

## REPORT

on the work of the Dissertation Council on defense of dissertations for awarding the degree of Doctor of Philosophy (PhD) in 2024 in the direction of training 8D072- Production and processing industries in the group of specialties: 8D07208 (6D070600) - Geology and Exploration of Mineral Deposits, 8D07210 - Oil and Gas Business at the Caspian University of Technology and Engineering named after Sh. Esenov.

Chairman of the Dissertation Council Doctor of Technical Sciences, Professor, Head of the Department of "Geophysics and Seismology", NAO Kazakh National Research Technical University named after K.I. Satpayev. K.I. Satpayev - Chairman dated June 25, 2024 № 04-03-02-231

The Dissertation Council is authorized to accept dissertations in two specialties: 8D07208 (6D070600) – Geology and Exploration of Mineral Deposits, and 8D07210 (6D070800) – Oil and Gas Business.

### Permanent Composition of the Dissertation Council:

1) Boranbai Tovbasarovich Ratov - Doctor of Technical Sciences, Professor, Head of the Department of Geophysics and Seismology, K.I. Satpayev Kazakh National Research Technical University - Chairman;

2) Kozhakhmet Kosarbai Abdrakhmanovich - Candidate of Geological and Mineralogical Sciences, Associate Professor of the Department of Ecology and Geology, NAO Caspian University of Technology and Engineering named after Sh. Yesenova – Deputy Chairman;

3) Gusmanova Aigul Gaynullaevna - Candidate of Technical Sciences, Professor of the Department of Petrochemical Engineering, NAO Caspian University of Technology and Engineering named after Sh. Yesenova;

4) Bayamirova Ryskol Umarovna - Candidate of Technical Sciences, Associate Professor of the Department of Petrochemical Engineering, National Academy of Sciences of the Caspian University of Technology and Engineering named after Sh. Yesenova is the academic secretary.

1. The number of meetings held is - 3.

2. The names of the council members who attended less than half of the meetings are - not.

### 3. List of doctoral students with an indication of the organization:

- Bekeshova Zhanna Baktygalievna - KUTI named after Sh. Yesenova;

- Khadieva Albina Sagingalyovna - KUTI named after Sh. Yesenova;

- Yusif oglu in Kulieva Mura - KUTI named after Sh. Yesenova

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

During the work, the dissertation council considered 1 (one) work on the specialty 8D07208(6D070600) - Geology and exploration of mineral deposits; 2 (two) specialty jobs - 8D07210 (6D070800) - Oil and gas business

The names of dissertations in the field of specialties are given below.:

№	Full Name of the Doctoral Student	Organization of Training	Scientific Advisors
1	Bekeshova Zh.B.	KUTI named after Sh. Yesenov	- Ratov Boranbai Tovbasarovich - doctor of technical sciences, professor, head of the

			<p>department "Geophysics and Seismology", NAO Kazakh National Research Technical University named after K.I. Satpaeva (Almaty, Kazakhstan);</p> <p>- Kojakhmet Kosarbai Abdrahmanovich - candidate of geological and mineralogical sciences, associate professor of the department "Ecology and Geology", NAO Caspian University of Technology and Engineering named after Sh. Yesenova (city of Aktau, Kazakhstan);</p> <p>- Yury Vitalyevich Popov - Candidate of Geological and Mineralogical Sciences, Deputy Director of Research and Innovation, Associate Professor of the General and Engineering Geology Department of the Institute of Earth Sciences of the Southern Federal University (Rostov-on-Don, Russia).</p>
2	Khadieva A.S.	KUTI named after Sh. Yesenov	<p>Sabyrbaeva Gulzhan Sanalbaevna - Candidate of Technical Sciences, Acting Associate Professor of the Department of "Oil and Gas Engineering", Non-Profit Organization Caspian University of Technology and Engineering named after Sh. Yesenov.</p> <p>Djalalov Garib Isakovich - Doctor of Technical Sciences, Professor, Head of the Laboratory of "Institute of Oil and Gas", "Hydro-Gas Dynamics of Reservoir Systems" at the National Academy of Sciences of Azerbaijan, Corresponding Member of the National Academy of Sciences of Azerbaijan.</p>
3	Kuliev M.Yu.	KUTI named after Sh. Yesenov	<p>- Seydaliev Askar Abiuly - candidate of technical sciences, associate professor, vice president for research and development, NAO Caspian University of Technology and Engineering named after Sh. Yesenova.</p> <p>- Efendiev Galib Mamedovich - member of corr. NAN AR, Doctor of Technical Sciences, Professor, Baku, Republic of Azerbaijan</p>

#### 4.1. Analysis of the Topics of the Reviewed Works

1) Analysis of the work by Bekeshova Zh.B. on the topic: **“Refinement of the geological structure and assessment of the oil and gas potential of the Kosbulak trough, taking into account new geological and geophysical data,”** submitted for the degree of Doctor of Philosophy in the educational program 8D07208 – Geology and exploration of mineral deposits.

The dissertation is devoted to a comprehensive geological and geophysical study aimed at identifying patterns in the formation, structure, and location of hydrocarbon deposits within the Northern Ustyurt region. It aims to clarify the geological structure of the subsoil, identify promising areas for oil and gas accumulation, and improve methods for searching for and evaluating oil and gas fields using modern technologies such as seismic exploration, 3D modeling, and geochemical analysis.

The dissertation, consisting of 128 pages of typed text, includes an introduction, four chapters, a conclusion, and a list of references containing 123 titles. The work is illustrated with 38 figures.

**Relevance of the topic.** In recent years, against the backdrop of a decline in oil and gas exploration, there has been a significant decline in scientific research on the stratigraphy and oil and gas potential of Mesozoic and Paleozoic sedimentary complexes. This process is particularly

noticeable in the North Ustyurt region, where issues related to the assessment of oil and gas accumulation prospects and the refinement of stratigraphic models remain unresolved. One of the key problems requiring priority consideration is the lack of a unified stratigraphic concept for the region. Different zones are characterized by sedimentary complexes of different ages, which makes their correlation difficult. This, in turn, affects the study of facies conditions of sediment accumulation, lithology, and reservoir properties of rocks, which directly influences the forecast of oil and gas potential of individual stratigraphic units. The situation has changed with the resumption of oil and gas exploration, which has increased the need for a detailed study of the geological structure of the Mesozoic-Cenozoic and Paleozoic deposits of the Northern Ustyurt. In these conditions, the study of Paleogene wedge-shaped complexes and Paleozoic carbonate massifs as key objects for oil and gas exploration has become particularly important. Thus, comprehensive analysis of geological and geophysical data aimed at identifying new stratigraphic hydrocarbon traps is not only relevant but also necessary for successful planning of exploration and prospecting work in the region. Research on the stratigraphy and oil and gas potential of the Northern Ustyurt has a long history, dating back to 1959, when geological exploration work was first carried out on Mesozoic-Cenozoic sediments. However, many existing models are outdated and need to be updated in light of new geophysical data. One of the most important areas of research is the study of the Samsko-Kosbulak trough, located in the Uzbek sector of the Northern Ustyurt. The research by M.G. Yuldasheva contains an analysis of the geological section of this trough, based on the interpretation of deep drilling data. This research is an important foundation for further study of similar structures in the Kazakh sector of the Northern Ustyurt. The work of G.S. Abdullaev and A.N. Bogdanov on Paleozoic reef-generated carbonate massifs played an important role in forming new ideas about the oil and gas potential of the region. In particular, at the Kokchalak and Karachanalak fields located in the Uzbek part of the Northern Ustyurt, commercial gas and condensate flows have been obtained from reef-type carbonate formations of Paleozoic age. Nevertheless, despite the accumulated data, questions remain unresolved regarding the stratigraphic affiliation of sedimentary strata and the facies conditions of their formation.

***Scientific results within the requirements for dissertations.***

A lithological and stratigraphic analysis of the region was conducted, and a facies zoning scheme for the sedimentary cover was developed. The tectonic structure of the Kosbulak trough was studied, and fault zones and structural traps were identified. Seismofacial analysis of Paleogene wedge-shaped complexes was performed, and their oil and gas accumulation potential was substantiated (for the first time). The reservoir properties of Paleozoic carbonate massifs were evaluated, and their role in hydrocarbon accumulation was determined. An integrated geological and geophysical model of the Kosbulak trough was developed, including data from drilling, seismic surveys, and geochemical studies. Recommendations were made for exploration and prospecting, including the selection of promising areas for drilling.

***Scientific novelty.*** As a result of the research: Promising gas traps in Paleogene wedge-shaped structures were identified based on a detailed analysis of geological and geophysical data. • Oil and gas accumulation zones in Paleozoic carbonate massifs were identified and their capacity characteristics were analyzed. An integrated geological and geophysical model of the Kosbulak trough was developed, including data from drilling, seismic surveys, and geochemical studies. A new method of 3D modeling of the geological section of the region has been proposed, which allows for more effective exploration work. The results obtained contribute significantly to clarifying the geological structure of the Kosbulak trough and allow for the optimization of strategies for further oil and gas exploration in the region.

***Practical significance.*** The practical significance of this work lies in the fact that its results make it possible to increase the efficiency of geological exploration in the Kosbulak trough and minimize financial and environmental risks during field development. Refining oil and gas models and applying modern methods (3D MOGT, dynamic analysis, geochemical studies) enable more accurate prediction of productive zones. The identified carbonate massifs

and wedge-shaped structures determine promising drilling directions, contribute to the optimization of exploration and prospecting activities, and expand the region's resource base.

**Research results.** The results obtained by the applicant are characterized by focus and internal consistency, solving the problem of increasing the efficiency of geological exploration and refining the forecast of oil and gas potential of the Kosbulak trough. The content of the dissertation is consistent with the main provisions of the State Program for the Development of the Geological Industry of the Republic of Kazakhstan for 2023–2027, the Strategy for the Development of the Fuel and Energy Complex, and the National Scientific Initiative for the Digitalization of Geological Exploration.

The paper examines both regional and local features of the structure of the depression and proposes specific methods for predicting oil and gas potential adapted to the conditions of the Northern Ustyurt. All elements of the study are logically interrelated: from geological and geophysical analysis to model construction and the formulation of applied recommendations. This ensures the integrity of the scientific concept and the practical significance of the results obtained.

**Publications.** List of scientific works, including 6 publications, of which: 2 articles in an international journal included in the Web of Sciences and Scopus databases, 3 articles in republican specialized publications recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan; 2 articles published in the proceedings of international conferences in Kazakhstan and abroad.

**Conclusion.** The dissertation by Bekeshova Zh.B. fully meets the requirements in terms of its relevance, scientific novelty, importance for theory and practice, and the scope of experimental research. We hereby request that Zhanna Baktygalievna Bekeshova be awarded the degree of Doctor of Philosophy (PhD) in the educational program 8D07208 – “Geology and Exploration of Mineral Deposits” for her new scientific results.

2) Analysis of the work by Khadieva Albin Sagynaliqyzy on the topic: “**Improving the effectiveness of physical and chemical treatment technologies for high-viscosity oil deposits**” under educational program 8D07210 (6D0700800) – Oil and Gas Industry.

The dissertation is devoted to the study of various aspects of the oil displacement process using polymer solutions and other technological methods. The main focus is on the rheological properties of polymers in porous media, their compatibility with injected water, and the influence of salts in formation waters on the efficiency of oil displacement. The work considers the use of various polymer grades, such as R-1 and GL-50, as well as combined technologies, including the use of polymers in combination with a water-gas mixture and electrochemically modified water. The research is aimed at optimizing processes and increasing the efficiency of oil production from heterogeneous and homogeneous reservoirs, as well as conducting a technical and economic analysis of the technologies used.

The work consists of an introduction, three chapters, key recommendations, a list of references including three titles, and appendices. The work contains 107 pages, 25 tables, and 28 figures.

**The relevance of the study** lies in the fact that the issue of effective oil field development, especially in developing countries, is becoming increasingly important due to the growing demand for oil and petroleum products. The effectiveness of traditional water pressure technologies is limited in conditions of oil field depletion and low formation permeability. It is now important to apply active methods of influencing oil- and water-saturated formations to increase the oil recovery factor. These methods allow the redistribution of fluid movement in formations and increase the coverage of water pressure, paving the way for efficient oil production. From a scientific and technical point of view, this is an important task, as it contributes to the efficient use of oil fields in the long term. The efficient extraction of high-viscosity and asphaltene-containing oil, found in many oil fields in Kazakhstan, is one of the key and most challenging tasks. The viscosity of oil directly affects its activity when filtering through

the formation, which, in turn, determines the flow rates of production wells and the final oil recovery rates. In formations with high viscosity, only 10% of the initial geological oil reserves are recovered under natural development conditions, which indicates a low oil recovery factor. In such fields, the use of water pressure does not yield significant results. Therefore, there is a need to develop technologies to increase the efficiency of high-viscosity oil recovery by increasing the oil recovery factor of formations and reducing the residual oil saturation factor. The use of tertiary methods is proposed to reduce residual oil in the formation through capillary and adsorption forces. Tertiary methods include thermal, physical, chemical, hydrodynamic, gas injection, acoustic, and bacterial methods. Chemical methods of influencing the formation include surfactants, polymers, alkalis, acids, etc. These methods can be used either separately or in combination with other methods, which significantly increases the efficiency of oil production. One of the most effective and promising methods for stabilizing oil production is physicochemical technologies based on the injection of polymer compositions. These methods regulate the permeability of oil reservoirs, simplify oil movement, and increase production efficiency. Among the methods of polymer impact, the most effective technologies for slowing down the rate of oil production decline and increasing reserves are methods based on the use of polymers. Research results show that combined impact options on the formation are the most suitable for implementation in specific conditions. These methods ensure efficient oil production, taking into account the geological characteristics of the formations. However, further experimental and production research is needed to further improve the technologies and increase their efficiency. This research will help determine the applicability of polymer methods at specific fields and their long-term effects.

***Scientific results within the requirements for dissertations.***

The dissertation corresponds to the priority areas of scientific development approved by the Government of the Republic of Kazakhstan, especially in the field of "Ecology, environmental protection, and efficient use of natural resources," including "Development and exploitation of oil and gas fields." The results of the work are aimed at improving the efficiency of oil production and the rational use of natural resources, which is in line with national strategic goals and scientific and technological development.

***Scientific novelty.*** 1. A comprehensive method has been developed for treating the formation with polymer compositions and water-gas emulsion, as well as electrochemically modified water. 2. A special regression equation has been proposed for determining the oil recovery coefficient when using polyacrylamides of various concentrations by planning experiments, which allows results to be obtained without conducting several additional experimental studies. 3. The use of polymer types R-1 and GL 50 is recommended based on the identification of their advantages in increasing oil recovery efficiency.

***The practical significance*** of the work lies in the fact that the research conducted has provided a deeper understanding and development of mechanisms for oil field development using complex polymer-based treatments in various geological and physical conditions. The results of this research can serve as a basis for the industrial-scale application of polymer treatment methods in Kazakhstan's oil fields. The use of polymer technologies opens up opportunities to increase oil production volumes and improve the technical and economic indicators of field development. Thus, the results of the research contribute to improving production efficiency in the oil industry and contribute to the development of the national economy.

***Research results.*** 1. Based on laboratory tests of polymers, oil recovery coefficients were determined for polymer injections of grades R-1 and GL-50. Based on laboratory studies, it was proposed to use grade R-1 polymer for injection in high-viscosity fields. 2. The composition of polymer and catholyte solutions was determined, and the technology for treating heterogeneous formations was improved. This composition was aimed at changing the rheological characteristics of oil in order to increase the oil recovery factor. 3. The accuracy of the experiments was determined using a mathematical regression equation of least squares. Based on

the theory of similarity, the number of experiments was reduced, and the results were obtained through analytical calculations. 4. A comprehensive method of influence based on the PAA+water-gas method was developed and investigated. The possibility of increasing the oil recovery factor in high-viscosity fields was confirmed experimentally. The application of this technology in homogeneous and heterogeneous formations showed an 8% increase in the oil recovery factor compared to the use of distilled water and PAA. The integrated technology of injecting a polymer solution (PAM) with electrochemically converted water (catholyte) and PAM+water-gas has been proven effective experimentally. 5. The technical and economic efficiency of the PAA+water-gas method was determined based on modeling. This method demonstrated high efficiency compared to other methods. Similarity theory is an important tool in the study of physical and chemical processes. This theory allows us to establish general patterns of processes under various conditions and scales, determine optimal conditions for experiments, and effectively summarize the results. Conducting experiments based on similarity theory can require significant time and financial resources. Therefore, researchers develop mathematical models and conduct numerous experiments under various conditions and scales to obtain the necessary data and test hypotheses. Based on laboratory studies, a comprehensive impact technology has been proposed to increase the oil recovery factor in geological structures. This method is based on the principles of similarity theory and allows for effective increases in oil production in various geological conditions.

**Publications.** The main results of the dissertation have been published in 14 scientific articles, including in leading peer-reviewed scientific journals recommended by the Committee on Scientific and Technical Education of the Ministry of Education and Science of the Republic of Kazakhstan (6 publications), as well as in a journal included in the Scopus database (2 articles). The rest of the articles have been published at international scientific conferences.

**Conclusion.** As a result of the research conducted in the dissertation, key aspects of oil displacement using polymer solutions and combined technologies were studied. The results showed that polymer solutions, including R-1 and GL-50, have high potential for improving oil displacement efficiency, especially when combined with a water-gas mixture and electrochemically modified water. The research also demonstrated the importance of considering the influence of salts in formation waters on displacement processes and the need to optimize technologies for different types of formations. The use of combined technologies, including polymer solutions and water modifications, can significantly increase the efficiency of oil field development. The results of the work can be used to further improve oil extraction methods and develop new technologies, taking into account economic and environmental factors.

3) Analysis of the work by Kuliev Murad Yusif ogly on the topic **“Improvement of drilling technology to enhance the quality of well reinforcement at fields in Western Kazakhstan,”** submitted for the degree of Doctor of Philosophy in the educational program 8D07210 (6D0700800) - Oil and Gas Business.

The dissertation is devoted to improving drilling technology aimed at enhancing the quality of well cementing in the fields of Western Kazakhstan. The study examines the scientific and practical aspects of improving the quality of casing cementing, ensuring reliable separation of formations and long-term operation of wells in complex geological and technical conditions. The work is aimed at developing and introducing new compositions of cementing slurries and buffer fluids using local raw materials (porphyry), which makes it possible to increase the strength and tightness of the cement stone, improve adhesion to the casing and rock, and reduce the risks of poor-quality cementing. Thus, the dissertation is devoted to the creation and justification of improved technological solutions to increase the efficiency and reliability of well cementing in the construction of oil and gas facilities in Western Kazakhstan.

**Relevance of the topic.** Currently, targeted research is being conducted worldwide to increase the strength of cement stone in order to reduce its permeability for effective separation of formations and good adhesion of cement stone to the casing and rock.

Based on this, special attention is paid to the creation of a high-strength cement mixture to improve the tightness of the annular space in the conditions of multi-layer deposits in the West Kazakhstan fields.

In the republic, special attention is paid to the long-term operation of oil and gas wells and increasing the strength of cement stone behind the annular space. When cementing wells, special attention is paid to technological measures to improve methods of regulating the properties of cementing systems, ensuring high-quality well cementing in difficult conditions, which is very important for Kazakhstan, as well as the development of special technological fluid compositions and recommendations for their use. Based on this, one of the most important problems is the creation of a new (or improvement of existing) technology, including the development of a composition of high-strength cementing mixtures for securing wells, which is a priority and urgent task facing the oil and gas industry.

Thus, the issue of improving well cementing technology remains on the agenda as an important and pressing matter, representing an interest for the oil and gas industry.

***Scientific results within the requirements for dissertations.***

Based on scientific research results and measures developed to improve the tightness of the annular space during cementing of casing strings, a highly effective grouting mixture using porphyry was introduced, as well as expanding grouting cement for separating permeable formations during cementing of multi-layer deposits. As a result of the use of calcium oxide (CaO), the corrosion resistance of the plugging stone increased by 11-13%, and good adhesion to the casing and rock was established by 7%; A new buffer fluid composition has been introduced in the form of a 0.2% aqueous solution of polyacrylamide, which has improved the quality of well cementing by 20-25%.

***Scientific novelty.*** An improved technology for bonding plugging stone to the casing string and wellbore walls has been proposed by introducing expanders such as calcium oxide (CaO) and porphyry into the plugging solution. A new buffer fluid composition is proposed in the form of a 0.2% aqueous solution of polyacrylamide based on hydroxyethyl cellulose, a structuring additive aluminum sulfate Al (SO ) , and a clogging filler IKKARB-75. A new composition of plugging solution with the addition of gas blockers for separating formations in gas wells has been proposed. Wells have been classified according to the quality of cementing and associated risks, based on their location in the acceptable or unacceptable risk zone.

***Practical significance.*** The practical significance of the research results lies in the creation of a technology that includes a new approach to cementing quality, as well as in determining the rheological and physical-mechanical properties of cementing mixtures in order to obtain the greatest efficiency from the separation of formations in specific well drilling conditions using fillers based on local raw materials (porphyry obtained from the Karatau deposit) to increase the strength of the cement stone.

***Research results.*** Based on calculation methods and analysis data, the applicant has found that for conditions of abnormally high reservoir pressures, expanding additives based on calcium oxide with lignosulfonates or sodium silicates are effective, and for conditions of abnormally low reservoir pressures, additives based on ferrite and calcium oxide are effective.

The most optimal component compositions of calcium oxide-based expanding additives for grouting solutions have been identified. Requirements for the technological parameters of the base grouting solution have been established. The component composition has been determined and a recipe has been developed for a base grouting solution based on Portland cement grade PCT-I-G-CC-I, which will form the basis for the expanding grouting composition.

As a result of using a plugging solution based on PCT-I-G-CC1, containing an expanding additive and modifying reagents that improve insulation characteristics due to the expansion effect (up to 8%), increased adhesion (up to 1.8 times), and low water release (up to 35 cmZ/30 min), the tightness of the wellbore increased.

To preserve the reservoir properties of productive formations during cementing, the author used the IKKARB-75 clogging filler as a crust-forming additive for buffer fluids, as

noted. Thanks to the formation of a dense impermeable carbonate crust on the walls of the well, the IKCARB-75 additive prevents the filtration of fluid from both the buffer mixture and the plugging solution. As a result of using a 0.2% high-viscosity aqueous solution of polyacrylamide and the NCCARB-75 clogging filler as a buffer fluid, the quality of well cementing has significantly improved, and based on this, the results of experimental field tests and technological efficiency from implementation have been obtained.

**Publications.** List of scientific works, including 24 publications, of which: 2 articles in an international journal included in the Web of Sciences and Scopus databases, 4 articles in republican specialized publications recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan; 18 articles published in the proceedings of international conferences in Kazakhstan and abroad.

**Conclusion.** Kuliev M.Yu.'s dissertation fully meets the requirements in terms of its relevance, scientific novelty, importance for theory and practice, and the scope of experimental research. We hereby request that Murad Yusif oglu Kuliev be awarded the degree of Doctor of Philosophy (PhD) in the educational program 8D07210 – “Oil and Gas Business” for his new scientific achievements.

#### **4.2. The relationship of the topic of dissertations with national state programs, as well as targeted republican and regional scientific and scientific-technical programs.**

The dissertation by Bekeshova Zh.B. was prepared as part of the grant project for young scientists “Zhas Galym” (No. AR22686978), implemented with the support of the Ministry of Science and Higher Education of the Republic of Kazakhstan in 2024-2026. The study of the oil and gas potential of Northern Ustyurt and the identification of new hydrocarbon deposits based on geophysical data is part of this project, which corresponds to the topic of the dissertation. The study of this territory has been ongoing since the start of doctoral studies in 2020. During the implementation of the grant, geological and geophysical studies were carried out, the results of which formed the basis of the dissertation.

The dissertation by Khadieva A.S. was completed as part of the “Zhas Galym” project on the topic “Improvement of a comprehensive method for intensifying the production of high-viscosity oil,” funded by the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan (grant AR22685524).

The dissertation of M.Y. Kuliev was prepared as part of the grant project for young scientists “Zhas Galym” (No. AR22687661), implemented with the support of the Ministry of Science and Higher Education of the Republic of Kazakhstan in 2024–2026 (dated June 20, 2024, No. 127/zh-5-24-26). Research into improving technological solutions for better well reinforcement in the West Kazakhstan fields is part of this project, which is in line with the topic of the dissertation. This research topic has been studied since the start of doctoral studies in 2020. During the grant implementation, analyses of the quality of well cementing in the fields of Western Kazakhstan were carried out, the results of which formed the basis of the dissertation.

#### **4.3. Analysis of the level of implementation of the results in practice**

1) The results of Bekeshova Zh.B.'s dissertation research demonstrate a high level of practical significance, as they make it possible to increase the efficiency of geological exploration in the Kosbulak trough and minimize financial and environmental risks during the development of deposits. The refinement of oil and gas potential models and the application of modern methods (3D MOGT, dynamic analysis, geochemical studies) provide more accurate forecasting of productive zones. The identified carbonate massifs and wedge-shaped structures determine promising drilling directions, contribute to the optimization of exploration and prospecting, and expand the region's resource base. Promising gas traps have been identified

2) The results of research conducted by Khadieva A.S. demonstrate a significant contribution to practical activities, as the novelty of this work has made it possible to supplement and develop ideas about the mechanism of oil field development using complex technologies based on polymer compositions in various geological and physical conditions. The results of this research were discussed at technological meetings of the Ushkoy JSC company, where a positive recommendation was received for their use in the oil fields of Kazakhstan, which will increase oil production by improving the technical and economic indicators of field development using polymer technologies. Thus, the results of the research contribute to improving production efficiency in the oil industry and the development of the national economy.

3) The results of experimental studies conducted by Kuliev Yu.M. demonstrate a high level of practical significance, as they involve the creation of a technology that includes a new approach to cementing quality, as well as determining the rheological and physical-mechanical properties of cementing mixtures in order to achieve maximum efficiency in separating formations under specific well drilling conditions using fillers based on local raw materials (porphyry obtained from the Karatau deposit) to increase the strength of the cement stone.

### 5. Analysis of the work of official reviewers (with examples of the most substandard reviews)

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

Information about the appointed reviewers is provided below:

№	Full name of the doctoral student	Reviewers	
		Full name of reviewer 1 (position, academic degree, title, number of publications in the specialty)	Full name of reviewer 2 (position, academic degree, title, number of publications in the specialty)
1	Bekeshova Zh.B.	Portnov Vasily Sergeevich - Doctor of Technical Sciences, Professor 25.01.00 - Geology and Mineralogy. NAO "Karaganda Technical University named after Abylkas Saginov".	Ahmetzhanov Aitbek Zhamsatovich - Candidate of Geological and Mineralogical Sciences, 6D070600 - Geology and Exploration of Mineral Deposits; JSC "Kazakhstan-British Technical University"
2	Khadieva A.S.	Alisheva Zhanat Nürkūatovna - Doctor of Philosophy (PhD), Acting Associate Professor of the Department of Physical Chemistry, Catalysis, and Petrochemistry, Kazakh National University named after al-Farabi.	Imanbaev Yerzhan Imanbayuly - Doctor of Philosophy (PhD), Associate Professor (Docent) at the Republican State Enterprise on the Right of Economic Management "Institute of Combustion Problems."
3	Kuliev Yu.M.	Akhmetov Nurken Makhsutovich - Doctor of Technical Sciences, Associate Professor of the Oil and Gas Faculty, Vice-Rector for Academic Affairs and International Cooperation, Safi Utebayev Atyrau University of Oil and Gas.	Arshidinova Makhiram Turganovna - Candidate of Technical Sciences, Associate Professor; Caspian Public University, Institute of Engineering Associate Professor