STANDARDS AND INDUSTRIAL ECOLOGY, WITH PARTICULAR REGARD TO THE RUSSIAN FEDERATION

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Contents

Summary

This article reveals the leading role of standards in Industrial Ecology. It describes the tendency for the modern stage of world development to introduce widely accepted international standards. Along with this, each country has it own system of standards and respective specifics. A number of significant standards are available for practical operations of industries and institutions, e.g. the international environmental management standard ISO 14000.

1. Role of International, Regional and National Standards in Industrial Ecology

Standards are important in industrial ecology, as a means of helping the world community on the course of sustainable development. Both national and international environmental standards play constructive roles in industrial development. Standards, as documents setting conditions, as well as licenses and certificates confirming compliance with these conditions, have become regulatory justification for favorable participation in the market on equal terms with competitive partners, while allowing for specific peculiarities of contract transactions. Within a short period environmental factors have become a requisite element of industrial standards. Systems of standards differ from country to country. Their development is a powerful invigorating factor that ensures competitiveness and reliability of goods and services. Environmental protection is enhanced through international standards, limits and rules.

Industrial ecology embraces principles and methods of international environmental standardization, environmental management (including status analysis and system upgrading), and testing of raw materials and produced goods. International

requirements, mainly using North American and Western European systems of environmental certification, promote environmental standardization of processes and products.

The current phase of economy sectors considering their development perspectives, is in urgent need for use of international standards, limits and procedures. First of all, it is dictated by the external market. Expert opinion is that today, in 90% of contracts in Europe, consumers request manufacturers to confirm availability of a quality system that complies with the international quality management standard ISO 9000.

Industrial companies often have to demonstrate to customers that they operate a certified quality system that complies with requirements of the International Standard Organization (ISO). Markets in Europe, USA and even in the Far East require better, clean and environmentally sound products, from any sector, agency or firm. Exporters either comply with these standards or sell their goods at a lower price. Along with this, great importance is attached to environmental requirements.

Quality system certification in developed countries is proof of an industry's ability to manufacture products of a certain quality, and this obviously influences sales and market opportunities. ISO, as well as other international standards, for instance standards by the International Electro-Engineering Committee (IEEC) are of a recommending character. It is interesting to note that many developed countries apply international standards, mainly ISO, as national standards in order to widen their market. Among these countries are Austria, UK, Finland, FRG, France, Switzerland, Sweden, etc. In the framework of the European Union these standards are effective as regional ones. This convincingly proves that these standards have gained broad international acceptance.

Establishment of sectoral testing centers based on large analytical laboratories, was an important step in certification of products and production operations. As an example, we will cite the center "Intechgas" of the joint stock company "Gasprom". It is equipped with modern facilities for analysis of fresh oil, natural gas, gas condensate, and their derivatives. This Center was set up by Gasprom and supported by the world famous British company "Intertek Testing Services – Cabel Brett", which is one of the largest international leaders in the field of certification. It shall be noted that the Testing Center (TC) is accredited in the national system of GOST R for technical eligibility and independence. According to the project TC, "Intechgas" was meant for tests, analysis and certification of different types of hydrocarbon raw materials and processing products: natural gas, gas condensate, helium, liquid gas, oil, various types of petrol, fuels, black mineral oil, etc. The center complies with all the requirements of the European standard EN 45001 and the Manual of the 25th International ISO, while implementing all kinds of tests in conformity with international and national specifications and analysis methodologies. Gasprom procured and launched for the center all the required equipment from the best analytical companies of the world.

At present, the Intechgas performs tests on gas and oil products using 75 methodologies, including those of ASTM, IP, ISO, and UOP. The Center is hoping to soon obtain

accreditation in the British system UKAS/NAMAS. Thus, the targeted activity of Intechgas, focused on introduction of the European quality system, bears fruit, although it is expensive.

In the near future Intechgas plans to significantly extend its list of certified goods and testing methods. In order to ensure appropriate control of correctness and evaluation of conducted analytical studies, the Center participates in the International Program of Inter-Laboratory Verification, the participants of which are laboratories of many well-known companies, including Exxon, and Intertek Testing Services – Caleb Brett.

In 1998 on the initiative by the European Union the PHARE Program was implemented, focusing on one-week training for East-European countries in certification systems and international standards. The program was called "Training in quality guarantee for organizations assessing compliance" and was based on ISO 9000 and EN 45000 standards.

In the TACIS Program that followed, "Oil and Gas Certification Centers" focused on harmonization of standards in the Russian gas sector with international standards to ease trade in gas engineering equipment between Europe and the Russian Federation.

In many countries there is clear recognition of the need to study European standards, for instance standards EN 45001 to EN 45003 and EN 45011 to EN 45014, that regulate operation of laboratories, certification authorities and manufacturers when applying for a product certificate.

ISO standards of different series are of significant importance to the efficiency of environmental activities in various sectors. The International Standards Organization, along with further developing of standards for methods to control environment components (air, water, soil), has elaborated a set of international standards for environmental management systems, known as the ISO 14000 series.

The first international standards of this series have been adopted. They have identified methods for establishing and functioning of environmental management systems in industry, and the requirements of these systems, and they have set requirements for environmental audit. The environmental management system, being a constituent of the overall administrative management system of an enterprise, has a lot in common with product quality management systems. This explains the similarities of quality management and environmental management methodologies. It is reflected in the unity of ISO 9000 and ISO 14000 standards. All layers of society are interested in good environmental quality while high quality of products is of great interest to consumers.

International Electro-Engineering Committee (IEEC) is also very active in the field of environmental accounting at all phases of a product life cycle in electrical engineering and electronics. This is clear from IEEC Manual 109 "Environmental Aspects, their Accounting in Electro-Engineering Standards".

EU countries, USA and Japan are busy with introduction of environmental requirements by ISO and IEEC.

In joining the community of industrial countries, Russia will have to ensure strict compliance with unified environmental standards and procedures, including application of environmentally sound management methods. There is a need to improve efficiency of quality management activities, sector studies and introduction of ISO standards for product quality management, and quality control for water, air and soil. International IEEC standards also find their appropriate application, and the standards and procedures of the International Bank for Reconstruction and Development, Washington, (the 'World Bank') must also be studied.

As examples, please find below some international standards, limits and procedures.

2. International Standards: ISO, IEEC, and Standards and Procedures of the World Bank

International ISO Quality Management Standards

ISO 8402:1994.	Quality management and provision. Glossary.
ISO 9000-1:1994	Overall quality manual and quality standards. Part I. Guidelines for selection and application.
ISO 9000-2:1993	Overall quality manual and quality standards. Part II. Overall Guidelines for ISO 9001, ISO 9002 and ISO 9003 application.
ISO 9000-3:1991	Overall quality manual and quality standards. Part III. Overall Guidelines for ISO 9001 application in software development, installation and maintenance.
ISO 9000-4:1993	Overall quality manual and quality standards. Part IV. Manual for the Reliability Program management.
ISO 9001:1994	Quality systems. Model of quality provision in designing, elaboration, production, assembling and maintenance.
ISO 9002:1994	Quality systems. Model of quality provision in production, assembling and maintenance.
ISO 9003:1994	Quality systems. Model of quality provision in final control and testing.
ISO 9004-1:1994	Overall quality management and quality system elements. Part I. Guidelines.
ISO 9004-2:1991	Overall quality management and quality system elements. Part II. Guidelines for services.
ISO 9004-3:1993	Overall quality management and quality system elements. Part III. Guidelines for recycling materials.
ISO 9004-4:1993	Overall quality management and quality system elements. Part IV. Guidelines for quality improvement.
ISO 10011-1:1990	Guidelines for quality system auditing. Part I. Auditing.
ISO 10011-2:1991	Guidelines for quality system auditing. Part II. Qualification criteria for experts auditing quality systems.
ISO 10011-3:1991	Guidelines for quality system auditing. Part III. Auditing program

management.

ISO 10012-1:1992 Requirements ensuring measuring equipment quality. Part I. The system of confirming metrological acceptability of measuring equipment.

ISO 10013:1994 Guidelines for Quality Manual elaboration.

International ISO Environment Management Standards

ISO 14001:1996 Environment management systems. Requirements and operational manual.

ISO 14004:1996 Environment management systems. Manual for Organizational Principles and Methods of Ensuring Operation.

ISO 14100:1996 Environmental Audit Manual. Major principles.

ISO 14011:1996 Environmental Audit. Environment Management System Audit.

ISO 14012:1996 Environmental Audit. Auditors qualification requirements.

ISO 14 040:1997 Life cycle evaluation. Principles and structure.

ISO Manual 64:1997 Manual on environmental aspects in product standards.

Standards of the International Electro-Engineering Committee (IEEC)

IEEC 721-1-81 Environment classification. Part I. Classification of ambient parameters and intensity.

IEEC 721-2-821 Environment classification. Part II. Climate. Environmental conditions. Temperature and humidity.

IEEC 721-3-0-84 Environment classification. Part III. Classification according to groups of internal factors and intensity of their impact.

IEEC 721-3-2-85 Environment classification. Part III. Classification of ambient parameters and their hardness. Transportation.

IEEC 721-3-5-85 Environment classification. Part III. Classification of ambient parameters and their hardness. On-ground transport setting.

Standards and Rules of the International Bank for Reconstruction and Development (World Bank), Washington, D.C., USA

World Bank Technical Document No.139. Policy and Procedures. Common issues for different sectors. Reference book for environmental assessment, vol. 1. – Washington, D.C., USA: IBRD, Environment Department, 1991.

World Bank Technical Document No.154. Instruction for the environmental assessment of energy and industrial projects. Reference book for environmental assessment, vol. 3. – Washington, D.C., USA: IBRD, Environment Department, 1991.

World Bank Operational Directive 4.01: Environmental Assessment (EA). – Washington, D.C., USA: IBRD, October 1991. World Bank Directives and Instructions Collection, 1995.

World Bank Operational Directive 4.02: Environmental Action Plan. – Washington, D.C., USA: IBRD, July 1992. World Bank Directives and Instructions Collection, 1995.

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Biographical Sketches

A.D. Ursul was born in 1936 in the Odessa Region (now in Ukraine). In 1959 he graduated from the Moscow Aviation Institute named after Ordzhonikidze. He obtained his DSc. (Philosophy) in 1969 and

became a professor in 1971. He is a honored RF scientist (1997), and academician of the Moldova Academy of Science (1984). Since 1991 he is an academician of the International Academy of Astronautics (Paris). He is also an acting member in a number of new public Academies: the Russian Academy of Natural Science (1995), the Academy of Social Science (1995), the Cosmonautics Academy named after K.A. Tsialkovski, the Russian Environmental Academy (1992), the International Academy of Informatization (1992), the Noosphere Academy (1991) (being the President of the Academy), the Peter Academy of Science and Art (1997), the International Academy of Science (1986, Munich). He is an honored member of the International Academy of Informational Processes and Technologies (1993) and the International Society "Mankind and Space" (1975).

He occupied a position of Department Deputy Head at the Philosophy Institute of the USSR Academy of Science (1970-1982), Director of the Philosophy and Law Department at the Academy of Science of Moldavian Soviet Social Republic (1982-1988), Director at the Institute of Social Informatics of the Academy of Public Science (1988-1991), and Director at the Noosphere and Environment Institute of the Russian Management Academy (1991-1994). Since 1994 he has occupied a chair at the Ecology and Environment Management Department of the Russian Academy of State Service under the President of the Russian Federation.

He is a significant scientist in terms of philosophy, science and technical methodology, especially in the fields of natural, technical and agricultural sciences, social informatics and cybernetics, cosmonautics and synergetics, social ecology and noospherology. He is an acknowledged leader in some of the scientific areas mentioned above. In recent years he has devoted special attention to developing a scientific basis for transfer of Russia and the whole of civilization to sustainable development with active involvement in various All-Russian and international forums addressing vital issues of the development of science. He has received many governmental and scientific awards.

A.D. Ursul is the author of over 700 scientific publications including over 70 monographs, books and brochures. He is the responsible editor of over 100 scientific collections and books, and over 200 of his publications have been translated into a dozen foreign languages. He made over 50 scientific trips to over 30 foreign countries. He prepared over 70 Ph.D.s and 20 DScs. He chairs the Council for Ph.D. and Doctor Degree Thesis in Philosophy and Technics at the Russian Academy of State Service under the President of the Russian Federation.

Vladimir N. Lopatin, Ph.D. (technics), is a professor at the Russian Academy of State Service under the President of the Russian Federation, and academician at the Russian Environmental Academy. The major areas of his activities are: environmental management economics, environmental management, environmental expertise, environmental impact assessment, environmental audit, resources management audit, waste management, regulatory support for the environmental management, international standards. He is the author of over 160 scientific publications. In 1970 he graduated from the Moscow Highest College named after Bauman (Apparatus Building Faculty) and obtained a Diploma of Engineering. At the same Highest College he obtained his Ph.D. (technics). In 1989 he obtained a degree of Doctor of Science (technics) with specialization in environmental protection and efficient use of natural resources at the Academy of the National Economy under the Russian Government. He obtained a professorship in basics of environmental and industrial safety in 1991. His has held the following posts: Deputy Head of the Technical Department at the State USSR Committee for Hydrometeorology and Environment Control, Head of the Laboratory for Metrology and Standardization at the Institute of Applied Geophysics named after Academician Fiodorov, Head of the Department for Regional Resources Use and Environment Protection at the Council for Studies in Production Forces and Economic Co-operation under the Ministry of Economy of the Russian Federation, Head of the Main Department for State Environmental Expertise at the Ministry for Environment Protection and Natural Resources of the Russian Federation, and professor of the Department for Ecology and Environmental Management at the Russian Academy of State Service under the President of the Russian Federation.