduce power consumption and it is not politically correct to speak of the problems of utilization. The resulting economy also raises doubts.

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V.A. Burkovskaya

SOCIALIZATION OF THE INDIVIDUAL IN ECOLOGICAL TOURISMS

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The problem of harmonious interaction of the individual and nature during the epoch of scientific and technological revolution embraces all the sides and spheres of life of society. Modern society is faced with the task of raising the level of ecological education, and first of all, of the rising generation.

Today ecological socialization as a way of accustoming a man to rational, socially and individually justified norms of interaction with the environment and its protection is not only the task of educating the rising generation, but “a must” for each conscious and unconscious of social obligations inhabitant of our country.

At present one of the most essential aspects of ecological socialization under the aspect of law is the knowledge and understanding of the people of the legal and administrative responsibility of the legislation in respect of the violation of nature.

Nowadays the role of ecological tourism can scarcely be exaggerated since for the last decades it is possible to watch the following trends:

- direct economic effect of tourism on all the key sectors of economy, all the spheres of life of society;
- great social significance of tourism; at the present stage of development the aim of the tourist service is solving social tasks;
- exceptional stability of tourism against the influence of unfavourable factors during its historical development.

In the research conducted among the students of Yelets Branch of ROSNOU one of the points of the questionnaire contained the question: “Which of the views below concerning the attitude towards nature reflects your personal opinion better and more precisely?” The opinions of the respondents were divided in the following way: the majority of the students (65, 9% of the respondents) treat the nature with great respect, regard it as the beginning of everything. Some of the asked (19, 1%) perceive themselves and nature as equals being of the opinion that there should not be any swinging to either side. Such a position is most likely an echo of a pragmatic attitude towards nature from the last century. People justifying their barbarian treatment of nature put themselves on the same level of development.

There was another question in our study dedicated to ecological issues: “Is there, in your opinion, a system of ecological public education for the grown-ups outside the educational institutions?” The results are given below:

1. Such a system exists – 17, 5%.
2. There are only separate elements of it – 31, 9%.

3. The system does not exist, though it is in great demand – 45, 9 %.
4. The system does not exist and there is no need in its existence – 1, 8 %.
5. Experienced difficulty in answering and did not answer – 26 %.

As one puts it, no extra comments are needed.

The aspects of ecological socialization in different fields of man's life constitute, no doubt, only part of all possible forms and ways of participation of the people in this, socially significant work. Any of the shown ways can be extended and supplied with details through the system of factual knowledge, skills, acquired habits received from different subjects of socialization.

The sphere of tourism and rest occupies a considerable place in the life of a person, and the study of mechanisms of acquainting with the norms and roles, stereotypes of economically conditioned behavior as well as the formation and development of abilities, skills and individual styles in the sphere are of great importance. One of the aspects of research of economic socialization can be dedicated to the study of motives when choosing the way and place of travelling.

In case of breaking any ecological law it is important today to keep in mind possible damage to a man, which could worsen his physical and mental health according to the formula: "As you make your bed, so you must lie in it."

Nowadays ecological tourism is actively developing since preserving the favourable conditions of the environment becomes an urgent task. Apart from this, there are a lot of people who due to urbanization and industrialization start to experience demand for contact with nature. At the same time ecological tourism should contribute to restoration and conservation of a traditional way of life of local population, its culture and ethnical peculiarities. Thanks to its great tourist and recreational potential, and increased demand for ecological tours this type of tourism has particular prospects.

O.A. Strojewa

DIE INTEGRATION ALS EIN LEITUNGSINSTRUMENT VON DER REGIONALEN FACHWIRTSCHAFT

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Heutiger Zustand der Volkswirtschaft wird von den großen Veränderungen charakterisiert. Mit der Entwicklung und der Vertiefung des Wirtschafts föderalismus werden die Rechte der Regionen in den Wirtschafts- und Finanzsphären ausgedehnt. Deshalb ist die qualitative Verwaltung der regionalen Fachwirtschaft zwecks der Entwicklung der Regionen im sicheren und standfesten Regime eine strategische Hauptaufgabe des ganzen Landes und unter anderem jeder Region. In diesem Zusammenhang ist das vollere Studium solchen Leitungsinstruments von der regionalen Fachwirtschaft wie die Integration notwendig.

Die Volkswirtschaft des Landes wird als System durch die Wechselbeziehung und die

Wechselwirkung der Regionen realisiert. Die Region ist ein großes Landesgebiet mit den mehr oder weniger gleichartigen Naturbedingungen und der charakteristischen Ausrichtung der Produktivkräfte aufgrund der Kombination des Komplexes der Naturschätze mit der entsprechenden ausgeprägten und perspektivischen materiell-technischen Basis, der Produktions- und Sozialinfrastruktur.

Dabei kann sich der Wirtschaftszustand jeder Region im Einzelnen auf verschiedenen Niveaus der Entwicklung befinden. Diese Unterschiede sind von einer Reihe der objektiven und subjektiven Faktoren bedingt: die physikalisch-geographische Lage (die Lage in Bezug auf die natürlichen Hauptobjekte der Erde); die Transport-geographische Lage (die Lage in Bezug auf das Transportnetz); die industriell-geographische Lage (die Lage bezüglich der Energieträger, der Zentren der verarbeitenden Industrie und der wissenschaftlich-technischen Basen); die agrargeographische Lage (die Lage bezüglich der Lebensmittelbasen und der Hauptzentren des Konsums landwirtschaftlicher Erzeugnisse); die Marktlage (die Lage bezüglich der Absatzmärkte); die demographische Lage (die Lage bezüglich der Bevölkerungskonzentration, der Arbeitsressourcen und der wissenschaftlich-technischen Fachkräfte); das Natur- und Ressourcenpotential (die sicheren Vorräte der Bodenschätze, die Land-, Wasser- und Waldressourcen).

Deshalb sind einige Regionen "die Lokomotiven" der Wirtschaft des Landes, und die anderen bremsen ihre Entwicklung auf jede Weise.

In solcher Situation ist die Verwaltung der regionalen Fachwirtschaft auf die Nutzeffektssteigerung des Funktionierens der Wirtschaft der Regionen, die Abflachung der Unterschiede der regionalen Entwicklung und die Erreichung solchen Zustandes der Entwicklung der Elemente der regionalen Fachwirtschaft gezielt, der den strategischen Interessen der wirtschaftenden Subjekte entsprechen würde. Das kann man auf solche Weise erreichen: durch die Versorgung der ausgedehnten Reproduktion der Bedingungen der Lebenstätigkeit der Bevölkerung des Territoriums, des hohen Lebensniveaus und der Lebensqualität der Menschen; durch die Wirtschafts- und Sozialtransformation der Wirtschaft des Territoriums, der Analyse, der Prognostizierung und des Programmierens der regionalen Entwicklung; durch die Optimierung der Finanzströme, die Bildung der Bedingungen und des Mechanismus der Stärkung der Wirtschaftsbasis der Region; durch die Versorgung der ökologischen Sicherheit, des Umweltschutzes; durch die Bildung und die Realisation der strukturellen Politik, der Investitionspolitik und der wissenschaftlich-technischen Politik; durch die Bildung und die Entwicklung der regionalen Marktinfrastruktur; durch die Entwicklung des Wirtschaftsföderalismus und der interregionalen Integration, durch die Versetzung einer Reihe der Reformrichtungen hauptsächlich auf das regionale Niveau (besonders in der Förderung der Entwicklung des kleinen Unternehmertums, der sozialen Sphäre, des Naturschutzes und der Nutzung der Naturschätze).

Die Bildung der Konkurrenzvorteile und die Entwicklung der Konkurrenzfähigkeit der Regionen ist eine grundlegende Voraussetzung für die Verbesserung der qualitativen Parameter des Wirtschaftswachstums, die mit den strukturellen Transformationen in der Industrie, dem landwirtschaftlichen Sektor, in der Finanzsphäre verbunden sind. Sie spielen

eine ernste Rolle in der Herstellung der regionalen Wirtschaftspolitik, die auf die Interessen der Bürger ausgerichtet ist, die fähig sind, die würdigen Lebensumstände auf dem regionalen Raum des Landes zu schaffen.

Die fachmännische Verwaltung der Regionen lässt zu, die Effektivität der ganzen nationalen Wirtschaft zu erhöhen, denn:

1. Die hohen Wachstumsraten einiger Regionen führen zur bedeutenden Kapitalakkumulation und dehnen das Investitionsvolumen in andere Regionen aus.

2. Dank der regionalen Fachwechselwirkung wird der Mangel an den bestimmten Ressourcen in einer konkreten Region auf Kosten von der Überströmung dieser Ressourcen aus anderen Regionen kompensiert. Das gewährleistet die Kontinuität des Reproduktionswirtschaftskreislaufs.

3. Es entstehen die günstigen Bedingungen für die volle Nutzung der Vorteile der Wirtschaft jeder Region.

4. Es öffnet sich die Möglichkeit, die Erzeugnisse im Hinblick auf den umfangreicheren Markt zu produzieren und im breiteren Marktraum zu arbeiten.

Schließlich soll die Verwaltung der regionalen Fachwirtschaft zur Spezialisierung der Wirtschaft der Regionen führen, aber es ist unmöglich, das ohne Integration zu erreichen.

O.A. Strojewa

Die innovative Entwicklung der regionalen Wirtschaftssysteme

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Die regionale Fachintegration ist ein Prozess der Bildung der optimalen Struktur der nationalen Wirtschaft mittels der zielgerichteten Einführung der für die Integration notwendigen Elemente der Wirtschaftskoordination und der Unifizierung, für die Beseitigung der künstlichen Hindernisse, die die Bildung des günstigsten Zustandes bremsen.

Die regionale Produktionskooperation stellt solche Form der Produktionsorganisation dar, bei der die Arbeiter verschiedener Regionen an demselben Produktionsprozess (oder in verschiedenen Prozessen, die miteinander verbunden sind) gemeinsam teilnehmen.

Die regionale Fachintegration soll also als objektiver, begriffener und gerichteter Prozess der Annäherung, der Anpassung und der Verschmelzung der Regional- und Fachsysteme mittels der Stärkung ihrer beiderseitig vorteilhaften Wirtschaftszusammenarbeit aufgrund des freien Handels, der freien Bewegung der Produktionsfaktoren und der Koordination der Politik verstanden werden.

Die Hauptobjekte der Verwaltung sind unter den Bedingungen der Integration der regionalen Fachwirtschaft die Arbeitskräfteressourcen, die grundlegenden Zweige, sowie die institutionell-rechtliche Organisation, die haushaltsfinanziellen Institute. Als Subjekte der Verwaltung treten die juristischen und natürlichen Personen, die öffentliche Hand des vorliegenden Territoriums auf, die zum Prozess der Integration zugezogen sind.

Die regionalen Fachvereinigungen sind mehr stabil und sicher und im kleinsten Maße dem Einfluss der zufälligen Faktoren auf Kosten von der Existenz der Funktionen der strategischen Planung unterworfen, haben die besten Perspektiven der Produktionsdiversifikation. Sie können die eigenen Investitionsfonds bilden, die für die Realisation der perspektivischen Projekte notwendig sind.

Bei der Verwirklichung der Integration der Regionen wird die Aufgabe der maximal wirkungsvollen Potentialnutzung jeder Region gelöst, d.h. der Effekt der ganzen Integrationsbildung, als auch der Effekt jedes Teilnehmers der Integration werden maximiert.

Außerdem führt die regionale Fachintegration zu:

1. der Maßstabsersparung. Der vorliegende Effekt lässt zu, die Einheitskosten bei der Einteilung der konstanten Kosten auf die größere Zahl der erzeugten Produkte herabzusetzen. Es handelt sich darum, dass die Hochtechnologieproduktion die hohen Anfangsinvestitionen fordert, die sich decken werden, wenn die Produktion großräumig wird. Sonst wird der hohe Preis den Käufer abschrecken.

2. dem Entstehen des synergetischen Effektes, d.h. dem Erscheinen der Zunahme des vereinten Effektes, der von der gemeinsamen Tätigkeit der integrierten Strukturen bekommen ist und die Summe der individuellen Effekte aller Teilnehmer der Integration übersteigt, die berechnet ist, als ob sie die isolierten Organisationen waren.

Die Hauptquellen (die Faktoren) des Synergismus können im integrierten System die Folgenden sein: das Vorhandensein der einheitlichen Elemente in der Konstruktion der hergestellten Produkte; die Vereinigungsmöglichkeit dieser oder jener Glieder der technologischen Ketten; die Vereinigungsmöglichkeit dieser oder jener Prozesse der Lebenszyklen der Erzeugnisse / der Technologie (zum Beispiel der Projektierung, der Tests, des Absatzes); die Vereinigungsmöglichkeit der abgesonderten Leitungsfunktionen und Leitungsaufgaben, sowie der technischen, informativen und normativen Verwaltungsbasen; die gegenseitige Eröffnung der Kanäle der kaufmännischen und wissenschaftlich-technischen Informationen, die die Austauschbeschleunigung der Neuerungen und der Spitzenerfahrung, die Einsparung von der Vereinigung der Datenbanken und die Erhöhung der Geborgenheit von der rückläufigen Einwirkung der Konkurrenten auf Kosten vom mehr qualifizierten Ausscheiden (der Filtrierung) der äußerlichen Informationen gewährleistet; die Harmonisierung der firmeninternen Standardisierung.

3. der Kürzung der Transaktionskosten, denn die Kosten, die mit den Marketingmarktforschungen, der Suche der Käufer der Erzeugnisse verbunden sind, werden infolge der gemeinsamen Tätigkeit im Hinblick auf jede Subjekte der Integration verringert. Ein Teil der Erzeugnisse wird vom System gekauft werden.

4. Der strukturellen Umgestaltung der Wirtschaft der Region. Das beschleunigt ihre Wachstumsrate.

Das Einbeziehungsgrad der Region in den Integrationsprozess mit dem Wirtschaftssystem anderer Regionen soll durch die Auffindung des optimalen Punktes zwischen dem Stabilitätsniveau und dem Höchstgewinn bestimmt werden, den die wirtschaftenden

Subjekte der Region infolge der Erweiterung der Integrationszusammenarbeit herausziehen können.

Die Einschätzung der Verwaltung der Integrationsprozesse der Regionen wird also auf der Einschätzung der folgenden Parameter gegründet: die Maximierung des Höchstgewinnes, den die wirtschaftenden Subjekten des Wirtschaftssystems der Region infolge der Integrationsprozesse bekommen; die Minimierung der negativen äußerlichen Effekte, die mit den Integrationsprozessen verbunden sind; die Optimierung der institutionell-rechtlichen Umgebung als Grundlage der Entwicklung der Integrationsprozesse.

Die Integration ist eine grundlegende Komponente solchen Begriffes wie die Anpassungsfähigkeit. Auf den ersten Entwicklungsstadien tragen aber die regionalen Fachintegrationsprozesse den spontanen Charakter und haben keine ausreichende vertragsrechtliche Basis. Es bildet sich die Situation, die den strategischen Aufgaben der Wirtschaftsentwicklung und den Interessen der strategischen Entwicklung des Wirtschaftssystems der Region nicht entsprechen kann.

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A.L. Podolsky
S.V. Bobyrev

THE SYSTEM APPROACH TO ENVIRONMENTAL EDUCATION AT THE DEPARTMENT OF ECOLOGY

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Steady economic development in Russia can only be maintained by an implementation of the policies providing environmental safety for the present and future generations and sustainable environmental management. Elevated levels of energy and resource use in the course of many modern technological processes lead to the increased environmental risks. Intensified manufacturing is often accompanied by the accelerated rates of natural resource use. At present, natural resources are depleted at higher rates than they can be restored. One of the main causes of resource depletion is an absence of truly responsible approach to environmental management by resource users. Future natural resource managers to come are expected to have a proper environmental awareness to ensure responsible environmental management. Environmental awareness as a system of human knowledge is not axiomatic: it needs to be developed, substantiated, and adjusted to the specific regional conditions and environmental management policies and legislation. Currently, university education in the Russian Federation includes ecology-related disciplines as obligatory courses for all fields of study. Teaching the system of ecological disciplines requires an availability of advanced laboratory equipment and methodology along with the development of innovative approaches to environmental education. The Department of Ecology at the Saratov State Technical University (SSTU) is in charge of these.

The system of continuous environmental education in SSTU is designed to train environmental scientists and engineers along with environmental managers. Besides training undergraduate students, Department of Ecology teaches graduate students and

is also involved into the environmental education of school students. We consider the development of mathematical models of the processes occurring in regional ecosystems to be the backbone factor of environmental education at the university level. Thus, training of the environmental managers should include teaching them knowledge and skills necessary for using physical and mathematical approaches in their future work. With this goal in mind, we developed the information system combining databases and applied models. Structurally, this system includes the following components:

- The equipment and devices used by our students for measuring the environmental variables.
- Gauges, converters of signals and codes, programming interfaces, and computers used as a system of environmental monitoring.
- The software controlling the databases and an expert system for analytical data management operating on the data reflecting the condition of ecosystems. The expert system produces managing decisions ensuring the rational and responsible resource management.
- The device drivers providing interaction of the technical devices.
- The teaching methods stimulating independence of the students at studying natural resource management.

We used the model-based imitation learning approach to teaching ecological disciplines through the interactive multimedia training environment including the imitation models of the regional ecosystems. This approach allowed us to train our students by conducting research in virtual training space along with conducting field studies. With a progress of the learning environment, the models built from the data obtained in actual field studies become more informative and complicated. The Department of Ecology at SSTU uses the following innovative approaches to the environmental education of the university students:

- The ecological website. It includes photographs, video-clips, and data illustrating the actual field and laboratory studies of our students and employees. The site also reviews the regional environmental situation and problems with the commentaries by the regional government officials in charge of natural resource management and nature conservation, along with the comments by environmental scientists and opinions expressed by the representatives of environmental non-governmental organizations.
- Organizing the practical training of the students in ecological risk assessment and decision-making in environmental management.
- Using modern informational technologies, such as geographic information system, in the curriculum and in the course of an implementation of student course projects and degree projects.
- Teaching the course “Ecology and the Culture” at the Virtual Branch of the Russian Museum in a context of interdisciplinary connections. The course also emphasizes the transformation of ecology from a purely biological science into the complex field of human knowledge - social and philosophical by its nature.
- The project approach to student training via case-study based teaching and their participation in the supervised scientific research.

- Using educational role-playing for student training and preparation of their course and degree projects. While working in creative groups, each student is assigned a role corresponding to the actual role of an expert involved in natural resource management. The department has local computer networks to facilitate this educational approach.

- Using Internet in the online mode for participation in joint projects with students of other universities in Russia and worldwide.

- Involvement of SSTU students into participation at the national scientific symposia "Ecology: The synthesis of knowledge from the natural sciences, technical disciplines, and humanities", "Environmental problems of big cities", etc. At these events, selected undergraduate and graduate students of our department report the results of their supervised research in the fields of ecological monitoring and natural resource management.

While trying to develop the ecological thinking in students of the engineering fields of study and humanities, we emphasize our focus on individualized training in connection with the specificity of the chosen trade. An algorithm of this educational approach includes lectures, practical and laboratory workshops for the students, departmental supervision of the degree project preparation by each student in engineering fields, and joint research projects of our students and the faculty. The professors of our department developed and published the laboratory manual on various methods of the ecological monitoring and environmental quality assessment along with ecological risk assessment and economic mechanisms of the environmental management.

The graduate environmental education at the Department of Ecology at SSTU includes graduate studies in the field of "Ecology (biological, chemical, and engineering sciences)". The postgraduate environmental education is conducted through the accredited training qualification courses for the practicing managers in industry and agriculture in the following fields: «Maintenance of environmental safety while working with the regulated dangerous waste», «Maintenance of environmental safety for the administrators and experts of the environmental services and ecological monitoring systems», and «Maintenance of environmental safety for the administrators and experts of the government regulatory agencies».

We also take an active part in the environmental education of the school students in the region. A few examples of our activities are as follows: designing an extra-curricular after-school program for the school students «Industrial ecology»; conducting the Internet conferences on ecology for school-age students; training students for the International Youth Bios Olympiads, along with organizing Ecology Olympiads and competitions for the scout organizations of the region. Expanding our educational services to the school students in the area, we involve them into the outdoor nature conservation activities. We also plan organizing the educational field camps for the young ecologists as a joint venture with the Children's Environmental Center (Saratov Oblast Ministry of Education) and the Russian Bird Protection Union.

We believe that various educational activities of the Department of Ecology at SSTU on the development of ecological thinking of the students at a technical university, along

with an involvement of the pre-college and post-college social contingents, would allow us to contribute greatly to the environmental education of the population in our region. We therefore would be able to play a major role in ensuring the environmental safety in our region and to serve as the guarantor of its sustainable development.

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IMPROVEMENT OF SOIL CONTAMINATION MONITORING SYSTEMS IN POPULATED AREAS

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Soil is considered to be a major means of producing and the spatial basis location and developing the national economical branches. Soil contamination is the result of accumulation on the surface, and storage of industrial wastes, atmospheric deposition of chemicals, the use of wastewater for irrigation in agricultural fields.

Large areas of the Republic of Kazakhstan are subject to anthropogenic disturbance.

Special areas for military training are also should be included. The development of mining, construction industry, and construction of transport roads, oil pipelines and the expansion of residential areas is a violation of the land cover.

Natural resources are extracted through violation, destruction and pollution of soil and vegetation, disrupting the natural balance and causing enormous damage to the functioning of the biosphere. One of the most powerful soil contaminants are industrial waste, hazardous as the environment and human health.

Municipal solid waste, which in addition to biological contaminants include heavy metals: vanadium, chromium, manganese, nickel, copper, zinc, lead, strontium, barium, titanium, cobalt, nitrite, zirconium and other substances are perceived as the main sources of soil contamination in residential areas.

Researches conducted for the purpose of ecological and hygienic assessment in natural and anthropogenic soil contamination revealed that the entire territory of the increased concentration of boron, chromium, nickel, lead, and a lack of iodine.

The level of soil contamination with lead, zinc, copper, chromium and nickel in urban areas was significantly higher than in rural areas while rural areas suffer from higher levels of vanadium. The soil comprehensive assessment has revealed that the area adjacent to the petrochemical polluted with oil products, organic compounds, salts, metals. Zone of massive soil contamination should be considered the territory at a distance of 1-3 km.

Researchers are paying attention to the problem of industrial waste as the most toxic, stable and often dangerous to man and his environment factors. Recently, there is a great interest in wastes of large industries rather than non-individual enterprises. For example, studies have established that non-ferrous metals mining and mineral processing

and mining complexes have a strong influence on the content of heavy metals in the soil cover.

In dealing with hygiene disposal and treatment of industrial waste it is vital to refer to the scientific evidence and methodological support to work out the criteria for hygienic hazard wastes, certification, and classification.

The introduction of low-waste and clean technologies throughout the production will save the environment from pollution. To ensure the hygienic environmental safeties it is important to develop technologies for processing and recycling industrial wastes.

The main task in solving the problems with industrial waste and household waste is to improve the monitoring of soil contamination in populated areas, taking into account morbidity. The monitoring system includes: creating a data bank on the amount and range of waste in different areas, development of a single methodology for assessing the hygienic safety of the use and application of industrial wastes in various industrial branches and agriculture, the creation of regional registers of potentially hazardous chemical and biological agents, reflecting industrial enterprises and agriculture peculiarities, measures to prevent adverse environmental and sanitary impacts of waste on the environment, a comprehensive study of effects leading to diseases from various waste products contamination.

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ASSESSMENT OF QUALITY OF WATER BODIES BEING UNDER ANTHROPOGENIC IMPACT

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Currently water bodies are under the influence of intensive negative impacts through economical activity being collectors for various contaminants because of discharge of insufficiently refined sewage. Accumulation of contaminated bottom sediments creates prerequisites for repeated water contamination, disturbs existing water ecosystems and frequently promotes eutrophication and swamping of water body subject to weak flowage. Analysis of such complex systems requires ascertainment of quantitative regularities and correlations, which could give the possibility of revealing relationships between determined indicators and numerous factors affecting on the behaviour of contaminants; such analysis can become the basis of prediction model of their behaviour in water objects.

Mathematical modelling with further realization of models as software, allowing to perform multi-aspect experiments by computer with minimal timetable, is very important for this problem solution. AIS "Geotechnology" software was used for modelling of contamination maps. This software is realized in accordance to mathematical scheme of modelling of spatial-factor correlation of data and provides data processing and interpretation in 2D and 3D formats. Using data set (e.g. concentrations of contaminants

and water body characteristics) obtained in certain points, it is possible to simulate full picture of anthropogenic impact on water body by AIS “Geotechnology”.

Contamination maps were created and spatial-factor correlation of iron and copper contamination in Zheleznyansky bay of Severskoe reservoir was revealed using this software. Obtained contamination maps (see figure) obviously show the dynamics of contaminants spreading in studied object. Also these maps are illustration for revealing space-time regularities.

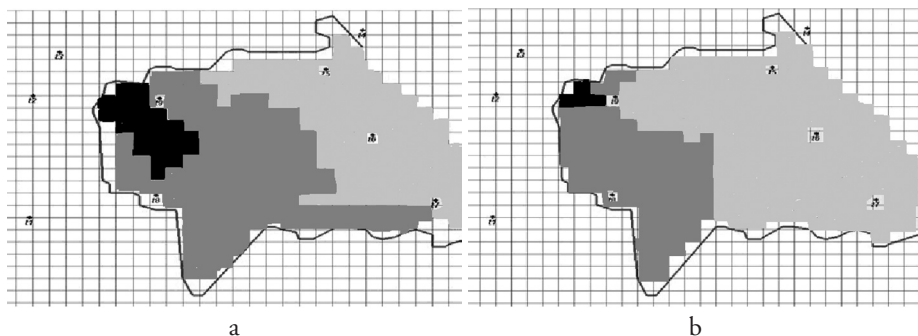


Figure – Map of iron concentration variations in the water of Zheleznyansky bay of Severskoe reservoir, based on data obtained in : a – February, 2007; b – April, 2007.

Δ – sampling point

Stated contamination levels: light grey: 0,1-0,3 mg·L⁻¹; dark grey: 0,3-1 mg·L⁻¹; black: >1 mg·L⁻¹

Suggested approach can be recommended for obvious presentation of results of water bodies environmental monitoring, forming approaches to realization of short-term and long-term prognoses of water bodies evolution. It demonstrates the possibility of modelling of anthropogenic impact on water body and substantiation of technological solutions for decrease of effects of anthropogenic impact.

I.I. Ustinova

ECO-PHYSICAL BASIS OF SUSTAINABLE DEVELOPMENT POLICY

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The definition of eco-physical basis of a sustainable development was based on the analogies reveal between the mankind development on various levels of system-territorial integrity and the ecological processes dynamics of “different physics”. There were esteemed ethnogenesis conceptions by L. Gumelev, ecosystem self-adjustment by

V. Dolnik, demographic transition by S. Kapitsa, cities dynamics by G. Forester. It was identified that the basis of ethno-, eco-, demo- and urbanistic system is an integral self-replicating thermodynamical model, which can exert in course of consistent shift of phases and phases transit. Development phases shift is stipulated by the alternating change of an attitude between the demography capacity parameters and the population quantity on certain territory. The categories “ethnic homeostasis”, “stable population” and “urban territories balance” depict the core of “ecological balance” phenomenon, under the condition of self-adjusting interaction of the population and environment. The sustainable development is a fluctuating process in a normal changes spectrum, which depends on population-environment ecosystem development phase.

An estimation of urbanization process in the ecological space of population displacement, starting from separate cities and ethnoes to the whole mankind, illustrated certain parallels between the ecological and physical interactions. It is discovered that the ecosystem self-adjustment mechanism defines the urban territories development as an ecological city planning system. In this aspect, land invasion becomes a goal-directed and predicted process, which undergoes management influence. This process has the goals with certain parameters – sustainable development in the ecological balance spectrum. This balance is described in terms of a proportion 1:1, between the population quantity and the environment (with a permissible variation 10% in spectrum). The proportion 1:1 is a fundamental dimensionless constant of strong interaction in physics. Weak interaction is observed during demographical transition, when a human life-time synchronization and a duplication of mankind leads to malfunction of growth and hazard of “radioactive” disintegration of complicated structures. As to the gravitation. Gravitational inhomogeneities, which have given an impulse to the stars and planetary systems creation, competed with each other. Just like that the cities compete for the territories invasion. Attractiveness – as a some kind of “magnetism” of territory in the ecological aspect reflects itself in a growth of quantity (in a natural or mechanical way). An exhaustion of growth possibilities “rejects” the population and leads to quantity reduce. The defined analogies give evidences that:

- urban ecosystems are only metastable, it is only enough to support their integrity and overcome the tendency of stochastic disintegration. They should exist in an oscillatory regime. It may give a chance to slow down an accelerating process of development and coordinate growth rates of all components;
- in the ecosystem context, urbanization phenomenon expresses its “super gravitation”, which is reflected by means of ecological influence onto four fundamental physical interactions (strong, weak, electromagnetic and gravitational).

The definition of urbanization eco-physical basis (more than a half of world population lives in cities) will give a chance to forme scientifically validate policy of sustainable cities, regions and countries development. Based on the abovementioned, the national and local strategies of environmentally safe, balanced and sustainable development is proposed to develop in view of potential of natural regions, which have a demographic stock capacity.

These regions were found during the study of possibilities, directions and parameters of sustainable development of Ukraine. The ecological age of its regions, as eco-urban city systems, are defined on the basis of comparison with the population demographic parameters of their capacity (calculated by the method of the author). These defined the possible regionalization of the territory and helped to suggest a transformational model of resettlement planning, which ensures the spatial terms of environmentally sustainable, balanced and safe development of the country for which the question of stabilization of the population provides the guideline features in its national security

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EXOGENOUS GEOLOGICAL PROCESSES AND RISK FACTORS IN THE AREA OF NUREK RESERVOIR (TAJIKISTAN)

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The Nurek water reservoir was built on the Vakhsh River in beginning of 1970-th XX century. It has highest dam through world more 300 m. The reservoir square is 98 km², lenth 70 km, width maximum 1.0 km, volume 10.5 km³, average depth 107 m; project fluctuation of water level in the reservoir is 53 m.

By increasing anthropogenic pressure due to the massive influx of population in this area during the Civil War 1992-1996, the active natural hazards in the vicinity of the Nurek reservoir rise every year more and more. As a result of unauthorized occupation and development of new land (not just the plain areas, but the steep slopes), the mass felling of trees in forests, depletion of grass cover due to intensive livestock grazing in mountain ecosystems, construction of new irrigation canals and roads the ecological disturbance area increased. Erosion processes and associated collapse-landslides and mudflow phenomena particularly active. This also contributed to the tectonic fragmentation of rocks, seismic activity area, the presence of a thick cover of loess-like loams, much dissected topography, and the presence of salt horizons in the geological section in conjunction with the practice of unregulated irrigation. All events marked with sharply reduced soil fertility and biological productivity of natural land; it reduced the area of irrigated lands, forests and pastures; it has led to the creation of conditions for the degradation of soil and vegetation, reducing the natural resources of the earth.

To solve the above-mentioned environmental problems in the area of Nurek reservoir is necessary, first of all, make a database of potentially dangerous objects and areas that pose a threat to the population, as well as to develop a targeted program to prevent and reduce the risk of emergencies and prediction of their consequences, the organization of the monitoring system for geo-ecological processes, etc. It should also carry out a complex anti-erosion and mad flow preventing measures, where the main point for mountain areas

should be water-resistant and fast-growing tree planting in hazardous areas as well as the prohibition of grain crops on slopes over 10 degrees.

Subsequently, this area can serve as a reference object for the development of scientific principles and methods of long-term monitoring of natural hazards in the area of large water-reservoirs with high dam.

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AWARENESS AND ECOLOGY

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Everything that is going on is happening not to us but thanks to us!

If there is some disorder in our environment it means there is some disorder in our mind: the thoughts, the ideas filling it. Our life is like a copier, it displays everything that exists in our consciousness. It's our consciousness that reveals all the events of surrounding reality. The man forms them and then lives them through. In order to change life it's necessary to change the way of thinking and first of all - our awareness. The change of world-outlook changes the existing reality. A man should realize: in order to save the earth and himself from dreadful effects it's necessary to change radically the conception of Life, to change radically his world-outlook. The existence of our wonderful planet depends on our awareness – either we somehow work on it or the Earth will change itself.

“New civilization should start with new educational programmes” – these are the words of a distinguished Russian scholar and researcher N.N. Moiseev, who in the last years of his life called the problem of ecological education the most important in the sphere of ecology. “The future of Mankind will be settled and solved not in the government's studies but at a school's desk of every state” – stated the members of the Roman club.

The fate of ecological education in Russia is becoming one of the most important problems. Judging by a number of publications on ecological problems in Mass Media everybody realizes it. But every person involved in this process gives his own answer to the questions: what to do, when to do, how to do and who will do it. Sometimes the answers are quite incompatible (for example, the answers of manufacturers, politicians and population).

N.N. Moiseev mentioned more than once that the spirit of ecological education turned to “the balance of freedom and responsibility of everybody”. In ecological culture of knowledge this is only one of resources. This is the will that turns knowledge into culture. And this will is not the will of a teacher but the will of a pupil. This will can't exist without accomplishment of freedom of choice and realization which in their turn are impossible without self-cognition, without knowledge of one's motives and goals. There are a few schools nowadays where the aims of education are based not on “science” but on cultural values of global scale and in these schools sooner or later three main components of unique

educational environment appear: ecology as natural science, psychological integrated courses as the basis of self-actualization and, compulsory, a culturological programme as a support of spiritual formation of an individual.

The solution of ecological problems mainly depends on the choice of the population. It is possible to make air and water clean, to reduce the risk of radioactive irradiation, to guarantee the safety of foodstuffs to preserve nature and mineral resources only in case if the population itself treats these aims on a priority basis, if the population itself watches the actions of the government and business owners, uses its civil rights in order to rule the situation. So ecological problems are created by social imperfection, by juvenility of the institutes of civil self-government, by a mess in vital guidelines of population.

B.Commoner is right to say: "everything is connected with everything."

A.V. Voronina
V.S. Semenichev
A.S. Kutergin

SURFACE-MODIFIED SORBENTS FOR DECONTAMINATION OF RADIOACTIVE CONTAMINATED WATERS

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Surface-modified sorbents based on various natural and artificial organic and inorganic carriers may be used for decontamination of liquid radioactive wastes (LRW) and radioactive contaminated waters. Methods of synthesis of these sorbents consist in impregnation of sorption active compounds onto the surface of carriers. Physical properties of produced sorbents depend on matter of carrier; in turn chemical properties depend on both nature of carrier and properties of impregnated compound. Produced sorbents can acquire a whole number of properties that were absent in both carrier and impregnated compound. In these cases receiving of multipurpose, selective and specific complex sorbents is possible.

For radiochemical and radio-ecological problems a carrier with a number of necessary properties can be selected for further producing of a sorbent. The Radiochemistry and Applied Ecology chair of UrFU produced surface-modified sorbents based on natural aluminosilicates (clinoptilolite and glauconite), hydrated titanium and zirconium dioxides and cellulose.

Sorbents based on hydrated titanium and zirconium dioxides are promising for various LRW treatment and for use as a matrix for radionuclides immobilization with the view of their further dead storage or burial. For example, mixed nickel-potassium ferrocyanide based on hydrated titanium dioxide ("T-55" sorbent) allows not only to concentrate long-lived β -emitting radionuclides (such as Cs-137, Sr-90) and actinides into minimal volume, but also reliably retain them for a long time. It possesses high mechanical strength, chemical stability and radiation resistance as well as high selectivity and capacity for caesium (distribution ratio of Cs from tap water under pH 7.8 ± 0.2 is

$10^{(5.6 \pm 1.0)}$ mL·g⁻¹, static exchange capacity is not less than 270 mg·g⁻¹). In addition, the “T-55” sorbent is able to extract strontium, uranium and thorium (distribution ratio of Sr from tap water is $10^{(2.7 \pm 0.2)}$ mL·g⁻¹, capacity is not less than 36.4 mg·g⁻¹; distribution ratios of U and Th from pure nitrate solutions under pH 4.5±0.5 are $10^{(3.6 \pm 1.4)}$ and $10^{(2.7 \pm 0.8)}$ mL·g⁻¹ respectively). The advantage of “T-55” sorbent is lower leaching rates of radionuclides as compared with those described in literature. If distilled water is used as a leachant, leaching rates are $3.7 \cdot 10^{-10} - 8.2 \cdot 10^{-12}$ g·cm⁻²·d⁻¹ for caesium and $1.8 \cdot 10^{-10} - 1.2 \cdot 10^{-12}$ g·cm⁻²·d⁻¹ for strontium; if tap water is used as a leachant, leaching rates are $1.4 \cdot 10^{-11} - 1.5 \cdot 10^{-12}$ g·cm⁻²·d⁻¹ for strontium.

Nuclear tests, “peaceful” nuclear explosions, normal activity and accidents on nuclear fuel cycle enterprises, work of transport and research reactors led to radioactive contamination of surface and ground waters. Under realizing of environment rehabilitation sorption technologies using cheap and easily accessible materials may be applied for decontamination of large volumes of radioactive contaminated natural waters, including drinking water. Surface-modified sorbents based on natural aluminosilicates and grain farming waste materials (husk and haulm of oat, rice and buckwheat) may be used as such materials. Interest in natural aluminosilicates and their intensive study are attracted by both presence of proven deposits in many countries and their ion exchange features. Annual renewal of organic feedstock, low prime cost, simplicity of recycling and low ash content also make their use prospective. Distribution ratios of Cs for mixed nickel-potassium ferrocyanide based on clinoptilolite reach up to $10^{(6.3 \pm 0.2)}$ mL·g⁻¹, and for ferrocyanide based on cellulose rice husk and buckwheat haulm are $10^{(5.6 \pm 0.1)}$ and $10^{(4.3 \pm 0.1)}$ mL·g⁻¹ respectively.

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EDUCATION IN ENVIRONMENTAL SAFETY PROTECTION

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With respect to the actual environmental situation and increasing anthropogenic impacts on environment the continuing ecological education is especially needed. The Radiochemistry and Applied Ecology chair of UrFU successfully provides multilevel education programmes in environmental safety management including bachelor and master educational programmes and additional professional education. These programmes are based on modular approach that gives the possibility of choice of subspeciality with a glance of requirements of enterprises due to deep fundamental knowledge providing adaptation of bachelors and masters to various fields of activity.

Bachelor specialization «Environmental safety management» is based on the educational programme «Chemical technology». Besides basic modules it also includes specific modules for forming next additional professional competences in environmental protection: dataware of environmental safety (system analysis and decision making,

information systems in environmental protection); environmental chemistry (geochemistry, hydrochemistry and chemistry of atmosphere, radioactivity in environment); technological support of environmental safety (environmental quality monitoring, methods of analysis of environmental objects, environmental safety); organizational and juridical support of environmental safety (ecological management and audit, environmental protection management, environmental protection normalization and standardization, ecological assessment). Bachelors educated under this specialization are competent in environmental protection, analysis of environmental impacts and environmental quality monitoring, environmental risk assessment and determination of causes of environmental risks and research in the field of environmentally appropriate technologies for prevention and/or minimization of negative effects of anthropogenic and natural impacts on the environment. Application of new methods and approaches, notably system analysis and system approach, for environmental safety providing allows to make studied objects (anthropogenic and environmental systems) more manageable, to ascertain their interactions and potentials, to develop new technologies of nature management.

Matters of environmental protection are important for nuclear fuel cycle enterprises working with radiochemical technologies and for other enterprises that use technologies with potential radioecological impact such as, for example, technologies of mining and processing of raw materials containing natural radionuclides. Master specialization «Environmental safety management of radiochemical technologies» is the logical continuation of our bachelor specialization and provides advanced education in environmental safety and minimization of hazard of enterprises using radiochemical technologies or technologies with radioecological aspects. Its programme includes studying of next modules: technological module (technologies of nuclear fuel cycle, radioisotopes production technology, radiochemical and radioecological aspects in mining and processing enterprises, nanotechnology in atomic energetics and radioecology); environmental protection module (radioecological monitoring, radioactive wastes processing, radiation safety, medicobiological fundamentals of life safety, radiotoxicology); management module (intellectual property management, innovations management, human resource management, sociology and psychology of management).

The realization of this master specialization makes a student competent in management, research and application of modern methods of radioactive wastes processing, innovative radioanalytical methods, radionuclides behaviour modelling in anthropogenic and natural systems, research of environmental protection technologies based on system approach.

Dorit Wilke
Michael Hahn

H2S-BESTIMMUNG IM ABWASSER

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Schwefelwasserstoff und flüchtige Organoschwefelverbindungen stellen neben der Geruchsbelästigung das größte gesundheitliche Gefahrenpotential in der

Abwasserkanalisation dar. Bereits in geringen Konzentrationen können sie erhebliche gesundheitliche Schäden verursachen. Die allgemein anerkannte Geruchsschwelle für Schwefelwasserstoff liegt bei 0.13 ppm; im Bereich von 3–5 ppm treten schon deutliche Geruchsbelästigungen auf. Der MAK-Wert für H₂S in der Luft beträgt 10 ppm, er beendet sich allerdings in der Diskussion.

Die Folgen für das Abwasserkanalisationssystem und die Kläranlagen sind beträchtlich:

1. Es werden erhebliche Geruchsbelästigungen aus den Abwasserkanälen und speziell bei Übergabe stellen aus Drucksystemen in Freispiegleitungen beobachtet.

2. Es tritt eine starke biogene Schwefelsäurekorrosion an Rohrleitungen, Schächten und Sonderbauwerken auf. Da Biogase und Abwasserkanäle immer eine gewisse Menge Wasserdampf enthalten, kondensiert dieser Dampf an kalten Stellen im Abwasserkanal. Das in diesem Kondenswasser gelöste H₂S wird mit Hilfe von Mikroorganismen und Luftsauerstoff zu H₂SO₄ oxidiert und bildet somit eine extrem saure und damit korrosive Lösung, die metallische Bauteile und Beton zerstört.

3. Da das Abwasser zufallsbedingt mit anderem Abwasser vermischt wird, ist es besonders für das in Abwasseranlagen arbeitende Personal gefährlich. Das Personal kann schnell durch lebensgefährlich hohe Gaskonzentrationen gefährdet werden, da das H₂S spontan aus dem anaeroben Abwasser austreten kann.

4. Aufgrund des verschlechterten biologischen Abbaus der organischen Matrix tritt verstärkt

Blähschlamm Bildung auf, welche die Abwasserreinigung in der Kläranlage behindert. Im Extremfall kann die gesamte Biologie der Kläranlage beeinträchtigt werden. Für eine zielgerichtete Festlegung von Maßnahmen zur Abwasserbehandlung und zur Erstellung von Sanierungskonzepten ist die direkte Analyse der H₂S Belastung im Abwasser zwingend erforderlich.

Eine neue Analystechnologie zur selektiven Bestimmung des H₂S im Abwasser soll im nachfolgenden vorgestellt werden.

Mit der neuen Sulfid/H₂S-Messtechnik ergeben sich weitreichende Möglichkeiten für eine gezielte Abwasserbehandlung in folgenden Bereichen von kommunalen und industriellen Abwassersystemen:

- Problembereiche von Fettabscheidersystemen innerhalb und außerhalb von Gebäudekomplexen und Großobjekten;

- Druckwasserleitungen;
- Freispiegleitungen;
- Pumpensümpfe;
- Kläranlagenzuläufe;
- Deponiesickerwässer.

Der Sulfid/H₂S-Gehalt in Abwässern kann mit dem neuen H₂S-Analysensystem exakt und reproduzierbar bestimmt werden. Es lässt sich das H₂S-Bildungspotenzial in Abwasseranlagen ermitteln. Die Matrixbestandteile der Proben stören die Bestimmung

aufgrund der indirekten Dosierung in das Extraktionsmodul nicht. Zusätzliche Proben vorbereitungsschritte sind nicht notwendig. Damit ist das Verfahren sehr einfach in der Handhabung. Die Geräte sind sehr kompakt und einfach zu bedienen und können sowohl zur Laboranalytik als auch zur online-Prozesskontrolle eingesetzt werden. Mit der direkten Analyse des Abwassers auf den aktuellen Sulfid/H₂S-Gehalt gelingt die Ermittlung des zeitgenauen Einsatzes von Abwasserbehandlungsmitteln, wodurch sich die H₂S-Emission bei gleichzeitig optimalen Betriebskosten für die Abwasserbehandlung drastisch reduzieren bzw. vermeiden lässt.

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D.V. Burkovsky

GLOBAL ECOLOGICAL PROBLEMS OF HOME ENTERPRISES

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The present stage of development of the economy is characterized by an increase in conflicts between the society and the environment when interacting. This state of conflict prevents the further development of scientific and industrial potential of the society and creates a threat to vital functions.

Today's rhythm of life and much greater scientific and technical progress caused man to enter the period of the global ecological crisis. The interaction of economic activities and the environment is characterized by a large scope of changes pertaining to the natural condition of landscapes, the constant growth of energy consumption, the production and emission of pollutants in huge amounts, an increase in the volumes of solid and rare wastes, a considerable decrease in both inexhaustible and exhaustible natural resources. The combination of these factors calls forth the ecological situation that requires profound research and active measures in regard to the prevention of possible negative consequences.

Global ecological problems find their reflection in many works by foreign scientists; gradually they become a matter of concern for home scientists, too. The experts of the World Bank, UNO, WTO, EC Commission, the Rome Club and other influential organizations are engaged in the problems and research work in the field of ecology.

The USA heads the list of the countries polluting the environment. 16 of the 20 most polluted cities of the world are in China. Statistics testify that 400,000 people die every year as a result of the air pollution. In fact, ecological problems are not the problems of one state, but of the whole of the world. That is why every country should watch the ecological conditions at its enterprises.

The main reasons for the growth of ecological problems at home enterprises are:

1) the structure of the national economy not properly balanced, with a heavy share of those productions that consume a great deal of resources – energy producing, metallurgic,

machine-building and mining industries that exert much pressure on the ecosystem of the country;

- 2) depreciated production funds;
- 3) out-of-date equipment for the protection of natural resources;
- 4) the absence of effective laws in regard to ecological issues;
- 5) the absence of proper ecological instruction in the system of education, of ecological attitude and a number of others.

The present economic circumstances constantly aggravate the ecological situation: the reduced production does not contribute to the process of decreasing the volumes of harmful pollutants emitted into the environment – in the crisis conditions it is nature protection measures that lack funds in companies.

Due to these reasons the issue of considering and minimizing the ecological problems should be given the first priority.

Minimization of ecological problems should include: 1) rational use of natural resources; 2) preserving the environment; 3) matching home ecological requirements with those of international ones; 4) regular analysis of the level of pollution of the environment caused by home enterprises; 5) introduction of modern technologies to protect the environment from polluting; 6) development of ecological strategy for companies.

The environment crisis has an all-embracing character; the dangerous influence of it is exerted on most kinds of economic activities, and in the first place, on the quality of life destroying the safe and healthy conditions of living of the people.

N.A. Zakarina
A.I. Tshai

NEW SORBENTS ON THE BASE OF PILLARED CLAYS FOR WASTE WATERS PURIFICATION FROM HEAVY METALS IONS

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Central department technical control (CDTC) of JSC "Caustik" has been certified within the system of certification of Kazakhstan Republic as required by the standard ST RK ISO/MEK 17025-2007 "General standards to competence of the test and calibrate laboratories". One of the activity direction of CDTC of JSC "Caustik" is the tests of waste waters and underground waters on 32 characteristics including the content of Zr, Cr, Fe, Ni, Hg and Cu. The tests are carried out as required by the interstate standards (GOST), state standards of Kazakhstan Republic and according to confirmed Russian methodologies, which were registered in State regulations of Kazakhstan Republic. The content of ions were determined with using technique for liquid analysis "Fluor at 02-3M (Russia, Sant-Petersburg).

Experimental data of sorption of Ni^{2+} , Cr^{3+} , Fe^{3+} , Zn^{2+} from waste waters of some industrial enterprises of Pavlodar city by pillared clays on the base of natural Tagan montmorillonite (Ust-Kamenogorsk, Kazakhstan) and kaolinites of Sarymsak and Ermakov deposits (Pavlodar, Kazakhstan) were presented.

Activated natural clays pillared by different concentrations of hydroxocomplexes of Al_{3+} , Fe^{3+} , Zr^{4+} , Ti^{4+} . The purification of waste waters were carried out in dynamic conditions passing through the sorbent certain volume of waste water.

The presentation provides assessment of the environmental pollution of the waste waters of JSC "Caustik", plants "Casting", "Cardboardruberoid", "Rukan", lake-accumulator Bilkildak. It was seen that waste waters contain great quantities of Ni^{2+} , Cr^{3+} , Fe^{3+} , Zn^{2+} . Optimal composition of pillared clays for purification of waste waters from heavy metals ions were selected. Modified natural kaolinites has a more high sorption ability than pillared montmorillonites. The purification degree of waste waters of JSC "Caustik" on optimal sorbent sample of modified kaolinite is decreased in row: Zn^{2+} (100%)> Fe^{3+} (93%)> Cr^{3+} (90.8%)> Ni^{2+} (88.6%).

The close results were obtained during the purification of waste waters of plants "Casting", "Cardboardruberoid", "Rukan". High sorption ability of pillared montmorillonites and kaolinites of Kazakhstan deposits was confirmed during the purification of waste waters of lake-accumulator Bilkildak from ions of heavy metals.

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PHOTOCATALYTIC DECOMPOSITION OF HYDROGEN SULFIDE UNDER THE ULTRA VIOLET AND SOLAR IRRADIATION ON MONTMORILLONITE PILLARED BY TI, FE AND TI-FE

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In conjunction with world modern tendencies of hydrocarbon processing industry development and great content of hydrogen sulfide in the associated oil gases the problem of H_2S utilization for hydrogen production is especially actual for Kazakhstan, because H_2S is known as one of the most toxic environment pollutant. There are many studies focused on the environmental applications of heterogeneous photocatalysis.

In the present study for photocatalytic decomposition of H_2S Ti, Fe and Ti-Fe - systems were selected for hydrogen and sulfur production. Ti, Fe and Ti-Fe – catalysts were prepared by pillaring of montmorillonite (MM) in Na - form by iron, titanium and their mixture.

The process of hydrogen sulfide photocatalytic decomposition under ultraviolet irradiation (UV) was studied in the quartz reactor at the range of space velocities from 60 – to 425 hour⁻¹. A mercury – quartz lamp source of intensity 100 W was used. Each experiment was carried out using 2,5 ml of catalyst. Under solar irradiation experiment was studied in the quartz reactor at the range of space velocities 17 - 325 hour⁻¹. The volume of catalyst was 12 ml. A concentrator of solar energy (CSE) was used as a source of irradiation. The catalysts before experiment were pre – sulfurized at 500°C during 2 hours.

The data of samples activity are presented in the table.

Table – An activity of catalysts under Uv and solar irradiation

	UV - irradiation			Solar - irradiation		
	ω , hour ⁻¹	t, mins	α , %	ω , hour ⁻¹	t, mins	α , %
FeNaMM	60	40	100	17,3	40	100
	330	27	93,1	104,5	23	98,3
	425,0	24	91,1	199,2	15	96
TiNaMM	145,2	40	100	18,3	43	100
	269,5	40	94,8	119,3	20	96,5
	377,4	25	91,3	142,6	14	96
	556,2	23	95,9	323,9	6	94
Ti-FeNaMM	60	40	100	27,5	43	100
	320	30	93,7	99	25	99
	420	25	91,7	191,3	21	96

ω – space velocity, hour⁻¹; t –time, mins; α –conversion;%

It was shown that the action of UV – irradiation catalysts more effective than the solar irradiation. The catalysts are located in the line TiNaMM>Ti-FeNaMM>FeNaMM by activity in photocatalytic decomposition of H₂S.

Some characteristics of synthesized samples, it's phase composition and particles dispersion were determined by physical – chemical methods (EM, BET, XRD, Mossbauer spectroscopy).

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TRAINING FOR THE RECYCLING INDUSTRY IN THE BAIKAL REGION

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The most important aspect of creating a system of sustainable waste management should be to control public opinion. Especially important is the environmental education - training of highly qualified personnel in the field of waste management.

In the Russian Federation to increase the skill level, there are several possibilities: higher education for reduced programs, training and professional development through additional vocational education and training through the program graduate, postgraduate and doctoral studies.

The concept of development of the Irkutsk State Technical University, defines a strategy for the transition to a qualitatively new stage of development for the university of innovative type. It provides the following strategic objectives of the educational activity:

- transition to the international scale of assessment, accreditation and certification in the delivery of educational services;
- introduction to the educational process principles of the European Memorandum "Education through life" (Belgium, Brussels, October 30, 2000), University Magna - Magna Charta Universitatum (Italy, Bologna, 1988) and the Bologna Declaration (1999).

In this process, ISTU purposefully working to implement two-tier system of education in the learning process.

The growth of interest in the treatment of waste production and consumption is due to two complementary factors: the tightening of legislation and increasing interest in the business. It identified the need to open an exclusive innovative Master's program "Waste management and recycling of production and consumption."

The program was developed during the project "Development of a Master course" Management of waste production and consumption "in the technical universities in the Baikal region" under the program TEMPUS Gemeinsames Europäisches Projekt.

At present, this international program in ISTU trained 25 undergraduates, 14 graduates in 2011 have already received the degree of "Master of engineering and technology."

Also in the Irkutsk State Technical University since 2003, organized by retraining workers of the enterprises under the program "Management of hazardous waste." Each year, an additional qualification in this area are more than 300 people.

We believe that the appearance of our enterprises and organizations of highly qualified experts in the field of waste management will make a real contribution to exist in Russia and in the Baikal region, in particular, problems in waste production and consumption.

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NEW DIRECTIONS IN WASTE MANAGEMENT IN THE BAIKAL REGION

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At present Russia and other industrial countries accumulated a huge amount of non-disposable and non-recycling solid post-consumer waste which pollutes the environmental. There is a certain group of domestic and industrial wastes, which are typical ones in every

region of Russia. These wastes include plastics, ash and slag waste, glass and paper waste, used car tires, etc.. The largest volume of waste accumulated in the fuel industry. As the results, it leads to degradation of soil, and secondary pollution of groundwater and surface water. As to recycling of wastes this is a serious problem for any country and region, because after landfilling wastes becomes useless and unrecyclable.

The area of Baikal Lake at Eastern Siberia, Russia is native and intact unique territory needs to be protected from any types of waste, including solid waste. The environmental policy here should be well organized to protect the area from contamination of soil and water. To realize the policy the network should be developed in Baikal area for collection, transportation, and processing of these wastes in final commercial products using modern and environmentally friendly technologies.

The development of new materials should be based on the principles of economic efficiency and environmental priorities. Ability to use fundamental knowledge related to chemical nature and physical structure of the industrial waste is necessary to create novel materials on their base and makes possible to get a new generation of various composites with unique properties at very low cost. The approach is valid for the development of new building materials as well.

According to the State report "On the state and Environmental Protection of the Russian Federation in 2007, the problems associated with the formation, neutralization and recycling of waste production and consumption are relevant to all industrial regions of Russia.

However, in the Irkutsk region have begun to solve the problem of disposal of waste from the work of thermal power plants. For example, ash and slag mixture is used in road construction in the construction of roadbed for the device of fortified bases, as a filler and a mineral powder in the asphalt.

For the regional construction is of great importance to use and manufacture of new building materials from local raw materials of the Irkutsk region, which does not require the presence of an advanced industrial base, large capital costs and transportation costs, but also possible to obtain long-lasting building materials of good quality. Technology of production of new building materials based on the method of extrusion. Extrusion - a process of forming articles of indefinite length, by forcing molten polymer through a head shape with channels needed profile. Extrusion line includes industrial extruder - the main part of the apparatus and equipment "downstream" (that is beyond the extruder determines the quality of the building structure).

In addition, the material is superior to natural wood on the fire and heat resistance, frost resistance, chemical resistance, water resistance, biological stability and durability. New building material is applicable for both exterior and for interior decoration.

A very important part of our work is the environmental aspect, ie, possibility of utilization of mineral waste and municipal solid waste from polymeric materials. This will not only clean the area of hazardous waste production and release of land, and forest conservation and preservation of millions of tons of natural wood.

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N.A. Solovey

METHOD OF PREDICTIVE EXPRESS ESTIMATE OF ENVIRONMENTAL HAZARD OF HYDRAULIC ENGINEERING WORKS

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Company "Eco-Express-Service" has a wide experience in designing of various hydraulic engineering structures (19 years of work, hundreds of successful projects). On this basis a simple method has been developed for predicting the approximate level of future environmental and economic damage from the planned hydraulic engineering already at the very first, concept design stage. The method is introduced by the example of projects implemented in the Gulf of Finland of the Baltic Sea. The following simple indices are used:

Absolute indices: V (million m^3) – volume of ground moved at dredging; S (km^2) – the area of formed territory; U_v and U_s (thousand $€$) – total size of payment for impact on all components of the environment (according to the current legislation) at dredging and deposition accordingly; U_{fv} and U_{fs} (thousand $€$) – size of compensatory payment for damage to water biological resources at dredging and deposition accordingly (U_{fv} is covered by U_v , U_{fs} is covered by U_s).

Relative indices: "environmental value" the units of volume of moved ground (U_v/V , $€/m^3$) and units of area of the formed territory (U_s/S , thousand $€/km^2$); damage to water bioresources per unit of volume of moved ground (U_{fv}/V , $€/m^3$) and units of area of the formed territory (U_{fs}/S , thousand $€/km^2$).

Ratios of these indices are described by equations:

$$\lg U_v = (2.928 \pm 0.135) + (0.715 \pm 0.115) \times \lg V; r = 0.77 \quad (1)$$

$$\lg U_{fv} = (2.465 \pm 0.115) + (0.651 \pm 0.098) \times \lg V; r = 0.79 \quad (2)$$

$$\lg(U_v / V) = (-0.072 \pm 0.135) - (0.285 \pm 0.115) \times \lg S; r = -0.43 \quad (3)$$

$$\lg(U_{fv} / V) = (-0.535 \pm 0.115) - (0.348 \pm 0.098) \times \lg S; r = -0.56 \quad (4)$$

$$\lg U_s = (2.764 \pm 0.158) + (1.063 \pm 0.163) \times \lg S; r = 0.89 \quad (5)$$

$$\lg U_{fs} = (2.073 \pm 0.164) + (0.861 \pm 0.165) \times \lg S; r = 0.84 \quad (6)$$

$$\lg(U_s / S) = (2.459 \pm 0.192) + (0.001 \pm 0.001) \times \lg S; r = 0.53 \quad (7)$$

$$\lg(U_{fs} / S) = (2.073 \pm 0.164) - (0.139 \pm 0.165) \times \lg S; r = -0.25 \quad (8)$$

For absolute indices (formula 1, 2, 5, 6) – the dependence is proved, positive and well formalized. For relative indices (the formula 3, 4, 7, 8), on the contrary, it is weak and doubtful. It allows using on a reasonable basis of average values of relative indices for

predicting of environmental and economic damage at any scales of the planned hydraulic engineering. Distributions of values of relative indices are characterized by positive asymmetry and are well approximated by lognormal model. The results of analysis of these distributions allow us to offer the following classification of relative impact level of hydraulic engineering on the environment (environmental operational safety measures):

- 1) Mild impact: $U_v/V < 0,1 \text{ €/m}^3$; $U_s/S < 0,1 \text{ €/m}^2$
- 2) Moderate impact: $0,1 \leq U_v/V < 1,0 \text{ €/m}^3$; $0,1 \leq U_s/S < 1,0 \text{ €/m}^2$
- 3) Material impact: $1 \leq U_v/V < 10 \text{ €/m}^3$; $1 \leq U_s/S < 10 \text{ €/m}^2$
- 4) Severe impact: $U_v/V \geq 10 \text{ €/m}^3$; $U_s/S \geq 10 \text{ €/m}^2$

As a whole, average values of relative indices for the whole set of hydraulic engineering projects developed by us on the Gulf of Finland (mean logarithmic values) correspond to the second class of relative impact ("moderate"):

$$\overline{U_v/V} = 0.700^{+0.271}_{-0.196}, \overline{U_{fv}/V} = 0.231^{+0.082}_{-0.061} \text{ €/m}^3; \overline{U_s/S} = 0.657^{+0.279}_{-0.196}, \overline{U_{fs}/S} = 0.117^{+0.053}_{-0.037} \text{ €/m}^2$$

The introduced patterns allow approximate predicting of absolute values of environmental and economic damage from hydraulic engineering already at concept design stage, even by the most original specifications (dredging volume, area of territory formation).

P.S.Zubkova
M.I.Martynova

AIR POLLUTION POTENTIAL AS A SELF-CLEANING FACTOR OF THE BIG CITIES ENVIRONMENT (ON EXAMPLE OF ST. PETERSBURG AND ROSTOV-ON-DON, RUSSIA)

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Atmospheric air is the most important life supporting natural environment. Large cities landscape components have undergone significant change; air pollution is particularly detrimental to human health. Emerging geo-ecological problems are caused by local natural conditions and character of territory anthropogenic influence. Air pollution potential (APP) is a combination of meteorological factors responsible for possible contamination atmosphere level from sources in a particular area. There is meteorological and climatic APP. Climate APP is used to estimate the climatic conditions of transport and dispersion contaminants in certain physical and geographical area.

Saint-Petersburg and Rostov-on-Don is situated on the East European Plain. Cities

are located in different zones of APP. St. Petersburg is located in a low APP area, where the transition seasons have increased pollution level. Rostov-on-Don is located in a high APP, with a maximum summer and winter of air pollution; thus, Rostov-on-Don is in more adverse conditions of air pollution than the northern capital.

Saint-Petersburg and Rostov-on-Don (1439 km² and 354 km², respectively) are the cities-millionaires (4,6 and 1 million people). Both the cities are industrial centers, with a leading engineering industry; transport junction (road, rail, waterway and air transport). St. Petersburg and Rostov-on-Don are dynamically developing cities.

According to field measurements carried out in 2008-2010 in the Rostov-on-Don Kirov district main pollutions maximum permissible concentration (MPC) is exceeded anywhere that creates an extremely hostile life environment. There are several regions allocated on the total distribution of nitrogen dioxide, carbon monoxide, hydrocarbons: with the relatively small exceedance (less than 5), with the exceedance average for the area (5-10), with significant MPC excess (10-25), with catastrophic exceedance (more than 25).

The St. Petersburg air emissions volume in 2009 was 625,3 thousand tons, which is in 5 times more than Rostov-on-Don emissions (131 tons), but emissions per person in both cities are approximately equal (in Saint-Petersburg – 135,9 kg, in Rostov-on-Don – 118 kg). St. Petersburg emissions density per unit of area (434,5 t/km²) is higher than in Rostov-on-Don (375 t/km²). Motor transport emissions dominate, in St. Petersburg they make up 92%, and in Rostov-on-Don – 93%.

Nitrogen dioxide, nitrogen oxide, carbon monoxide, solids have heightened level of St. Petersburg air pollution (SI). The concentrations of 3,4-benzo(a)pyrene, ammonia, aromatic hydrocarbons do not exceed average daily MPC. The air city pollution largest contribution is making formaldehyde, nitrogen dioxide, phenol, ozone and solids. The main Rostov-on-Don air pollutants are formaldehyde, benzo(a)pyrene, phenol, nitrogen dioxide and solids. Nitrogen oxides, carbon monoxide, solids, phenol, formaldehyde, benzo(a)pyrene have heightened level of pollution on the SI. There was no excess of sulfur dioxide MPC.

Integrated air pollution index API₅ of St. Petersburg air pollution level is assessed as heightened (5,3), and Rostov-on-Don – as high (11,7). As the emissions volume in both cities per unit area is roughly equal, the high air pollution is explained by heightened Rostov-on-Don air pollution potential.

Thus the large cities atmospheric air conditions are determined by complex of anthropogenic and natural factors. On the examples of Saint-Petersburg and Rostov-on-Don is shown that air pollution potential is an important indicator of the atmosphere ability to cleanse itself. In assessing the large cities atmospheric air state should be considered air pollution potential of this area.

E.D. Chertov

**INTEGRATED SCIENTIFIC SYSTEMS AT THE TRANSITION
TO A NEW TECHNOLOGICAL STAGE***VSUET, Voronezh, Russia*

Nowadays the integrated processes at the national and international levels are still taking place. They result in creation of clusters and communications networks for manufacturing applications, appearance of new forms of cooperation ties. There is a tendency for innovative renewal concerning manufacturing systems which is based on the synergetic effect of using national and international resources. Besides, the fast passage of Russia to a new technological stage – the 5th one, characterized by such key factors as microelectronics and software – is coming to an end. Member of RAS Koblov E.N. believes that the transition to the 6th technological stage is to do with the aspiration for development and application of biotechnologies, nanotechnologies, genetic modification, membrane and quantum technologies, photonics, micromechanics, nuclear power. According to Evgeniy Kolobov, the synthesis of achievements in all these spheres will enable creation of quantum computer, artificial intelligence; provide a passage to a radically new level in the systems of state, society and economy administration. The USA and Japan are the two countries ready for a passage to the 6th stage.

Appearance of integrated systems in economy is accompanied by integration of science and industry. In this respect it is becoming more and more popular to establish ties between universities and enterprises, create scientific-educational complexes. The condition of their functioning is “the triple spiral” which is to be looked upon as cooperation between the state, private business and science. In Russia the institutional conditions for “the triple spiral” are presented insufficiently. The major risks to be observed in the national innovation system are general views of the population, lack of legal framework, infrastructure for creative engineering performance and updated scientific framework.

Overcoming of traditionalism can and must have a certain organizational form of integrated structures resembling multi-layered “pie” of constant and continuous training, closely connected with practice or organized within the framework of real activity. Our university has had an experience of creating joint chairs at the enterprises, which enables students to study “on-line” and does not create barriers in cooperation and creative work of researchers belonging to different generations. Establishments of such or similar to them integrated systems is possible at the international level with involvement of high educational institutions and enterprises of other countries.

Creation of technological platforms is to exert profound effect on these processes. Our university has become an initiator and coordinator of one of them (Technologies of food industry and agriculture). Dozens of field-oriented high educational institutions, R&D establishments, and a significant number of the biggest enterprises have supported the creation of the platform.

L.V. Shulgina
A.V. Shulgin

ECONOMIC ASPECTS OF THE «GREEN» ECONOMY

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The events which took place in Japan in spring 2011 draw our attention to the problem of environmental security and make us look at it in a different way. We saw it on the TV screens how within a short period of time the cities turned into accumulations of trash. In fact, all the material values achieved in Japan disappeared. One more time the nature proved that society is always in the zone of the constant risk and instability.

Environment and economy have always been closely connected with each other. Economic relations should have taken into consideration the environmental aspect since the time when the mining industry emerged or even earlier – since the appearance of economic activity of human-beings. The sphere of environmental security is to do with the possibilities to forecast the development of economic systems and management of this development. The aspect of «green» economy is becoming very popular.

Economic life is getting more and more complicated, new forms of activity and new ways to satisfy the needs appear.

«Green» economy means reduction of anthropogenic use of biosphere from 7-10% (which is to be observed today) to 1-2%.

Nowadays (Muravykh A.I. Synergetic approach to the management of environmental security // Law and security. – 2004. - № 3(12)):

from 242 thousand plant species 14% are on the verge of extinction;

from 9,6 thousand bird species 11% are on the verge of extinction, and for 60% a decrease in the number is to be observed;

from 4,4 thousand species of mammals 11% are under threat of dying out;

from 24 thousand species of fish 33% are on the verge of extinction.

We live in an asynchronous world, since information flows constantly overlap, and vectors of decision-making can be directed at the different planes. The speed of decision-making is compatible with the speed of information distribution. Exponential growth of an information flow, which creates new waves of consumption development, and, consequently, production development, takes place. All this causes exponential growth of environmental problems, technogenic and anthropogenic disasters, damage to the noospheric ideology. There is a need in a new system model of environmental security, which will outline the required state of the ecological system and determine the mechanisms for its development.

It is highly likely that in the nearest future we are to expect boost in new technological advances negating the classical concepts on the development of new equipment and technologies, and denying the classical principles of management. It is possible to forecast rethinking of the role and forms of industrial culture, significance of manufacture, technological level, training modes and ways of population socialization, and also forms, methods and tools for information access and its processing. From this point of view,

economists and news people joining their efforts together make it possible to determine the prospects for transition to the information-oriented society, and such cooperation is becoming very popular nowadays. Environment and its state for human development will become indicators of the loyalty to the model which is being adopted. After all, economists can observe the limits to which existing technological models are able to develop, even in environmental indicators.

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