

Report of the Dissertation Council on Hydrogeology, Engineering and Oil and Gas Geology at KazNITU named after K.I.Satbayev on decisions on awarding (refusal to award) the degree of Doctor of Philosophy (PhD) in the specialties 6D070600 - Geology and exploration of mineral deposits, 8D07104 – Oil and gas and ore geophysics for 2023.

1. The number of meetings held.

The Dissertation Council in the specialty 6D070600 – "Geology and exploration of mineral deposits", 8D07104 – "Oil and gas and ore geophysics" and 6D075500 – "Hydrogeology and Engineering Geology" held 5 (five) meetings.

2. The names of the members of the dissertation council who attended less than half of the meetings – no one.

3. List of doctoral students with indication of training organization.

№	Full name of the doctoral student	Organization of training
1	Isagalieva Aigul Kalieвна	KazNRTU named after K.I.Satbayev
2	Kudaibergenova Sabina Satybaldykyzy	KazNRTU named after K.I.Satbayev
3	Onlasynov Zhuldyzbek Alikhanuly	KazNRTU named after K.I.Satbayev
4	Ismagulova Aida Zhanatovna	KazNRTU named after K.I.Satbayev
5	Itemen Nurbol Mergenbayuly	KazNRTU named after K.I.Satbayev

4. A brief analysis of the dissertations reviewed by the Council during the reporting year

During the work, the Dissertation Council reviewed 5 (five) papers in 3 (three) specialties. The names of dissertations in the context of specialties are given below:

№	Full name of the doctoral student	Subject of the work	Cipher and the name of the specialty
1	Isagalieva Aigul Kalieвна	Geophysical criteria for geodynamic zonation of oil and gas bearing regions of the South Caspian depression	6D070600 – Geology and exploration of mineral deposits
2	Kudaibergenova Sabina Satybaldykyzy	Modern technologies of geodynamic monitoring in the study and mapping of rapidly changing natural and technogenic processes in hydrocarbon deposits	8D07104 – Oil and gas and ore geophysics
3	Onlasynov Zhuldyzbek Alikhanuly	Implementation of Remote Sensing and GIS in hydrogeological investigation of Makhtaral irrigated lands in the Turkestan region	6D075500 - Hydrogeology and engineering Geology
4	Ismagulova Aida Zhanatovna	Исследования процессов кольтатации на опытно-экспериментальных системах искусственного восполнения запасов подземных вод в Юго - Восточном Казахстане	6D075500 - Hydrogeology and engineering Geology
5	Itemen Nurbol Mergenbayuly	Assessment of the development of associated reservoir brines in the oil and gas fields of Southern Mangyshlak and the development of a technological scheme for extracting lithium and its compounds from them	6D075500 - Hydrogeology and engineering Geology

4.1 Analysis of the subject of the considered works

4.1.1 Brief analysis of the dissertation of Issagaliyeva Aigul on the topic: "Geophysical criteria for geodynamic zonation of oil and gas bearing regions of the South Caspian depression", on the speciality 6D070600 - Geology and Exploration of Mineral Deposits.

- *analysing the topics of the reviewed works;*

The aim is to develop and create a scientific and methodological basis for studying the deep structure and geodynamics of the Earth's crustal lithosphere based on the analysis of geophysical data of the southern part of the Caspian Basin, to identify its main depth heterogeneities relevant to the oil and gas content of the region.

To achieve the goal, the following tasks are envisaged:

1. Analysis and generalisation of a priori geological-geophysical and field-geological information on oil and gas content of the region;

2 Analyses of physical fields, crust and mantle models along the lines of regional profiles DSS, GEPM-DSS.

3. Post-method and complex interpretation of the results of geophysical, structural-geological and petrophysical data for compiling physical-geological sections of the Earth's crust on the geodynamic basis of the studied region;

4. Establishing the relationship of oil and gas content of the region with the deep structure and geodynamic mode of development of the main geological structures on the basis of the developed geophysical criteria.

The work was carried out on the basis of analyses of physical fields, models of the Earth's crust and mantle along the lines of DSS, GEPM-DSS profiles, gravel and magnetic surveys, existing concepts of geodynamics of the region's development.

4.1.2 Brief analysis of Kudaibergenova Sabina Satybaldykyzy's dissertation on the topic: "Modern technologies of geodynamic monitoring in the study and mapping of rapidly changing natural and man-made processes in hydrocarbon deposits", specialty 8D07104 – Oil and gas and ore geophysics.

- *analysis of the topics of the reviewed works;*

The aim is to study the peculiarities (regularities) of manifestation of natural-technogenic seismo-deformation processes at the developed hydrocarbon fields on the basis of long-term monitoring of rapidly changing natural-technogenic processes associated with anomalous changes of geophysical field parameters (gravity, resistivity) and accompanying deformation geodynamic parameters (subsidence, horizontal shifts, earthquakes).

Tasks to be solved:

- Collection, analysis and generalisation of available stock materials, published domestic and foreign literature, compilation of analytical reviews of cases of occurrence of deformation and seismic events at the developed hydrocarbon fields;

- analysing methods, equipment and methodology for conducting GDM;

- assessment of the reliability of the database on complex GDM of modern natural and technogenic processes at hydrocarbon fields;

- identification of regularities of occurrence and spatial and temporal development of various forms of manifestation of natural-technogenic geodynamics of the subsurface;

- geodynamic zoning of the territory of hydrocarbon fields - allocation of zones and areas of geodynamic risk according to a set of geological-geophysical and geodetic research methods;

- substantiation of recommendations on optimisation of complex GDM for solving problems on placement of systems and facilities at hydrocarbon fields, which will allow avoiding possible emergency situations related to geodynamic factor.

4.1.3 A brief analysis of the dissertation of Onlasynov Zhuldyzbek Alikhanuly on the topic: "Application of GIS technologies and Earth remote sensing data in hydrogeological research on the example of the Maktaaral irrigation massif of Turkestan region", specialty 6D075500 - Hydrogeology and engineering geology.

- analysis of the topics of the reviewed works;

The main purpose of the work is to study the regional features of the hydrogeological and hydro-reclamation conditions of the Maktaaral irrigation massif using GIS technologies and remote sensing data, to assess the potential of using water from the SVD for irrigation using mathematical modeling.

The method of achieving the goal is based on the integrated use of modern remote sensing methods, ground-based route studies, GIS and methods of mathematical modeling of hydrogeological conditions

To achieve this goal, it was necessary to solve the following main tasks:

1) to study the hydrological, geological-geophysical, hydrogeological conditions of the research area based on the collection, analysis and systematization of previously conducted studies to clarify the conditions of distribution and regional patterns of formation, movement and discharge of groundwater and groundwater of the Maktaaral irrigation massif;

2) ground-based route studies to assess the water management situation of the research area, study the level regime and chemical composition of groundwater based on laboratory studies;

3) identify areas with favorable and critical reclamation conditions based on the analysis of spectral index images using GIS technologies;

4) to identify the equation of the predictive model of soil salinity using regression analysis of spectral indices and channels of multispectral satellite images of medium resolution LandSat-8 and Sentinel-2 and use it for further mapping of soil salinity of irrigated lands of the Maktaaral massif;

5) to assess the potential of secondary use of water from the SVD for irrigation and scenarios of the impact of water intake from the SVD on the groundwater regime based on a mathematical model;

6) create a mathematical model and calculate the water balance based on it.

4.1.4 A brief analysis of Ismagulova Aida Zhanatovna's dissertation on the topic: "Studies of colmatation processes on experimental systems of artificial replenishment of groundwater reserves in Southeastern Kazakhstan", specialty 6D075500 - Hydrogeology and engineering geology.

- analysis of the topics of the reviewed works;

The main purpose and direction of the research were focused on the issues of studying the main factors influencing the processes of colmatation in the bases of infiltration basins, as well as the prospects and efficiency of IVZPV systems at the stages of feasibility study and subsequent working one-stage design.

At the same time, the following basic and defining criteria are used in the work:

- the presence of a potential consumer of accumulated waters at the sites of the IVPZP;
- the presence of an aquifer with a free surface with a depth of the groundwater level of no more than 5-7 meters, having good filtration properties;

- prospects for using research objects as representative for similar regions, and the results obtained for use as a source and sufficient material for implementation in the design of IPPW systems and open infiltration basins at the stages of working design;

- the possibility of organizing experimental work on the site;

- acceptable technical and economic indicators.

In this regard, the main objectives of this work were to develop the organization of sites, methods of complex field research in the infiltration mini-basins of the Aksu, Lepsy and Koksu valleys, accepted as typical for the territory of South-Eastern Kazakhstan, which is most in need of improving the water supply of rural settlements and remote pasture areas.

When organizing sites, large-scale comprehensive studies were set and organized in the list of tasks to obtain reliable full-scale characteristics and parameters. These studies were supplemented by a detailed assessment of the water-physical, hydrodynamic and filtration properties of the aeration zone and the upper layers of the aquifer.

For the arid conditions of Southeastern Kazakhstan, mechanical colmatation plays a leading role, due to the transfer of physical weathering products by river runoff and, especially, flood waters. Therefore, in the dissertation work, primary importance is attached to conducting field studies of the turbidity of surface waters of rivers in areas of Southeastern Kazakhstan to study colmatation and assess its effect on colmatation processes when used as a source of artificial replenishment of groundwater reserves.

4.1.5 A brief analysis of the dissertation of Itemen Nurbol Mergenbayuly on the topic: "Assessment of the development of associated reservoir brines in the oil and gas fields of Southern Mangyshlak and the development of a technological scheme for extracting lithium and its compounds from them", specialty 6D075500 - Hydrogeology and engineering geology.

- analysis of the topics of the reviewed works;

The purpose of the work is to study modern hydrogeological and hydrogeochemical conditions and features of brine formation in the oil and gas fields of Southern Mangyshlak, to develop a technological scheme for extracting lithium and its compounds from them; to assess their operational reserves and forecast resources.

To achieve this goal, the following tasks were solved:

- study of geological, hydrogeological and hydrochemical conditions of the territory to clarify the basic patterns of formation and assessment of forecast resources and reserves of underground industrial brines;

- conducting hydrogeochemical analysis and substantiation of methods for the distribution of valuable components in underground industrial brines for the purpose of their further processing;

- substantiation of methods of physico-chemical modeling of the "water-rock" system for the extraction of lithium and its compounds from industrial brines;

- development of a technological scheme for the extraction of lithium and its compounds from reservoir brines with an assessment of its effectiveness;

- assessment of forecast resources and operational reserves of underground industrial brines.

4.2 Connection of dissertation topics with the directions of science development, which are formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan in accordance with paragraph 3 of Article 18 of the Law "On Science" and (or) state programs;

4.2.1 Isagalieva Aigul Kalievna was directly involved in the following research projects:

1. 2021-2023 "Assessment of seismic hazard of territories of regions and cities of Kazakhstan on a modern scientific and methodological basis" Institute of Seismology of the Ministry of Education and Science of the Republic of Kazakhstan;

2. 2018-2020 "Integrated studies of seismic hazardous areas of south-eastern Kazakhstan, and development of the basis of the early warning system of strong earthquakes" Institute of Seismology of the Ministry of Education and Science of the Republic of Kazakhstan;

3. 2015-2018 No. 757 MES. GF.15. RIPR.32 "Collection and analysis of geophysical information to form a database and create digital models of hydrocarbon fields in Kazakhstan" KazNRTU named after K.I.Satbayev.

4.2.2 Dissertation work of **Kudaibergenova Sabina Satybaldykyzy**, based on carrying out researches the modern technology of control of anthropogenic changes in dynamics of the Earth crust on developed hydrocarbon fields by creation of geodynamic polygons is offered.

Practical significance - the obtained conclusions confirm the principal possibility of assessing the occurrence of various scenarios of geodynamic situations and environmental risks associated with the development of hydrocarbon fields, recommended measures to reduce these geodynamic risks.

The results of dissertation research are of practical interest for companies conducting operational and service activities at hydrocarbon fields in Kazakhstan.

4.2.3 The practical significance of **Onlasynov Zhuldyzbek Alikhanuly's** work consists in using the results of research, methods of analyzing and decrypting remote sensing data with the creation of scenarios of hydrogeological regime and the application of a mathematical model for the rational use of water resources for irrigation and increasing the yield of raw cotton on The Maktaaral irrigation massif.

4.2.4 The scientific and practical significance of the completed research of **Ismagulova Aida Zhanatovna's** dissertation was that priority was given to field and laboratory work, the results of which served as the primary characteristic of the fundamental parameters of the formation and physical activity of the processes of colmatation.

In the course of the experiments, in addition to measuring water flow, the turbidity of the supplied water, the thickness of the silty sediment, and the bulk mass of the skeleton of the silty sediment were determined, which are the initial parameters for calculating water filtration under colmatation conditions.

The experiments were carried out at different values of the water content of the hydrological year: from 25 to 75% of the water supply, and therefore the total duration of the infiltration period when using artificial groundwater replenishment systems was about 8 months annually for four years.

Full-scale studies of instantaneous values of turbidity of surface waters of rivers were carried out by the photometric method - point measurements using a portable turbidometer when taking water samples and control laboratory analyses by the weight method.

Such large-scale and long-term experiments in domestic research practice in Kazakhstan were carried out for the first time, the results of which eventually allowed to identify both the nature of the change in the rate of infiltration and its transition through certain control values, conditionally serving as a quantitative guideline for evaluating the timing of the filter cycle, and to exclude the element of randomness.

Experimental fillings were carried out in the aeration zones and underlying rocks of the upper part of the undifferentiated modern and upper quaternary alluvial-proluvial aquifer deposits located at different distances from riverbeds and differing in lithological and granulometric composition in water permeability parameters and in depth from the ground surface.

Field experimental filtration studies made it possible for the first time to reasonably identify the infiltration capacity of the aeration zone; to establish patterns of development of colmatation; infiltration facilities for IVZPV; to assess the operational reserves of groundwater, taking into account their artificial replenishment; to predict changes in groundwater quality. This made it possible to give a more objective and larger-scale and detailed characterization of the processes of water infiltration and actual colmatation through the soils of the aeration zone and underlying sediments of the upper part of the water-bearing horizon promising for the IWZPV, which

eventually served as a real opportunity to unify the data obtained for the same type of rivers of Southeastern Kazakhstan.

Data from field and laboratory studies of the hydrochemical regime of surface and groundwater were used to substantiate the created models of geofiltration.

4.2.5 The practical significance of the completed research of the dissertation of **Itemen Nurbol Mergenbayuly** is based on the scientific justification of the prospects for the development of industrial groundwater manifestations based on the results of an assessment of their projected resources and reserves, technical and economic indicators of operation, reasonable parameters of conditions and rational schemes of integrated use. It is confirmed that sufficient efficiency of development of industrial water deposits can be provided only by their complex processing. The most cost-effective are the possibilities of extracting lithium and its compounds from associated reservoir brines of oil and gas fields. A large amount of research has been conducted on the adaptation of modern technologies used in the processing of hydromineral raw materials to the reservoir waters of oil fields.

4.3 Analysing the level of implementation of dissertation results into practical activities.

4.3.1 The practical significance of the work of Isagalieva Aigul Kalievna:

1. The conducted studies with the use of newly obtained geophysical data have shown the wide possibility of geophysical methods for studying the depth structure of the lower horizons of the Earth's crust, basement surface, pre-Devonian complexes and sedimentary cover of large sedimentary basins;

2. The peculiarities of the deep structure of the south of the Caspian depression were revealed. The analysis of structural-velocity and density sections along the lines of regional profiles allowed to perform zoning of the territory on the basis of correlation of its separate layers by types of the Earth's crust (continental, relict paleoceanic, transitional crust) and to make schemes of relief and thickness of the deep boundaries of the south of the Caspian depression, showing heterogeneities of the structure of different layers of the Earth's crust and complex structural relationships of heterogeneous blocks of the lower sedimentary cover, necessary for geodynamic zoning of sedimentary basins.

3. Based on the revealed spatial relationship of local anomalies of gravity and magnetic fields with structural elements of the platform cover, it is possible to forecast a number of new promising Paleozoic structures formed in the lower sedimentary cover, mainly in the middle-upper Devonian and lower Carboniferous. The regularities of geophysical field distribution, established on the basis of the analysis, can become the basis for the strategy of prospecting in the region under consideration.

Results of researches are published in 12 scientific works, in periodicals of Kazakhstan, CIS countries, foreign countries, recommended by "Committee on control in the sphere of education and science of MES RK", two manuscript reports. On the subject of the thesis published 12 printed works, including 3 articles in the journal with non-zero impact factor (quartiles Q2, Q3), 2 articles in journals recommended by the Ministry of Education and Science of the Republic of Kazakhstan, 7 articles in collections published on the results of scientific international and national conferences.

4.3.2 The main provisions of the dissertation work have been published in 9 scientific papers, including 4 articles published in journals included in the database Scopus and Clarivate Analytics, 1 article in other scientific journals and publications, 4 publications - in the published proceedings of international conferences, Kazakhstani and foreign.

In addition, the results of the thesis research were discussed in enterprises/organisations (there are discussion protocols):

- Council of young scientists of IO&GG;
- Council of Young Scientists Satbayev University;
- ICforReservesA&D Satbayev University;
- Institute of Seismology of the Ministry of Education and Science of the Republic of Kazakhstan;
- Department of "Surveying and Geodesy";
- Institute of Geological Sciences named after K.I. Satpayev;
- Department of "Geophysics" Satbayev University.

4.3.3 6 articles have been published on the topic of **Onlasynov Zhuldyzbek Alihanuly's** dissertation. Including: 2 articles in republican specialized publications recommended by the Committee for Control in the field of education and science of the Ministry of Education and Science of the Republic of Kazakhstan; 2 articles in an international journal included in the Scopus database (Proceedings of the National Academy of Sciences of the Republic of Kazakhstan, a series of geology and technical sciences); 2 articles published in the materials of international conferences.

4.3.4 The research carried out by **Ismagulova Aida Zhanatovna** of a scientific and applied nature on the study of colmatation processes on physical and mathematical models of representative and experimental sites of the IVZPV undoubtedly confirmed the justifiability and full compliance with the truth of the proposed and formulated hypothesis of scientific research; reasonably indicate a sufficiently high degree of their scientific and technical potential as a reasoned tool for the introduction of small IVZPV systems in all identical regions of the arid zone of the Republic of Kazakhstan.

Based on the results of the research work carried out, 8 articles were published and 3 reports were made, of which 2 works were published in international publications included in the database of Scopus and Thomson Reuters companies, and 3 articles in scientific publications recommended by the Committee on Supervision and Certification of the Ministry of Internal Affairs of the Republic of Kazakhstan.

One article: M.K.Absametov, E.J.Murtazin, V.V.Kulagin, A.T.Makyzhanova, A.J. Ismagulova "Dynamics of infiltration and colmatation on physical models of studying infiltration basins with artificial groundwater recharge" read all the articles published in the journal "Water Nature Conservation and Management (WCM), included in the database data from Scopus, Malaysia.

4.3.5 7 articles have been published on the topic of **Itemen Nurbol Mergenbayuly's** dissertation. Including: 3 articles in republican specialized publications recommended by the Committee for Control in the Field of Education and Science of the Ministry of Internal Affairs of the Republic of Kazakhstan; 1 article in an international journal included in the Scopus database (Proceedings of the National Academy of Sciences of the Republic of Kazakhstan, a series of geology and technical sciences); 3 articles published in the materials of international conferences.

5. Analyses of reviewers' performance (with examples of the most poor quality reviews).

Reviewers of dissertations of doctoral students for the degree of Doctor of Philosophy (PhD) were appointed in accordance with the requirements of the Standard Regulations on the Dissertation Council.

In order to ensure compliance with the requirements of the Standard Regulations on the work of the dissertation council, a memo was sent to each reviewer with the requirements for the content and design of the review of the dissertation work.

All reviews were submitted on time and in accordance with the requirements of the Committee for Quality Assurance in the Field of Science and Education of the Ministry of Internal Affairs of the Republic of Kazakhstan.

There are no negative reviews.

6. Suggestions for further improvement of the system of scientific training – to ensure high-quality review of the work at the seminars of the department.

7. The number of dissertations for the degrees of Doctor of Philosophy (PhD), doctor by profile in the context of specialties (areas of training):

	Specialty 6D075500-Hydrogeology and engineering geology	Specialty 6D070600 – Geology and exploration of mineral deposits"	Specialty 8D07104 – Oil and gas and ore geophysics
dissertations accepted for defense (including doctoral students from other universities)	3	1	1
dissertations withdrawn from consideration (including doctoral students from other universities)	-	-	-
dissertations that received negative reviews from reviewers (including doctoral students from other universities)	-	-	-
dissertations with a negative decision on the results of defence (including doctoral students from other universities)	-	-	-
Including from other training organizations	-	-	-
With a negative decision based on the results of the defense	-	-	-
Including from other training organizations	-	-	-
The total number of defended dissertations	3	1	1
Including from other training organizations	-	-	-

**Chairman
Dissertation Council**

**Scientific Secretary
of the Dissertation Council**



M. Absametov

E. Auyelkhan