Organization of observations of marine environment pollution in the areas of search, prospecting and production of hydrocarbon resources located in the Russian sector of the Caspian Sea subsoil.

Observations of marine environment pollution in the areas of search, prospecting and production of hydrocarbon resources located in the Russian sector of the Caspian Sea subsoil are subdivided into:

a) regional environmental research;
b) local environmental research;
c) industrial environmental monitoring of temporary facilities;
d) industrial environmental monitoring of infrastructure facilities;
d) environmental monitoring of emergency situations.

Regional environmental research and industrial environmental monitoring of infrastructure facilities (deposit facilities construction) are of long-term and regular nature. The procedure of these observation types is presented as follows:

Table 1

Data on regional environmental research

Observation system	System of environment monitoring
Observation types	Regional environmental observations in the areas of search, prospecting and production of hydrocarbon resources.
Observation area	License area
Starting year of observations	Year of issuing subsoil use license
Final year of observations	Year of expiry of subsoil use license
Number of ship stations	at least 1 station for the area of 250 km2 so that the total number of stations ranged from 25 to 50.
Observations structure	Presented in Annex 1.
Observation periodicity	At least 2 times a year
Type of ownership for observation data	Private
Organization owning observation data	The company ordering regional environmental research.
Materials presented to the agencies carrying out state environmental control of the companies' activities in the offshore area	Annual "Reviews of environmental conditions at the license area"

Table 2

Data on organization of industrial environmental monitoring of infrastructure facilities

Observation system	System of environment monitoring
Observation types	Industrial environmental monitoring of infrastructure facilities
Observation area	Areas of deposit facilities construction
Starting year of observations	Starting year of infrustructure facilities construction
Final year of observations	Final year of infrustructure facilities elimination
Number of ship stations	20 stations within the radius of 1,000 m from the point object At least 20 stations in a 1,000 m wide corridor where the linear object is located along its axis
Observations structure	Presented in Annex 2
Observation periodicity	At least 1 time a season
Type of ownership for observation data	Private
Organization owning observation data	The company ordering industrial environmental monitoring.
Materials presented to the agencies carrying out state environmental control of the companies' activities in the offshore area	Annual "Reports on environmental situation at the deposit".

Annex 1

The list and scope of observations carried out within regional environmental research

1. ACCOMPANYING OBSERVATIONS

1.1. Meteorological observations comprise measuring atmospheric pressure, temperature and relative air humidity, wind speed and direction, cloudiness and visibility as well as weather phenomena. Meteorological observations are carried out at every station.

1.2. Hydrological observations include measurements of wave height, period, type and direction, transparency, colour, temperature and electrical conductivity (salinity). Hydrological observations are carried out at every station. Temperature and electrical conductivity are measured with help of a probe, registering readout at sampling rate of 1 m.

1.3 Sedimentation observations include the determination of granulometric composition, carbonate and organic carbon in samples taken from the surface layer of bottom sediments. Sediment observations are carried out at every station.

2. GENERAL OBSERVATIONS

2.1 Hydrochemical observations include determination of hydrogen concentration (pH), concentration of dissolved carbon (organic and inorganic), oxygen and hydrogen sulfide in water, biological oxygen demand (BOD5), concentrations of ammonium nitrogen, nitrate nitrogen and total nitrogen, mineral and total phosphor, dissolved silicon and suspended substance. Hydrochemical observations are done at every station in water samples taken from surface and near-bottom layers. The data are analysed on board the research vessel.

2.2. Observation of marine pollution cover determination of the following concentrations in every water sample:

petroleum products;
synthetic surfactants;
phenols;
heavy metals (Fe, Mn, Zn, Ni, Cu, Pb, Cd, Co, Hg, Ba);
aliphatic and alicyclic hydrocarbons (from C_{14} to C_{33})
polycyclic aromatic hydrocarbons (naphthalene, metilnaphthalene, dimetilnaphthalene, diphenyl, acenaphthylene, acenaphthene, fluorene, phenanthrene, antracene, fluorantene, pyrene, chrysene, benz(a)anthracene, benz(a)fluorantene, benz(k)fluorantene, benz(a)pyrene, dibenz(a,n)antracene, benz(g, h, i)perylene);
persistent chlororganic compounds (polychlorinated biphenyl, pescticides HCH and DDT).

Observations of marine water pollution are carried out at every station, water samples are taken in the surface and near-bottom layers; Samples are analysed in coastal laboratories (extraction can be done on board the ship).

2.3. Observations of sediment pollution include the determination of the following concentrations in each sediments sample:

petroleum products;
synthetic surfactants;
phenols;
aliphatic and alicyclic hydrocarbons (from C_{14} to C_{33})
heavy metals (Fe, Mn, Zn, Ni, Cu, Pb, Cd, Co, Hg, Ba);
polycyclic aromatic hydrocarbons (naphthalene, metilnaphthalene, dimetilnaphthalene, diphenyl, acenaphthylene, acenaphthene, fluorene, phenanthrene, antracene, fluorantene, pyrene, chrysene, benz(a)anthracene, benz(a)fluorantene, benz(k)fluorantene, benz(a)pyrene, dibenz(a,n)antracene, benz(g, h, i)perylene);
persistent chlororganic compounds (polychlorinated biphenyl, pescticides HCH and DDT).

The research of marine sediments pollution is carried out at every station. The samples are analysed at the coastal laboratory. Alongside with chemical analysis, at least three biotests of bottom sediments samples are performed.

2.4. Hydrobiological observations include the determination of species composition, number and biomass of neuston, phytoplankton, zooplankton and zoobenthos, as well as the concentration of phytopigments and plankton production and destruction. Plankton and benthos samples are taken at every station. Phytopigment concentration is determined in surface water samples. The samples are analysed at the coastal laboratory with the exception of phytopygment concentration and intensity of production and destruction processes which are determined in board the ship.

2.5. Microbiological observations, which are part of regional environmental research, include the determination of total number and biomass of microorganisms in marine water, the number of saprophytic microflora and oil-oxidizing bacteria. The scope of microbiological research specified in the Terms of reference, should provide representativeness and validity of the obtained data (microbiological research are not carried out as part of local environmental research).

2.3. Ichthyology and theriology observations which are part of regional and local environmental research include the determination of species, age, sex and size composition, number and biomass, fatness and nutritional state of fishes and the number of the Caspian seal. Regional environmental research determines the content of heavy metals and oil products in the gills, liver and muscles of main commercial species. Local environmental research determines the content of heavy metals and oil products in the muscles of goby fish. The scope of ichthyology and theriology research at every polygon specified in the Terms of reference, should provide representativeness and validity of the obtained data.

2.7. Ornithology research which is part of regional environmental research comprises the determination of species composition and birds number (subdividing the birds into resident birds, migratory birds and birds of passage), birds mass rookeries (nesting colonies, etc.), migration routes and other periodic migrations (ornithology research is not carried out as part of local environmental research).

Annex II

The list and scope of main and accompanying observations in the process of industrial environmental monitoring of infrastructure facilities.

1. ACCOMPANYING OBSERVATIONS

1.1. Meteorological observations comprise measuring atmospheric pressure, temperature and relative air humidity, wind speed and direction, cloudiness and visibility as well as weather phenomena. Meteorological observations are carried out at every station.

1.2. Hydrological observations include measurements of wave height, period, type and direction, transparency, colour, temperature and electrical conductivity (salinity). Hydrological observations are carried out at every station. Water temperature and electric conductivity are measured with help of a probe registering the readouts at sampling rate of 1 m.

1.***3 Sedimentation observations*** include the determination of granulometric composition and losses during burning the samples taken from the surface layer of bottom sediments. Sediment observations are carried out at every station.

2. GENERAL OBSERVATIONS

2.1 Hydrochemical observations include determination of hydrogen concentration (pH), concentration of dissolved oxygen and hydrogen sulfide in water, biological oxygen demand (BOD5), concentrations of ammonium nitrogen, nitrate nitrogen and total nitrogen, mineral and total phosphor, dissolved silicon and suspended substance. Hydrochemical observations are done at every station in water samples taken from surface and near-bottom layers. The data are analysed on board the research vessel.

2.3. Observations of marine water pollution include the determination of the following concentrations in each water sample:

petroleum products;

synthetic surfactants;

heavy metals (Fe, Mn, Zn, Ni, Cu, Pb, Cd, Co, Hg, Ba);

aliphatic and alicyclic hydrocarbons (from C_{14} to C_{33})

polycyclic aromatic hydrocarbons (naphthalene, metilnaphthalene, dimetilnaphthalene, diphenyl, acenaphthylene, acenaphthene, fluorene, phenanthrene, antracene, fluorantene, pyrene, chrysene, benz(a)anthracene, benz(a)fluorantene, benz(k)fluorantene, benz(a)pyrene, dibenz(a,n)antracene, benz(g, h, i)perylene);

Observations of marine water pollution are carried out at every station, water samples are taken in the surface and near-bottom layers; Samples are analysed in coastal laboratories (extraction can be done on board the ship).

2.3. Observations of sediment pollution include the determination of the following concentrations in each sediments sample:

-oil products

-synthetic surfactants;

- heavy metals (Fe, Mn, Zn, Ni, Cu, Pb, Cd, Co, Hg, Ba);

- polycyclic aromatic hydrocarbons (naphthalene, metilnaphthalene, dimetilnaphthalene, diphenyl, acenaphthylene, acenaphthene, fluorene, phenanthrene, antracene, fluorantene, pyrene, chrysene, benz(a)anthracene, benz(a)fluorantene, benz(k)fluorantene, benz(a)pyrene, dibenz(a,n)antracene, benz(g,h,i)perylene).

The research of marine sediments pollution is carried out at every station. The samples are analysed at the coastal laboratory. Alongside with chemical analysis, at least 2 biotests of bottom sediments samples are performed.

2.4. Hydrobiological observations include the determination of species composition, number and biomass of phytoplankton, zooplankton and zoobenthos, as well as the concentration of phytopigments. Plankton and benthos samples are taken at every station. Phytopigment concentration is determined in surface water samples. The samples are analysed at the coastal laboratory.