4. TEHRAN CONVENTION AS THE TOOL FOR PROVISION OF ECOLOGICAL / ENVIRONMENTAL SAFETY IN IMPLEMENTATION OF ENERGY–RESOURCE CAPACITY, INCLUDING ENVIRONMENTAL RISKS

4.1 MEASURES TO ENSURE ENVIRONMENTAL SAFETY UNDERTAKEN BY THE LUKOIL COMPANY AT EXPLORING AND DEVELOPING THE OIL AND GAS DEPOSITS IN THE NORTHERN AREA OF THE CASPIAN SEA [1]

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LLC "LUKOIL-Nizhnevolzhskneft" has been carrying out its activity in the Northern area of Caspian Sea since 1995 and currently the Company is the owner of 3 license areas – "Severny", "Tsentralno-Kaspiisky", "Vostochno-Rakushechny".

In turn, oil production in the Caspian Sea has been going on more than age, but its scale incomparable to the upcoming oil and gas development. In the past, there were many examples of the neglect of nature by oil-producing organizations: littered with debris, abandoned machinery and equipment on the seabed near oil rigs, dumping of production and household waste into the Sea, a permanent oil slick in the area of developed deposits.

[1] Based on the presentation at the "Caspian Sea Day" celebration, Astrakhan, 2015

Modern realities do not allow destroying the ecosystem of the Caspian Sea so thoughtlessly. Issues of biodiversity conservation, environmental safety and environmental management of companies operating in this region are very important today.

The Company has developed a scheme for the complex development of fields in the northern area of the Caspian Sea.

Of 8 discovered fields, the following are of the priority:

- The deposit named after Yu. Korchagin, the first stage of which was completed in 2009, and oil production was launched in 2010;
- The deposit named after V. Filanovsky for which the design documentation was developed and tenders for the facilities construction were carried out; the beginning of construction - 2012, the beginning of oil production - 2015;
- Sarmatskoye deposit for which the beginning of gas production is to be launched in 2017.

It is planned to construct 10 marine ice-resistant platforms with a total mass of about 100,000 tons and to lay more than 900 kilometers of pipelines before 2017. More than 250,000 tons of the pipe products will be required to realize this activity.

Fully aware of its responsibility for conserving the unique ecosystem of the Caspian Sea, the "LUKOIL" Company has created at its oil and gas facilities a powerful local complex of security technical equipment to ensure industrial and environmental safety, which allows timely detecting of emerging technological and environmental risks, to warn them and, if necessary, to eliminate the consequences as soon as possible.

In 2001, the "LUKOIL" Company was one of the first among the Russian oil companies received a certificate of compliance of the occupational safety and health and environmental protection management system with the international standards ISO 14001 and OHSAS 18001.

The complex for the first time in the Caspian Sea was based on the principle of "zero" discharge, which prevents leakage of any kind of waste. In compliance with this principle, all the waste from the drilling platforms are transported to shore for further disposal and recycling.

An important part of the environmental safety system is a set of measures on the prevention and oil spill response. At the exploration and production drilling and the oil production, rescue vessels with equipment

for the oil spill on board are permanently on duty in the area of deposits. Protection of coastal and shore zones is provided by a specialized organization via vessels with a low draught and corresponding equipment for liquidation of oil spills in shallow coastal areas and contaminated parts of the coast. Relevant skills are regularly trained during the annual regional and international exercises on joint actions of practical efforts and facilities at liquidating consequences of marine accidents in the northern part of the Caspian Sea.

Before the construction of each well, calculation of damage to fishery is made, and the Company compensates the damage, which, according to estimates, drilling could cause to fish stocks. The damage will be compensated by the Russian sturgeon juvenile fish release.

The higher degree of risk of activity conducted on the continental shelf on developing and operating of oil and gas deposits imposes specific requirements for the organization of the system for monitoring of natural processes and the status of the environment.

The structure of industrial environmental monitoring includes: monitoring of water bodies, subsoil status, pollution of the environmental and wildlife. Conducting the first two types of monitoring is prescribed by the water legislation and legislation on subsoil, and the implementation of other types of monitoring should follow "The Special Environmental and Fishery Requirements for Prospecting, Exploration and Production of Hydrocarbons in the Protected Area in the Northern Part of the Caspian Sea".

The environmental monitoring system provides data, which reflect the environmental situation in general in a certain area of the Caspian Sea, as well as to draw conclusions about the impact of production facilities on the marine environment and biological objects.

The observations covered about 300 parameters of the marine environment. Furthermore, these observations are correlated to the bio-testing marine environment and the identification of specific groups of micro-organisms, responding to the level of the marine waters pollution.

Since 2009, in the framework of production ecological monitoring the Company has been carrying out a complex satellite monitoring, the main task of which is to detect oil pollution in the waters in the areas of the Company operations.

An important component of the environmental monitoring is monitoring of bird population in the license areas of LLC “LUKOIL-Nizhnevolzhskneft”, including Malyi Zhemchuzhnyi island (natural monument of the federal value), i.e. obtaining data on the resources and birds habitats status.

The environmental monitoring of the North Caspian deposits is carried out using data from different sources. With a view to solving the problems of informational support of the environmental monitoring processes, the Company uses the “Information System of Ecological Monitoring" (ISEM).

ISEM integrates the obtained data, their analysis with charts, graphs and maps of the distribution of controlled parameters and the preparation of relevant reports.

An important function of ISEM is a possibility of constructing a trajectory of distribution of oil pollution in the event of an accidental spill at sea-in the Russian waters.

The “LUKOIL” Company is always open to dialogue with the public, actively cooperates with the Russian and international environmental organizations.

The Company closely collaborates with the Russian Ministry of Natural Resources and Environment on the preparation of the Nationals Plans of Action for the Tehran Convention, which includes a number of positions connected with the activities of LLC “LUKOIL-Nizhnevolzhskneft”.

Accepted by the “LUKOIL” Company the principle of its activities on the basis of the environmental policy gives confidence in the environmental safety of offshore oil and gas production activities carried out by the Company, and in maintaining the unique natural resources of the Caspian Sea.

In developing its activities on the Caspian shelf the “LUKOIL” Company plans to take further measures aimed at further improvement of the environmental security system, and to continue its work, following the principle of ecological and economic balance.

4.2 MONITORING OF IMPACT OF HYDROCARBON FIELDS DEVELOPMENT IN THE CASPIAN SEA ON THE ECOSYSTEMS AND BIODIVERSITY STATUS IN SUCH AREAS AND REDUCING RISKS FOR THE NORTHERN CASPIAN BIODIVERSITY

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Improvement of monitoring of technogenic impacts on the ecosystems in hydrocarbon fields development areas of the Northern Caspian for the purposes of reduction of risks for biodiversity due to the integrity of the Caspian geo-ecological system is closely linked to increase in efficiency of environmental monitoring of the whole Caspian in general. And the improvement of approaches to organization of integrated monitoring performed by the subsoil user and that include biodiversity monitoring could promote the development of the Environmental Monitoring Programme (EMP) under the Tehran Convention. This issue was developed under the UNDP/GEF international project "Mainstreaming biodiversity conservation into Russia's energy sector policies and operations".

Conceptually, the main problem of environmental monitoring of oil and gas fields in the Northern Caspian in terms of control of biodiversity and the state of geo-ecological systems is the detection of changes in biota due to a reaction to the activities of specific mining companies within the license areas on the existing background of typical to the region quasi-periodic and other long-term changes in the marine environment of both natural, and anthropogenic genesis, including those related to the impact of oil and gas development in the adjacent water areas.

The biodiversity monitoring specificity is that its object is a feature(s) that characterizes the aggregates of populations of various species at the ecosystem level, and controlled variables of biodiversity

("ecosystem variables") should reflect the integral ("system") characteristics of the biota. Such factors as the number and biomass of individual species, age and sex composition of populations, the spatial distribution of individual components of biological communities, species diversity of communities are determined as population and ecosystem variables. Sometimes the determination of ration between the numbers and/or the biomass of individual groups of organisms is recognized as sufficient.

The current Russian standard marine environmental monitoring programmes include a wide range of physical, chemical and biological variables. However, there are no integrated variables (indicators of the ecosystem state) in this list of parameters, with rare exceptions. For the Caspian sea, this situation is aggravated by the lack of generally accepted idea of a "current norm" of ecosystems condition (usually, the "background" state of the Caspian Sea / Northern Caspian is taken as such a norm) and standard methods of its assessment, as well as the need to adapt to the specific conditions of the Caspian and its Northern part of the techniques proven in other water areas – such as the "marine biotic index" (AMBI), "benthic index" etc.

Affiliation of marine ecosystems with the "very complex systems", which include a great number of organisms of different taxonomic and trophic groups, interacting with each other and the environment, involves significant differences in their sensitivity and ambiguous response to the same intensity of technogenic impact, exacerbated by differences in seasonal conditions, in stages of population dynamics etc. At that, the establishment of the most significant cause-effect relationships in the marine ecosystem and the formation of appropriate models belong to the sphere of interests of the fundamental science.

Under the conditions of typical for the Caspian Sea relatively low biological diversity, the specificities of population-based structure of aquatic ecosystem, with its highly important in terms of resources hypertrophied development of sturgeons and other objects of fishing, indicate a high degree of adaptability to dynamic natural conditions of the marine environment, including the significant quasi-periodic fluctuations in the level and changes in physico-chemical parameters of the waters on the one hand, and its sensitivity to anthropogenic effects on the other (Abdurakhmanov et al., 2002). At the same time, the modern shallow

freshened North Caspian as a zone of transit of variable amounts of polluted river waters and effective hydrochemical barrier when mixed with more saline "marine" waters, overheating in summer and freezing in winter, subject to wind-surges and storms, runoff, wind and compensation currents, water area of high diversity of incoming technogenic pollutants and their deposit, is a very difficult region for the organization of biodiversity monitoring.

There are two problems clearly identified here for the monitoring of the effects for the biodiversity from oil and gas production:

- How to identify such effects against a background of complex manifestations of natural and anthropogenic dynamics, and
- Exactly how and to what extent the hazard such impacts occur at one or another "phase" ("scenario") of natural and anthropogenic ecosystem dynamics of a particular water area.

Accordingly, to study the effects of oil and gas production for the biodiversity and ecosystems of the North Caspian the formation of adequate ideas about the natural and anthropogenic dynamics of the ecological state of the region is important (Matishev et al., 2011), and especially – the dynamics of benthic communities (Ushivtsev et al., 2011). At that, there are very different assessments of the expected environmental impacts of the offshore production of hydrocarbons in the North Caspian: from catastrophic (Diarov et al., 2005), to those that recognize the possibility that they will not be the worst in the complete set of consequences of anthropogenic impacts (Patin, Zaitseva, 2005). All this requires the organization of biodiversity monitoring in the areas of oil fields development, and special care under the selection of the objects and methods of research, as well as in the interpretation of its findings.

It must be borne in mind that significant changes in the habitat of the Northern Caspian biota may occur due to natural causes.

Available data from studies of the effect of pollution on the Caspian hydrobionts indicate that different taxa, even within the same trophic group may respond differently to low and medium levels of contamination (e.g., petroleum products) and have different resistance to high levels of pollution. Their toxicoresistance is very heterogeneous and makes the row of reducing the sensitivity of organisms to the effects of oil products: fish fry – crustaceans – worms – mollusks – macrophytes. Geographically, the most sensitive and vulnerable to oil pollution is the

Volga mouth area to a depth of 6-8 m, and the Volga-Ural interfluve. Next on the degree of vulnerability is the steep area of the western part of the North Caspian, also affected by the effects of Mnemiopsis ctenophore (Mnemiopsis leidyi). Even less sensitive is the area of the slope (8-10 m) in the Western part of the Northern Caspian and the Ural Borozdina – biotope of mass development of introduced species – polychaete worm Nereis diversicolor. The least sensitive to pollution are areas of the south and eastern shallow waters of the North Caspian (Karpyuk, Katunin, 2005).

The number and diversity of planktonic organisms of the North Caspian is very dynamic. Plankton is sensitive to chemical pollution, changes in turbidity, concentration of suspended solids, hydrological regime etc. With the ability to quickly restore its abundance and species composition, the plankton community could stand the short-term and/or limited in scale negative impacts, including oil pollution. Variables of control of the state of phytoplankton communities include: the total number of cells, total biomass, species composition, number of species, and the level of saprobity. For zooplankton: the total number of organisms and species composition (species number and list), total biomass, saprobity level, the number of major groups and species, the biomass of the main groups and species. The Northern Caspian zooplankton, which basis of the communities is formed by the Rotifera, Cladocera and copepods, is the most vulnerable to oil pollution, while remaining the basis of the food ration of juvenile fish.

Benthic communities are the most stable over time, and often characterize the local environmental conditions and are able to save the retrospective information on previous levels of impacts. Assessment of impact on the benthic communities is based on the data: for phytobenthos – on the floristic composition, the percentage of species distribution in communities, projective cover of the bottom surface with vegetation in percentage, on the spatial structure of vegetation (vertical, horizontal), degree of the vegetation transformation; for zoobenthos – on the total number of organisms, species composition, variables of community structure (biomass, ratio of the major groups and species, the dominant species in number and biomass). The composition of benthic communities, their structure may vary considerably from site to site and depend on many factors, but its total biomass is determined by the number of the largest representatives of bivalves and worms. These groups of

macrozoobenthos organisms are sensitive to granulometric composition including fine sediment fraction, and could be considered as potential indicators of long-term technogenic impact on the seabed. In addition, recently a number of meiobenthos organisms' advantages over other biological test objects was identified: a large population density, diversity of species and a high resistance to anthropogenic and natural stresses (Mokievsky, 2009). Lesser length of life cycles than the macrobenthos organisms theoretically allows to use meiobenthos to track the short-term effects of impact. Another useful distinction of meiobenthos, as a potential object of monitoring, is the lack of pelagic larvae in most species, allowing to precisely localize the area of violations and to unambiguously associate it with the action of local factors.

Assessment of impact on ichtyofauna is based on the results of the fisheries monitoring (assessment of the species composition of fish in catches, catch per effort/ha by species and fishing gear, the presence of rare fish species, size structure, obtaining of standard biological characteristics). As the bio-indication objects the massively common species are preferred (not "rare" and "endangered"), for which the results of a long-term regular observations are available. According to CaspNIRKh, the best bio-indicators are mass representatives of the suborder Gobioide*i* of the genus Neogobius (black sea-Caspian gobies): Neogobius fluviatilis – monkey goby, Neogobius gymnotrachelus – goad goby, Neogobius iljini – Caspian goby Golovach, and Neogobius melanostomus – round goby. Caspian gobies are an essential part the food ration of sturgeon, herring, whitefish, chub, pike-perch, catfish and seal. The proportion of gobies in the diet of adult specimens of sturgeon and Beluga reaches 80% of the total food mass. The gobies make up to 40% of the food ration of the seals' food in winter and summer. They have no commercial value, and are food for fish and mammals.

The concentrations of substances, such as organochlorine pesticides and heavy metals (lead, copper, zinc, mercury) in the tissues of internal organs and muscles of the fish, are used as the controlled variable in toxicological studies.

The Northern Caspian is a place of concentration of migratory and breeding in the region waterfowl and wading bird species of international conservation importance. Monitoring of the impact of hydrocarbon production stages on this group of organisms is carried out through

studying the seasonal and long-term dynamics of species composition, number, reproduction characteristics, and the nature of travel and accommodation of birds.

The Caspian seal (Phoca caspica) – species on top of the trophic pyramid, is among the special, specific for the Caspian Sea objects of monitoring. The status of its population is of indicative value for the assessment of the Caspian Sea ecosystem overall well-being. In the process of exploration, field development and operation phase the data is collected on: the number, age and sex composition, the nature of sojourn and accommodation especially in the controlled area, seals locations (meeting sites) are marked etc.

Changing in the environment, including its pollution, alters the conditions for the existence of individual species, resulting in the restructuring of the species community structure, changing the dominants etc. The environmental effect of the same type of impact at its different intensity could have a different sign: a low content of organic matter and nutrients, and their very high content, what have an adverse impact on the biodiversity of aquatic ecosystems. This is an additional "complication" of the existing quantitative indices of biodiversity, as well as identification of their "sensitivity" to identification of certain impacts on biota.

To include variables of biological diversity into the environmental monitoring of the Northern Caspian a number of problems should be address:

1. Quantify the "normal" state of different ecosystems per indicator taxa or groups in the selected time interval (intervals), taking into account seasonal and long-term dynamics of variables.
2. On the basis of ideas about "norms" to develop rating scales for the concrete indicators.
3. Unify measurement techniques of selected indicators of the quality of the marine environment.
4. Carry out the procedure in the "establishment" of the Caspian marine water quality standards per the relevant indicators.

The state of marine ecosystems in quality categories ("good", "satisfactory", "poor" etc.) is usually perceived adequately by a wider range of non-specialists, and is thus a kind of "interface" between environmental experts, mining companies, government officials and public.

From a substantive point of view the integrated indicators contain

at the same time information on few or many components of the ecosystem that ensures the implementation of the principle of integrity of environmental assessment.

These materials could be used by the Work Group on monitoring and assessment during the implementation of the Environmental Monitoring Programme (EMP) to promote cooperation with oil and gas companies and the implementation of the Ashgabat Protocol.

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4.3 ISSUES OF CREATING AN EFFECTIVE SYSTEM FOR MONITORING THE TECHNOGENIC IMPACT ON THE CASPIAN ECOSYSTEMS IN THE CONTEXT OF IMPLEMENTING THE TEHRAN CONVENTION" USING GEOINFORMATION TECHNOLOGIES (GIS)

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Characteristic of GIS as an instrument of information support of management decisions in the region of the Caspian sea is given. Main problems of obtaining, storage and use of data on the basis of analyzing information resources of Pre-Caspian subjects of the Russian Federation is given. Recommendations on approaches to creation of a problem-oriented system of monitoring of impact of oil and gas sector on the state of Caspian sea ecosystem are presented.

4.4 ENVIRONMENTAL IMPACT ASSESSMENT AND ECOLOGICAL RISKS MANAGEMENT

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In accordance with item 2 of Article 13 of the Tehran Convention the Parties: agree to perform assessment of impact on marine environment of dangerous types of activity and implement measures on risk reduction.

Short characteristic of mechanisms of the Tehran Convention, such as SPAC, etc., envisaging impact assessment is given.

Content of environmental impact assessment dependent on quality of used information is disclosed. Characteristic of methods of assessment based on the analysis of sensitivity of components of the environment to various impact factors is given.

In order to apply provisions and the Tehran Convention and its protocols it is proposed to develop approaches to assessment of environmental risk and potential environmenta damage.

4.5 PECULIARITIES OF ENSURING ECOLOGICAL SAFETY IN THE CASPIAN SEA

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Short characteristic of measures on protecting Caspian environment within the framework of the system of environmental safety is presented. Description of elements for ensuring environmental safety in the region, including environmental monitoring, control, EIA, compensation measures on planned impact is given. The Tehran Convention envisages the development of effective methods for prevention, reduction, control and combating consequences of pollution of marine environment, as well as measures for mitigating consequences of fluctuations of sea level, including assessment of vulnerability of different parts of marine shallow wasters to integrated impact of anthropogenic factors.

4.6 ECOLOGICAL RISKS IN THE CASPIAN SEA AND POSSIBILITIES TO REDUCE THEM

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Basing on the results of the studies by CaspNIRH characteristic of the state of marine environment of the Caspian is given including increase of the background of oil products in water and wish. The main risks in the Caspian include probable emergency situations connected with oil spills, installation of drilling platforms in areas of formation of ice fields, as well as transportation of hydrocarbons, etc. Special attention is paid to arrangement of artificial islands extraction of oil and gas. Preventive environment protection measures are proposed.

4.7 ON SPECIAL ENVIRONMENTAL AND FISHERY REQUIREMENTS TO EXPLORATION AND DEVELOPMENT OF OIL AND GAS DEPOSITS IN THE NORTHERN PART OF THE CASPIAN SEA

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Short description of the development of Special environmental and fishery requirements for the development of oil and gas deposits in the northern part of the Caspian sea. Characteristic of 2010 project entitled "Rules of environment protection in the course of searching, exploration and extraction of mineral resources of the Russian part of the dwells of the Caspian sea" on given along with relevant proposals on the given subject.

4.8 PRACTICAL IMPLEMENTATION OF COMMITMENTS TO MEET SPECIAL ENVIRONMENTAL AND FISHERY REQUIREMENTS AND OBLIGATIONS UNDER THE TEHRAN CONVENTION AT DEVELOPING LICENSE AREAS IN THE RUSSIAN SECTOR OF THE CASPIAN SEA

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Since the very beginning of its evolvement, the offshore sea oil and gas sector has attracted and is continuing to attract the attention of environmental agencies and public in comparison to some "on-land" activities. In any case, the list of publications on the environmental consequences of oil and gas development at the Sea (in particular, with regard to the oil pollution problem) is unprecedentedly long and includes many thousands of articles, books, reports, conference proceedings, etc. And it is certainly not a coincidence, but is the result of a number of reasons and circumstances, referred to by S.A. Patin (Patin, 2001):

• Highly variable, severe (sometimes extreme) environmental conditions in the areas of oil and gas development at the Sea, where the probability of accidents and even catastrophic outcomes is usually higher than on land;

• «Openness» of oil platforms, convenience of visual and other types of observations (from ships, satellites, etc.) over the ecological situation in the offshore oil fields area;

• The ubiquity of the distribution and ease of detection of oil pollution traces in the Sea, for example, in the form of an iridescent foil;

• Wide public response to every emergency oil spill in the Sea;

• Conflict of interests on the shelf among different users of the marine resources, coastal zones and, above all, between the oil industry and fisheries.

In this context, the public response to oil spills at the Sea and environmental disasters should be recalled. Most serious response was noted in connection with the offshore oil and gas platform Deepwater Horizon in the Gulf of Mexico, where, in the result of an accident on April

20, 2010, 11 people died, 115 individuals were evacuated, the destroyed platform sank, and oil was flowing to the Gulf of Mexico for 92 days. Total leakage into the marine environment amounted to 4.9 million barrels of oil.

After winning the 1997 tender for the exploration and production of hydrocarbons, the oil company “LUKOIL” pioneered the development of oil fields in the Russian sector of the northern part of the Caspian Sea.

Taking into account special conditions of the “LUKOIL-Nizhnevolzhskneft” license areas location, namely the northern shallow, which is well warmed up and, hence, the most highly productive aquatoria of the Caspian Sea, as well as closed and isolated from the World Ocean, the subsoil user had to offer such technologies, that would ensure the necessary protection of the marine environment from pollution.

To this end, in 1998, the Russia's leading ecologists together with the “LUKOIL” Company experts developed and the Ministry of Natural Resources of Russia approved Special Ecological and Fishery Requirements for Geological Exploration, Development and Production of Hydrocarbons in the Protected Northern Part of the Caspian Sea (Special Ecological and Fishery Requirements…, 1998) based on the principle of “zero” discharge.

The Special requirements are applied to the Russian sector of the Caspian Sea and to the adjacent shoreline in the areas affected by storm surge. Many years of practical experience of the LLC “LUKOIL-Nizhnevolzhskneft” development of the license areas in the Russian sector of the Caspian Sea have demonstrated high efficiency of this brief, but very serious in content, regulatory document, based on the principle of “zero” discharge.

After signing by all Caspian littoral states in 2003 and the subsequent ratification of the Framework Convention on the Protection of the Marine Environment of the Caspian Sea (August 12, 2006), the “LUKOIL” Company has followed the provisions of the Convention and its protocols in their activity.

We should specially note the practical implementation of the “Regulation on the Environmental Impact Assessment of the Proposed Economic and Other Activity in the Russian Federation” requirements (2000) by the “LUKOIL” Company with regard to public involvement in

the preparation and discussion of materials on the impact of the proposed activity which is an issue of the ecological expertise.

United Nations Conference on Environment and Development (Rio de Janeiro, 1992) noted that environmental issues are best handled with the participation of all concerned citizens (Principle 10 of the Declaration of the Conference). It was emphasized that each individual should have access to the information concerning the environment, which is available at the governmental authorities, as well as to have a chance to participate in decision-making.

Complicated economic and environmental solutions are much easier to be implemented if consensus is achieved by involving the public in decision-making and if all stakeholders agree on the need for mutual concessions. However, as noted in the materials of the European Economic Commission of the United Nations, dedicated to the public participation in environmental decision-making, the main problem is the lack of tradition to involve the public into the process, as well as the lack of methods for reaching agreement among the proponents, environmental authorities and the public.

In Russia, there is no such tradition even to a greater extent than in such countries as the Netherlands, Canada, Finland, Germany, where environmental consciousness of the population has begun to develop much earlier. The public consciousness and the interest in environmental issues were important driving forces towards the public participation in the West.

Practical implementation of the "LUKOIL" Company project in the Caspian Sea, in accordance with the Convention on EIA in a Transboundary Context (Espoo Convention, 1991), the Regulation on EIA in the Russian Federation (2000), and later with the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran convention, 2003), was preceded by discussion on the planned economic activity with the public concerned.

The first discussions on the planned economic activity of the "LUKOIL" Company (the offshore exploration wells construction) took place in the late 90-ies of the XXth century with active participation of the public not only from the Astrakhan region, but also from Moscow, Dagestan, Kalmykia, Kazakhstan and Azerbaijan. Representatives of the State Marine Rescue Service, Ministry of Emergency Situations, Rostekhnadzor, Rosprirodnadzor, mass media, scientific and legal

organizations were also involved in that process. At that time, there was no experience in holding such events, while the public concern was extremely high taking into account the Caspian Sea uniqueness. Besides, there was no practical experience in the development of the shallow of the Caspian Sea - the most vulnerable to contamination area.

Nowadays, LLC "LUKOIL-Nizhnevolzhskneft" has organized and held more than 110 public hearings on the proposed economic activities on the license areas development in the northern part of the Caspian, including discussions on the land-based production facilities.

In recent years the number of participants of the public hearings has considerably decreased. Perhaps this is due to the fact that during the period from 1999 to 2015 the "LUKOIL" Company drilled more than twenty wells for various purposes with total footage of more than 55 thousand meters, discovered eight multilayer hydrocarbon deposits, mined and shipped to the land more than 5 million tons of oil in the Russian sector of the Caspian Sea. The activity was carried out without accidents with the environment damage. The structural composition of the public hearings participants has also changed. Now, indispensable participants of the hearings are mostly representatives of supervisory and regulatory authorities, universities and students.

However, the public hearings minutes are subject to careful scrutiny of the expert commissions of the State ecological expertise.

The public discussions on the planned economic activity of LLC "LUKOIL-Nizhnevolzhskneft" in the northern part of the Caspian Sea have resulted in launching new research themes in addition to those already carried out or currently being conducted:

• Study of impact of Mnemiopsis leidyi on the biodiversity and productivity of the northern part of the Caspian Sea ecosystem in order to develop measures to combat it;

• Ranking biological objects of the Caspian Sea according to the degree of sensitivity to the specific contaminants complex at drilling operations;

• Elaboration of biological methods of the northern part of the Caspian Sea ecosystem protection from spills of hydrocarbons;

• Research of the Caspian seal ecology;

• Ornithological studies on the islands in the northern part of the Caspian Sea and in the lower reaches of the Volga river Delta, including night-migrating birds;

• Melioration of spawning grounds of semi-anadromous fishes in the Volga river Delta;

• Other studies.

In the course of the public hearings, the LLC "LUKOIL-Nizhnevolzhskneft" system of ecological safety, the results of the conducted ecological research and monitoring were appreciated by the public.

In the mid 90-ies of the XXth century, that is long before the drilling of the first prospecting and appraisal well 1 Khvalynskaya in 1999, the "LUKOIL" Company conducted a comprehensive large-scale geological and geophysical study of the Russian sector of the Caspian Sea. The experience in oil and gas exploration in the North Sea and in the Gulf of Mexico was taken into account to the maximum extent. That experience was summarized by the UN experts on the Scientific Aspects of Marine Pollution in their report (GESAMP, 1993).

The protection of the highly productive marine environment of the shallow in the northern part of the Caspian Sea is ensured by strict observance of the Special Ecological and Fishery Requirements (Special Ecological and Fishery Requirements…, 1998) and provisions of the Framework Convention for the Protection of the Marine Environment of the Caspian Sea, including its protocols, in particular, by:

• Performance of the "zero" discharge principle for all types of waste, which greatly increases the cost and complexity of the work, but provides the necessary and effective protection of the marine environment from pollution;

• Permanent presence of a rescue vessel equipped with facilities for liquidation of emergency oil spills (OSR) near the offshore platform;

- Banning the use of all kinds of chemicals that do not have fisheries maximum permissible concentrations (MPC) or approximate safe impact level (ASIL);
- Introduction of time limits for carrying out economic activity and of zones, prohibited for seismic survey;
- Support of the economic activity with the environmental monitoring, including via satellite;

- Project documentation submitting to the State ecological expertise;
- Carrying out annual comprehensive training, including international joint training, aimed at the activity coordination improvement at liquidating consequences of accidents in the northern part of the Caspian Sea;
- Acquisition of ice skimmers;
- Financial support of the activities, envisaged by the plan on prevention and response to oil and oil products spills, including compensation in full the harm caused to the environment, including bio-resources;
- Public discussions on the results of the EIA of the planned economic activity results;
- Elaboration of a package of corporate regulatory and procedural documents and standards to ensure the environment protection, rational nature management, environmental and industrial safety of the license areas exploration, which correspond to the best foreign analogues, and in some cases are superior to them;
- Financing the cultivation of juvenile sturgeon in the Severny license area, which only in 2014 exceeded 95 million rubles;
- Other activity.

The Company has a rich experience in the development of the offshore fields in the Baltic, Caspian and Azov seas. Standards and approaches to ensure the ecological safety, applied by the Company at developing the offshore fields, proved to be effective and were recognized both by the Russian and international public. In 2012 the oil company "LUKOIL" was qualified by the Ministry of Oil of Norway to function on the Norwegian continental shelf.

In 2015 the "LUKOIL" Company adopted the Program for the Biological Diversity Conservation at their offshore production facilities with account of the legal and other applicable requirements on the biodiversity conservation, including the joint recommendations of the UN Development Program, the Global Environment Facility, Ministry of Natural Resources and Environment of Russia and WWF Russia.

Preventing the negative impact of the planned economic activity on the Caspian Sea marine environment is directly connected with interests of the coastal population of the region. This objective interest forms the basis for public participation in the environmental optimization of the proposed

economic activity by means of the EIA procedure, which is envisaged by the Protocol on Environmental Impact Assessment in a Transboundary Context (EIA). The Protocol has been already elaborated and is expected to be adopted.

Publicity and transparency of the subsoil user at developing license areas is noteworthy. Specialists and enthusiasts of LLC "LUKOIL-Nizhnevolzhskneft" in collaboration with contractors, including research and design organizations, have already published several monographs, special editions of the branch scientific-technical journal "The Environment Protection in the Oil and Gas Sector". They regularly make presentations on the development of offshore fields at the most prestigious international conferences. The accumulated unique materials allowed preparing several theses, including Dr.Sc. dissertations. But this is not enough, as these materials are accessible only for a limited group of specialists. It is reasonable to publish the materials in wide mass media, which is accessible to the public, to make periodical presentations at various meetings with the public participation, to use resources of the regional/municipal radio, television and print media.

The annual large-scale celebration of the "Caspian Sea Day" on August 12 has become a good tradition. On this date the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran convention) was ratified by all the littoral states.

Visits of the Rospotrebnadzor Expert Commission members to the offshore ice-resistant platform of the deposit named after Yu. Korchagin, to the Transportation and Production Base in the village of Ilyinka and to the scientific experimental base "CaspNIRKh" - the Center "BIOS", organized by the subsoil user, were very beneficial. That experience allowed the experts to see for themselves the implementation of programs on the ecological and industrial safety of the offshore fields` development. Perhaps it would be worth to consider the possibility of such visits by the public for better understanding the techniques and technology used.

The legal basis for the LLC "LUKOIL-Nizhnevolzhskneft" development activity in the northern part of the Caspian is the following:

- The Russian Federation Government Resolution dated March 14, 1998, N 317 "On the Partial Amendment to the Legal Regime of the Protected Zone in the Northern Area of the Caspian Sea";

- The Russian Federation Government Order of December 19, 1997, N1806-r: in compliance with the established procedure, the Russian Ministry of Natural Resources was to issue for the "LUKOIL" Company a license for the subsoil use of the bottom area of the Caspian Sea within the coordinates according to an attachment to the Order. The Company had won tender for the right to use the subsoil for searching, exploring and extracting hydrocarbons within the certain area of the Caspian Sea bottom;
- License number SHKS 11386HP for the exploration and production of hydrocarbons in the northern part of the Caspian Sea until 01/04/2023, issued by Minprirody of Russia;
- The Special Ecological and Fishery Requirements for the wells drilling and development of the deposits named after Yu. Korchagin and V. Filanovsky (at the final stage of the work completion) within the protected territory of the Caspian Sea northern part.

Despite the availability of these and other official permitting documents, the Astrakhan region population periodically protests against the maritime activities in the northern area of the Caspian Sea. The people accuse the oil companies that fishery, being an important part of the Sea economic complex, is in decline due to diminishing of the resource base. However, according to the CaspNIRKh data, the average commercial return from the sturgeon natural reproduction in the past 40 years (that is long before launching the factual "LUKOIL" activities in the northern area of the Caspian Sea) has declined by more than 60 times (Khodorevskaya et al., 2012). The most sensitive impact on the sturgeon species is overfishing (including poaching). Since the time, when the Caspian Sea became the common property of five "owners", everyone has taken out of it as much resources as he can.

In the conditions of active development of the Caspian Sea subsoil by all littoral states, claims of the oil and gas activity opponents in the Russian sector of the Caspian Sea do not correspond to the national interests of the Russian Federation, its Maritime Doctrine (2015), its Strategy of Exploration and Development of Oil and Gas Potential of the Continental Shelf of the Russian Federation for the Period until 2020 on the basis of one of the main principles of the environment protection – the scientifically grounded combination of ecological, economic and social interests of an individual, the society and the state in order to ensure

sustainable development and the favorable environment (Article 3 of the Federal Law "On the Environment Protection", 2000). And finally, it is practically impossible to physically isolate the Russian sector of the Caspian Sea from other areas of the Sea and to ensure the bioresources growth within the sector.

The development of the shelf provides an increase in investments into the national transport, machinery (for example, investors contribute to one offshore oil platform about 1 billion US dollars in average), metallurgy, professional equipment, and other industries.

A few words about the importance of the offshore hydrocarbon fields' development for the Russian economy should be added. At present "black gold" is the main item of the Russian energy resources export: about 40% of Russia's budget consists of revenues from crude oil exports. At the public discussions on the EIA of the proposed economic activity it is emphasized that the "black gold" is now the major article of the Russian energy resources export, and the development of the offshore hydrocarbon deposits provides an increase in investments into transport, machine building, metallurgy, professional equipment, and other industries.

In addition, the development of the offshore hydrocarbon deposits results in:

- An increase in direct revenues from the subsoil use;
- The inflow of investments into the real economy sector;
- Increasing domestic consumption and export;
- GDP growth;
- Reduction of import dependence in the field of equipment and high-technology;
- Socio-economic development of the Russian remote regions and areas of special geopolitical interests;
- Maintaining employment and creating new jobs. In particular, only the development of the marine deposit named after B. Filanovsky ensured the creation of about 10 thousand jobs, including the employment in the construction sector.
- Based on the above, the following conclusions can be made.

- LLC “LUKOIL-Nizhnevolzhskneft” has established, tested and successfully implemented the system of industrial and ecological safety of hydrocarbon deposits development in the protected area of the northern part of the Caspian Sea. The system is based on the special environmental and fishery requirements, including the “zero” discharge principle and the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran convention) and its Protocols. The environmental monitoring results, including satellite monitoring, confirm high efficiency of the environment protection measures at developing the license areas in the Russian sector of the Caspian Sea. And it is appropriate to note the “state” achievements of the private oil Company at the Caspian Sea shelf developing (Novikov, 2007).

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4.9 NEUTRALIZATION AND UTILIZATION OF INDUSTRIAL AND DRILLING WASTE; PURIFICATION FROM OIL POLLUTION

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Characteristic of biological methods for cleaning up oil pollution is given. The experience of integrated cleaning of coastal area in the Republic of Dagestan (oilfield Berikeiskoe) with application of physical-chemical methods of microbiological reclamation and implementation of works on restoration of landscapes on the Caspian coast is given. Some examples of application of technologies for biological cleaning of oil pollution during emergency oil spills, in oil storage tanks, etc., are given.

4.10 TEHRAN CONVENTION AS THE TOOL FOR PROVISION OF ECOLOGICAL/ENVIRONMENTAL SAFETY IN IMPLEMENTATION OF ENERGY-RESOURCE CAPACITY, INCLUDING ENVIRONMENTAL RISKS

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Participants The 3rd thematic session the Stakeholders Meeting of the «Caspian Sea Day» (Astrakhan, 2015) have reported on the necessity of the formulation of the common approaches and further harmonizing methodologies for the implementation of the EIA procedures and the assessment of the environmental impact on the Caspian biota as well as specific instruments to promote environmental compliance in all the Caspian countries. The issues of mitigation and offsettings (compensation) under the use of natural resources were noted. Moreover, the necessity of uncertainty analysis under the environmental risks assessment should be taken into account. It was emphasized the need of the inclusion of uncertainty factor and risk management in the monitoring programme of the Caspian Sea as the likelihood of the alteration of the state of the Caspian environment.

The speakers have noted that the "**Zero Discharge**" principle widely applied by the oil companies to water pollution prevention in the Caspian Sea. It was stated that satellite monitoring is also being widely used to monitor the state of the marine environment. The concerns over the treatment of formation waters in the course of the oil extraction, ballast water, the protection of biodiversity from accidental oil spills, as well as the discharge of oil products from the marine vessels, the problems of the change in water balance, deteriorating habitat conditions, and the state of bioresources of the Caspian Sea were expressed by the meeting participants. The special focus was on the mechanisms of the Caspian biodiversity offsetting from oil spills in the future. It was mentioned that the geodynamic peculiarities of the Caspian Sea and risk management should be taken into account during the transportation of oil by the submarine pipeline and oil tankers.

Furthermore, the projects on the creation of artificial islands in the area of abandoned oil wells aimed at the improvement of biodiversity and clean up oil from water in the Northern Caspian area was supported by the "LUKOIL" company. The representative of the "Dagestan" State Nature Reserve delivered the presentation of the project on granting the status of Specially Protected Area (nature sanctuary) to the "Tyuleniy" (Seal) island in the Northern Caspian and its environmental rehabilitation by the cleaning up activities its area from the household and industrial wastes.

Conclusions and Recommendations:

The following conclusions were made with regard to the finalization of the discussions of the thematic session on the above issues:

1) The development of common methods and approaches to conducting the EIA procedures in the countries of the Caspian region
2) Minimization the negative impact on the marine environment, its mitigation and compensation for damages
3) The importance of considering of uncertainty in the environmental risk assessment
4) Negotiation and adoption of the Regional Oil Spill Action Plan
5) The development of insurance mechanisms for biological resources from accidental oil spills.
6) Prevention and liquidation of the risks and threats related to the transportation of oil taking into account peculiarities of the Caspian Sea ecosystem
7) Promotion of the use of the "ecosystem approach" to regulate economic activity and environmental management in the Caspian Sea
8) Facilitation of waste and ballast water management and the rehabilitation of the ecosystem of the Caspian Sea and its islands
9) Organization of joint research activities/surveys on the state of sturgeon stocks of the Caspian Sea
10) Establishment of a unified website on the achievements in science and the technology/ industry of the Caspian region

*** Following the thematic session Astrakhan 2015, moderated by E. Mammadov**

4.11 ANALYSIS OF INTERNATIONAL REGULATORY AND LAW ENFORCEMENT PRACTICE IN THE ESTABLISHMENT OF LEGAL LIABILITY AND IMPLEMENTATION OF COMPENSATION FOR ENVIRONMENTAL DAMAGE FROM POLLUTION

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Formulation of the problem of establishing procedures concerning liability for damage from pollution and its relevance to the Caspian Sea region; analysis of the USA and Western Europe databases (Germany, Norway, Kazakhstan); proposals to the Russian legislation which were developed on the basis of the analysis of the international regulatory legal framework concerning liability and compensation for damage to the environment.

This issue was developed under the UNDP/GEF international project "Mainstreaming Biodiversity Conservation into Russia's Energy Sector Policies and Operations".