Department of Industrial and Environmental Control in KAPE LLC performs complex works on environmental monitoring.

Ichthyologists, hydrobiologists, soil scientists, geobotanists, theriologists, ornithologists, chemists, hydrologists, engineers and technicians work in the Department.

Over the past years KAPE has carried out more than 70 projects, including:
- Background monitoring surveys,
- Industrial environmental control, including monitoring,
- Monitoring of the environment under applications of government agencies.

Main customers are the following companies:
NCPOC, Agip KCO, NCOC, Karachaganak Petroleum Operating B.V, Karazhanbasmunai, Tengizchevroil, KMG, RDKMG, KazTsink and etc.

State bodies of RK:
Environmental Control Committee of the Ministry of Energy of the Republic of Kazakhstan, Water Resources Committee and the Committee of Fisheries of the Ministry of Agriculture of the Republic of Kazakhstan.
Administration of natural resources and environmental management of: Mangistau, Almaty, Kzylorda and Aktobe regions.

Performable work on land and at sea:
- Monitoring of the impact on the environment;
- Monitoring of groundwater and surface water quality;
- Monitoring and emissions (air emissions, discharges and waste);
- Monitoring the composition of bottom sediments;
- Monitoring of biodiversity of terrestrial and aquatic ecosystems;
- Monitoring of soil and plant communities;
- Magnetometric, bathymetric and sonar studies, photo and video survey;
- Geophysical monitoring of engineering facilities, including hydraulic structures.
KAPE conducts a full range of groundwater monitoring activities, including the development of programs and projects. We also carry out drilling and equipping, repairing and abandoning of monitoring wells.

The development of programs and projects for monitoring the industrial emissions was performed for the following companies:

Karazhanbasmunai, Mangistaumunaigas, Emir-Oil, Embamunaigas, Ozenmunaigas, Ekogeoneftgaz, Samek International, Agip, Buzachi-oil and Tengizchevroil LLP.

For groundwater monitoring all the necessary equipment and specialists are readily available.
Observation of environmental components:

- Meteorological;
- Hydrochemical;
- Sedimentological;
- Echosounding;
- Hydroacoustic;
- Monitoring of air quality;
- Hydrological studies, including autonomous Hydrological observations;
- Observation of bottom sediments;
- Magnetometric, bathymetric, Hydrolocation surveys;
- Geophysical surveys;
- Photo-video shooting of underwater objects.

Observation of biological objects:

- Hydrobiological;
- Microbiological;
- Ichthyological;
- Ornithological and theriological;
- Hydroacoustic;
- Photo-video shooting of marine organisms.
EXPERIENCE IN PERFORMING MONITORING SURVEYS

For several years, the Company has been cooperating with the Ministry of Agriculture of the Republic of Kazakhstan to work on the State program: «Integrated marine research in assessment of the biological resources status in the Kazakhstani part of the Caspian Sea».

The research includes assessing the fish species composition, the abundance of populations, the reproduction conditions, the forage base and other parameters. The hydroacoustic survey method is introduced into the fish counting practice, which allows to significantly reduce the volumes of net fishing.

*Echo of fish are displayed on the monitor screen*

*Echo-sounder-chart plotter*

Based on the survey results, a map of the distribution and relative abundance of fish in the water area is being constructed:

The results of complex studies serve as an information base for the scientific justification in the Caspian's biological resources use.
To monitor the abiotic factors of the natural environment, KAPE has a full set of equipment and software:

- **High-precision weather station**
  - Skywatch GEOS 11

- **Testo-350 gas analyzer**

- **Gas analyzer HANK-4**

- **Current Prophylograph**
  - ADTP Nortek

- **Current Profilograph**
  - ADTP RDI-1200

- **Particles size analyzer**
  - LISST 100X
Oceanographic Measuring platform SeaGuard RCM

**The YSI EXO2 probe** is designed to measure the physical and chemical parameters of water.

The marine buoy is equipped with long-term hydrological monitoring stations.
TOOLS AND INSTRUMENTS FOR SEDIMENTATION AND HYDROCHEMICAL SURVEYS

Water Quality Analyzer
Horiba U 52G, U53G

Petersens Dredger

Echman’s Dredger

Van Veen Dredger

Vibro-Sampler
INSTRUMENTS AND EQUIPMENT FOR RESEARCH WORK

Profiler sounder Chirp 32 12

Humminbird echo-sounder 998cx HD SI Combo
UNDERWATER PHOTO-VIDEO RECORDING. TELE-CONTROLLED UNDERWATER APPARATUS «GNOME»
MAGNETOMETRIC, BATIMETRIC AND HYDROLOGICAL SURVEYS

FIELD OF APPLICATION:
• Construction of sea ports, canals, structures;
• Charting courses for ships at sea and rivers;
• Visual assessment of underwater pipelines condition;
• Dredging and engineering works in water areas;
• Inspection of water reservoirs and hydraulic structures;
• Search for sunken ships and structures

Magnetometric surveys are conducted to detect flooded steel structures. The coordinates of found objects are recorded, the volumes and areas of structures are estimated.

Bathymetric surveys are conducted as follows:
• Depth mapping of the sea / water body;
• The morphology definition of the seabed, its characteristics, the layers thickness of bottom sediments.

Instruments and equipment:
• Marine magnetometer Explorer from Marine Magnetics;
• The bathymetry and C3D-LPM sonar system from Teledyne Benthos;
• High-precision marine positioning system TRIMBLE SPS461 GPS;
• IMU-108 motion sensor manufactured by Ship Motion Control;
• MiniSVP prophylograph is used to measure speed of sound in water.

PROVIDING WORK
• The company possess a full set of equipment, and the appropriate software;
• ships and coastal support vessels (hovercrafts) are used to carry out work,
INSTRUMENTS AND EQUIPMENT
FOR MAGNETOMETRIC, BATHIMETRIC AND HYDROLOGICAL SURVEYS

Marine Magnetometer Explorer

The MiniSVP prophylograph measures speed of sound in water

The C3D-LPM system of bathymetry and sonar localization

GPS compass TRIMBLE SPS461

Positioning system C-NAV 3050

Приемник SPS461 с двумя антенами Zephyr Model 2 rugged
EXPERIENCE IN MAGNITOMETRIC, GEORADAR, AND BATHYMETRIC SURVEY

Since 2014, our company conducts geophysical surveys “Offshore survey for CaTRo” at the “North-Caspian marine navigation channel” for Tengizchevroil LLP. The surveyed area total length is 70 km.

**Magnitometric surveys** were conducted in order to detect abandoned wellheads and metal containing structures. The surveyed area length is 86 km.

**Georadar surveys** were conducted in order to visualize the subsurface structures, which could not be detected by magnetometer.

**Bathymetric surveys** were conducted to identify the morphology of seabed, characteristics, and potential obstacles. The length of the surveyed area was 15 km.
Two projects are carried out by the Tengizchevron LLC’s order since 2014:

«Offshore survey for CaTRo»

«Monitoring of dredging operations impact in the CaTRo channel’s area».

Magnitometric surveys conducted in 2014 allowed to detect flooded wells, some parts of structures, drilling pipelines etc.

Monitoring surveys at channel construction site (2014 -2016) have shown that the sea water quality, composition of bottom sediments, and reproduction of benthic organisms are typical for the North-Eastern Caspian Sea.
In 2012 the Company has started integrated geophysical surveys and assessment of the engineering structures state. The work is based on the method of reflected waves recording. These are advanced non-destructive technologies that allowed the company to obtain the most accurate facility characteristics without damaging buildings, structural elements, dams, soil cover and the environment.

The work is carried out by professional geophysicists who have obtained certificates and passed training, including trainings arranged by the equipment manufacturers. KAPE LLC specialists are full members of EAGE (European Association of Geoscientists & Engineers) since 2017.

**Equipment and Software:**

- Georadar system "MALA Geoscience" (Sweden) with a full set of antenna assembly; Processing software (software): - REFLEXW-2D-3D, Georadar-Expert;
- Electromagnetic prospecting multi-electrode station "SKALA-48" (Russia) SP: RES2DINV, RES3DINV;
- Seismic station "Lakkolit HM-3" (Russia), software: RadExPro;
- Multifunction electric survey meter "MERI-24";
- Electromagnetic induction meter "EMP-400 GSSI" (USA);
- Electromagnetic profiling equipment "AEMP-14" (Russia).
GEOPHYSICAL MONITORING OF ENGINEERING STRUCTURES AND NATURAL OBJECTS

Types of work:
• Monitoring of motor roads and railways state;
• Monitoring of earth dams state at waterworks and industrial sites;
• Survey of underground utilities (pipelines, cables, assembly units and junctions);
• Searching for hidden objects in soil;
• Inspection and control over construction structures and facilities (searching for fittings, cables, identification of protective concrete layers, free space, caving etc.);
• Engineering-geological survey;
• Survey of shallow water bodies (bottom sediments mapping);
• Environmental assessment of areas (mapping of soil contaminated by hydrocarbons, detection of hidden waste landfills)

Georadar survey of the road and interpretation of the road pavement layers radiogram

Magnitometric and georadar survey of territory and aquatic area adjacent to waterworks
Chemical and Analytical Center includes:

- Mobile environmental laboratory;
- Testing laboratory (in Aktau and subdivision in the field);
- Hydrobiological laboratory in Almaty with subdivision in Atyrau

- 53 highly qualified specialists are working in the center
- The center is equipped with up-to-date equipment.
- All specialists regularly go through advanced training.
- The company has purchased and registered over 60 methodologies in the RoK Register
Testing laboratory has subdivisions in Aktau and at Tengiz field.

Laboratory is accredited according to GOST ISO/IEC 17025-2009 requirements «General requirements to the competence of testing and calibrating laboratories»

Accreditation field includes sampling and analysis of the following:
- Drinking water, natural water (surface and ground water), waste water (before and after treatment);
- Soil (soil, bottom sediments);
- Production and consumption waste, waste water sludge, mud, and biological sludge;
- Ambient air of residential and sanitary-protection zones;
- Industrial emissions.

Implemented work:
- «State ecological monitoring at Caspian shelf»;
- «Biological resources state assessment in the Kazakhstan’s part of the Caspian sea»;
- “Monitoring of ground and surface water at “Peski Kokzhide” facility”.

Orders fulfillment on a contractual basis with oil companies as NCOC, Tengizchevroil LLC etc.
Hydrobiological laboratory has its subdivisions in Almaty and Atyrau

The Laboratory is accredited according to GOST ISO/IEC 17025-2009 requirements
«General requirements to the competence of testing and calibrating laboratories»
Accreditation certificate: №KZ.I.02.1661 of 03.11.2015.

Accreditation field includes:
1. Sampling of surface water, bottom sediments, and soil.
2. Values identification for:
   Phytoplankton, Zooplankton, Periphyton,
   Macrozoobenthos, Ichthyofauna – taxonomic composition, numbers, biomass.

Implemented work:
• «State ecological monitoring at Caspian shelf»;
• «Biological resources state assessment of in the Kazakhstan’s part of the Caspian sea»;
• “Impact analysis from hydrological regime and toxicants entering the transboundary rivers as Irtysh, Ili, Syr-Dariya, Tobol, Esil, Shu, and Talas on formation and state of biological resources…”

Orders fulfillment on a contractual basis with oil companies NCOC, Caspiy Meruerty Operating Company B.V., Kurmangazy Petroleum, Kaztransoil etc.
KAPE LLC TRANSPORT USED FOR MONITORING ONSHORE AND IN OFFSHORE TRANSIT ZONE

- Hovercrafts with jet propellers
- Mobile environmental laboratory
- Cross-country vehicle Polaris Sportsman 6x6
- Motor boats “Zodiak”, Leader 599
- Cargo-and-passenger amphibia crawler MT-LB
- 12 offroaders (Toyota Tundra, Toyota Hulix etc.)
OFFSHORE SURVEY VESSELS

Scientific–research vessel Nautilus-1

Ice breaking rescue vessel “STRATIS Z”

Scientific–research vessel “Alina”

Scientific–research vessel “Electra”

Scientific–research vessel “Helen”
KAPE LLC owns all certificates and silences for conducting monitoring, including:

- the right to be engaged in environmental design, standardization, work related to environmental assessment, ecological audit;

- work related to land use planning, image-geodetic and cartographic work;

- provision of services related to atomic energy use;

- the right to implement the project activity;

- the right to conduct surveys, including:
  - geotechnical;
  - engineering - hydrogeological;
  - engineering - geophysical;
  - engineering - geodetic surveys.
We are open for cooperation and meetings, consultations, visiting offices, territory and production sites for all potential customers

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