

**On scientific–organizational report
of “Fluid Mechanics” department for the 1st half of 2018**

**Topic: INVESTIGATION OF THE INFLUENCES OF BOUNDARY
LAYERS ON THE NON-STATIONARY PROCESSES IN
HETEROGENEOUS FLUIDS FLOWS**

During the reporting period, the research was fulfilled according to the plan.

Work 1. Investigation of pulsation regimes in flows through pipelines of heterogeneous systems.

The main reason for changing the flow properties in the pipelines is that fluids move in the mixed form. Diversity in moving systems results in differences in velocity of these systems. In flow, so various velocity cause pulsation regime. During the reporting period, in one-dimensional flow, pulsation regimes of heterogeneous systems were considered.

Work 2. Modeling of electrokinetic and suitable non-stationary processes in the boundary layer

During the report, in pipelines, the processes of regulation of non-stationary regimes of electrokinetic potential generated by flow of rheological complex systems were investigated. The conditions for the formation of electrokinetic potential in the flow of disperse systems and the regulation of hydrodynamic parameters in the movement of gaseous heterogeneous systems in pipelines are considered.

Work 3. Investigation of the effects of gas generation in gaseous liquids on wave parameters

In the study, the propagation of waves arising during the transportation of mixtures of gas - liquid and the influence of gas bubbles on the hydraulic process were considered. Considering the mathematical expressions of the movement equations and continuous equation of the fluid, the equation of wave amplitude was found. In thermobaric conditions, the propagation area of the wave was determined by giving different values to the radius in the equation and suitable values were determined for the change of wave amplitude depending on the radius of the bubble.

During the reporting period, the department's employees took part in the competition, which announced by SOCAR's Science Foundation to support

fundamental and innovation-oriented research projects and other scientific projects of importance to the state and society, projects on the "Development of a new hydrodynamic method to optimize of residual oils recovering from the heterogeneous layers" have been awarded.

In addition, the departments' employees took part in the grant competition of fundamental and applied research projects "Science and Education Integration", announced by the Science Development Foundation under the President of the Republic of Azerbaijan, and projects on the "Regulation and investigation of complication generated by pulsating regimes in flows through pipelines ", which was presented jointly with the Department of Theoretical Mechanics and Continuous Mechanics of the Baku State University was awarded.

Corresponding member of ANAS, Dr. Geylani Panahov and leading researcher of this department, candidate of the technical sciences, associate professor Eldar Abbasov were on a business trip to the People's Republic of China at the invitation of the New Horizon scientific center (Beijing). The purpose of the visit was to discuss joint research with experts from the People's Republic of China and testing of new technologies at the field conditions.

At the suggestion of this company, Geylani Panahov and Eldar Abbasov participated in the application of hydrodynamic impacts to oil collectors and application of gas creation's technology on the layer. In injection well #C12ST01, which proceed on a tough sea condition, the technological process has been successfully implemented and the results were monitored and analyzed jointly with company's team. Employees of the department also operated for intensification of increase of oil production at three operating wells in Binagady Oil Company.

During the reporting period, 3 articles were accepted and 2 articles were prepared for print:

1. Pənahov Q.M., Müseyibli P.T. Qaz qabarcıqlarının yaranma dinamikasının hidrozərbə dalğalarının yayılmasına təsiri. – “BDU-nun Xəbərləri” Jurnalı (çapa qəbul edilmişdir).

2. Панахов Г.М., Аббасов Э.М., Юзбашиева А.О., Балакчи В.Д.
Нестационарная конвекция Марангони в капилляре с жидкостью. –
Нефтегазовое дело, Уфа. (accepted).

3. Панахов Г.М., Асланов Х.И., Аббасов Э.М., Мусеибли П.Т.
Управление процессом капиллярной неустойчивости при гидродинамическом
воздействии на пласт. – (accepted).

Corresponding member of ANAS Geylani Panahov has been the opponent of
5 dissertations, one of his dissertants has defended his dissertation work for gaining
Phd. degree and supervises 3 dissertants.

Head of the department Geylani Panahov and scientific worker Afat
Yuzbashiyeva teaches at BSU, Geylani Panahov participates in examination and
diploma defense of bachelors of "Mechanics" specialty at the position of chairman
of State Examination Commission at Baku State University.

Head of the department,
Corresponding member of ANAS,
Dr. on technical sciences

Geylani Panahov