

# **Cabinet of Ministers of the Azerbaijan Republic**

## **On approval of the “Program of Measures for 2007 – 2014 for Study of Hydrocarbon Potential and Geo-Dynamics of the Azerbaijan Sector of the South Caspian Depression”**

### **Resolution № 98**

*Baku, June 18, 2007*

Taking into account the proposal of the National Academy of Sciences of Azerbaijan agreed with the Ministry of Industry and Energy of the Azerbaijan Republic, the Ministry of Ecology and Natural Resources of the Azerbaijan Republic, the Ministry of Education of the Azerbaijan Republic and the State Oil Company of the Azerbaijan Republic, the Cabinet of Ministers of the Azerbaijan Republic **hereby resolves as follows:**

1. To approve “Program of Measures for 2007 – 2014 for Study of Hydrocarbon Potential and Geo-Dynamics of the Azerbaijan Section of the Southern Caspian Depression” (appended hereto).
2. The National Academy of Sciences of Azerbaijan and other relevant state organs shall ensure implementation of the Program of Measures.
3. Financing of the Program of Measures shall be performed within the limits of funds allocated to the National Academy of Sciences of Azerbaijan for the corresponding year.
4. This Resolution shall come into force on the date of signing.

*Prime Minister of the Azerbaijan Republic*

*A. RASIZADA*

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# **“Program of Measures for 2007 – 2014 for Study of Hydrocarbon Potential and Geo-Dynamics of the Azerbaijan Sector of the South Caspian Depression”**

## **1. Introduction**

By virtue of its vast natural resources, during the recent years the Caspian region turned into one of the most active operations centers of the world. Further development of Caspian countries is tied to the efficient integration of the existing potential into the world economy. As a result of substantiated activities being implemented by the governance of the Republic, Azerbaijan has become a leading country in the region. Our country has a very extensive and rich experience in the area of study of potential of the Caspian basin. This is based upon fundamental scientific researches which were performed and are currently performed with respect to geological, geophysical and production of fields in the Caspian basin, created modern technologies and production of over 1.5 billion tons of oil in the Republic. All projects being implemented in this area are based upon the geological model of the region. Geological model constitutes the foundation of application of relevant measures, use of operating, processing and transportation technologies for the purpose of performance of fundamental scientific researches, evaluation of hydrocarbon potential, performance of exploration and search activities, forecasting and prevention of geological and ecological risks.

Due to complexity of its geological structure, diversity of its hydrocarbon resources and geodynamic activity, holds an exceptional position among similar basins throughout the world. It is sufficient to say, that in no other oil – gas basin throughout the world, other than Caspian, the thickness of rock structures does not go up to 24 — 26 kilometers. Based upon hydrocarbons potential per square kilometer, Caspian is at the level comparable with oil – gas regions of Gulf of Mexico.

The geological model being currently used for the Caspian region, including Azerbaijan section, is based upon geological and geophysical information which was collected during 60s – 90s of the last century, and is by now outdated with respect to several important parameters. During the past period of time the relevant organizations of the Republic and leading foreign oil companies collected large scope of geological and geophysical and space information. Such information was, to varying extents, used in connection with oil and gas production, for study of subsurface depths for 6 — 8 kilometers. Exploration and engagement into production of hydrocarbon reserves on deeper levels requires creation of the geological and geophysical information model covering such levels.

The Subsurface Section of the National Academy of Sciences of Azerbaijan discussed the existing situation in detail with leading scientists and specialists from relevant organizations of the Republic, and propose to produce the relevant program of measures dedicated to this area. As a result of implementation of such a program, there will be created a geological model covering depths of 25 – 30 kilometers of the Azerbaijan section of the Caspian and based upon that model there will be collected new, important from scientific and practical points of view information on sources, migration and fields of hydrocarbons in the region, location of earthquake centers, appropriateness of geodynamic development of the region. Hydrocarbon potential will be

revaluated subject to deeper levels. There will be arranged overall monitoring for the purpose of effective forecasting and protection of human activities within this section of the Republic and adjacent territories from geological and ecological risks.

“Program of Measures for Study of Hydrocarbon Potential and Geo-Dynamics of the Azerbaijan Section of the Southern Caspian Depression” (hereinafter referred to as the “Program”) provides for implementation of necessary activities in the above mentioned areas for the period of 2007 — 2014.

## ***2. Main purpose and duties of the Program***

- The Program pursues the purpose of creation of a new geological and geophysical model, more accurate valuation of hydrocarbon resources based thereupon, application of newly prepared methods and theories, development of new efficient programs and methods for the processing of geological and geophysical information, geological interpretation thereof, and further improvement of regional network for monitoring of geodynamic processes, through fundamental scientific researches, new technologies, concepts, processing and development computer program complexes, based upon geological and geophysical information and rich experience obtained during last years. To achieve these purposes, the Program provides for the performance of the following duties:
- Creation of geological and geophysical model of the Southern Caspian depression covering deeper levels based upon modern scientific and practical knowledge;
- More accurate valuation of hydrocarbon potential of the region through application of this model and modern methods;
- Improvement of regional monitoring network of geodynamic processes through application of geodynamic researches, modern technologies and equipment.

## ***3. Directions of implementation of the Program***

The Program provides for implementation of measures related to the creation of geological and geophysical model of the region, valuation of hydrocarbon resources, engaging such resources into production, forecasting geodynamic conditions and efficient monitoring thereof and activities in the following fields:

- Analysis of geophysical information, improvement of development methods and application of modern technologies;
- deepness structure and development history of the Southern Caspian depression;
- Structure of depression cover;
- sub-vertical and sub-horizontal geological items;
- geological interpretation of earthquake centers and mud volcanoes;
- physical experiments carried out under high thermo-baric conditions;
- computer modeling;
- modern methods of valuation of hydrocarbon potential and application thereof;
- analysis of modern geodynamic processes of the Caspian basin;
- anomaly development factors of subsurface due to technological impacts;
- improvement of geodynamic monitoring networks in Azerbaijan;
- global positioning of geographic situations with space geodesy (GPS technology);
- air-space monitoring;
- geo-ecological (geo-chemical) monitoring;
- cooperation with international monitoring networks.

## ***4. Plan of implementation of the Measures Program***

No.	Name of the activity	Organizations in charge	Period of implementation (years)
1	2	3	4
<b>1. With respect to the creation of new geological and geophysical model of the Sothern Caspian Depression (SCD)</b>			
1.1.	Reprocessing of gravitation magnetic and electric exploration information	SOCAR, NASA, MENR	2007-2008
1.2.	Development of algorithms and programs reflecting functional dependence with respect to reconciliation of information obtained via various geophysical methods	NASA	2007 — 2008
1.3.	Performance of laboratory physical experiments under high thermo-baric conditions (for kerns)	NASA	2007 — 2008
1.4.	Performance of field works for the purpose of establishing geological and geophysical connection between offshore and onshore areas	NASA, SOCAR, MENR	2007 — 2009
1.5.	Revaluation of interval speeds of deep levels with respect to seismic materials, application of seismic anisotropy and preparation of geological model	NASA, SOCAR, ME, MENR	2007 — 2009
1.6.	Regional stratification of produced profiles, reconciliation of profiles prepared with various methods and selection of a single geological model	NASA, SOCAR, ME, MENR	2007 — 2009
1.7.	Selection of consolidated surface, granite and basalt layers, Moho layers and determination of area of spread of granite layer	NASA, SOCAR, ME, MENR	2007 — 2010
1.8.	Reprocessing, interpretation (creation of 3D interpretation model) and generalization of existing geological and geophysical information with application of modern technologies	NASA, SOCAR, ME, MIE	2007 — 2011
1.9.	Following various levels of the depression layer above the basement - Meso-Cenozoic deposits	NASA, SOCAR, ME, MENR	2008 — 2009
1.10.	Preparation of various geological and seismic profiles, structures, sectors, paleo-geological, seismic tectonic, seismic facial, etc. maps and diagrams, and determination of oil and gas requirements of non-anticlinal fold form of the region based upon seismic-stratigraphic research	NASA, SOCAR, ME, MIE	2008 — 2010
1.11.	Study of paleo-geography of Meso-Cenozoic era	NASA, SOCAR	2008 — 2010
1.12.	Application of results of laboratory	NASA	2008 — 2010

	experiments performed under high thermo-baric conditions in development of scientific technologies, seismology and geodynamics		
1.13.	Determination of oil and gas creation and collection zones within profiles and sections	NASA, SOCAR, MIE	2009 — 2010
1.14.	Reconciliation of the border of SCD with adjacent territories (Great Caucasus, Tersk-Kaspiysk-side zone, etc.)	NASA, SOCAR, ME, MENR	2009 — 2010
1.15.	Processing of deep cut sections of the SCD, preparation of seismic tectonic and seismic zoning maps	NASA, SOCAR, MENR	2009 — 2010
1.16.	Determination of petroleum physical factors of oil and gas bearing section by depth	NASA, SOCAR, ME, MIE	2009 — 2010
1.17.	Study of cut tectonics, classification of cuts and determination of their role in fluid dynamics, dia-prism, mud volcanoes activities, and formation of thermo-dynamic regime of the basin	NASA, SOCAR, ME	2009 — 2010
1.18.	Study of emergence and development history of modern structures of SCD	NASA, SOCAR, ME	2010
1.19.	Performance of Basin Modeling imitating model for development of SCD basin and oil and gas appearance	NASA, SOCAR, ME	2010 — 2011
<b>2. With respect to valuation of hydrocarbons potential</b>			
2.1.	Determination of method of systematic analysis and level of geological and geophysical researches	NASA, SOCAR, ME	2011 — 2012
2.2.	Classification of oil and gas systems (Pliocene — 4 <sup>th</sup> period; Oligocene — Miocene; Cretaceous; Jurassic; Upper Perm - trias; devon – Lower Perm)	NASA, SOCAR, ME	2011 — 2012
2.3.	Determination of structure of systems, establishment of paleo-geographic conditions and sedimentation speed within systems, study of heat regime and catagenesis of organic substances	NASA, SOCAR, ME	2011 — 2012
2.4.	Study of distribution of initial potential resources of hydrocarbons, establishment of their cumulative value and determination of distribution by areas	NASA, SOCAR, ME, MIE	2011 — 2012
2.5.	Study of distribution of hydrocarbons characterized with difficult production conditions along the area of Southern Caspian basin	NASA, SOCAR, ME	2011 — 2013
2.6.	Classification of hydrocarbon resources	NASA, SOCAR	2012 — 2013
<b>3. With respect to geodynamic researches and monitoring</b>			
3.1.	Upgrading of equipment and various parts	NASA	2007 — 2008

	of seismic and other physical stations		
3.2.	Preparation of theoretical models of modern deformation processes in geodynamics	NASA, MIE	2007 — 2008
3.3.	Study of horizontal and vertical displacement occurrence mechanisms with respect to offshore areas and sea bed	NASA	2007 — 2008
3.4.	Improvement of geodynamic monitoring network in Azerbaijan	NASA, MENR	2007 — 2008
3.5.	Preparation of technologies and methods for operative monitoring of modern geodynamic processes in the Caspian basin	NASA	2007 — 2008
3.6.	Improvement of regional observations network	NASA	2007 — 2008
3.7.	Establishment of Kura geodynamics range (Zabrat-Baku-Alat-Kurdamir-Ganja)	NASA	2007 — 2008
3.8.	Establishment of Great Caucasus southern slopes geodynamics range (Balakan-Gabala)	NASA	2007 — 2008
3.9.	Creation of Azerbaijan range for GPS measurements	NASA	2007 — 2008
3.10.	Study of dependence of hydrocarbons production upon activities of mud volcanoes, change of level of the Caspian Sa, seismic activities of the land surface and fluid dynamics	NASA	2007 — 2008
3.11.	Establishment of local geodynamics ranges	NASA, MENR	2007 — 2010
3.12.	Establishment of Shemakha – Ismayilli geodynamics range	NASA, MENR	2007 — 2010
3.13.	Establishment of Absheron geodynamics range	NASA, MENR	2007 — 2010
3.14.	Establishment of Mingechevir – Shemkir geodynamics range	NASA, MENR	2007 — 2010
3.15.	Establishment of the Northern (Yalama-Siazan) and Mountainous (Talish-Nefchala) geodynamics ranges	NASA, MENR	2007 — 2010
3.16.	Preparation of the model of mixed geodynamic impact of natural and human factors upon methods of search and production of hydrocarbon resources on selected facilities	NASA, SOCAR	2007 — 2013
3.17.	Organization and performance of geophysical, hydrodynamic and geochemical activities in stations	NASA, MENR	2007 — 2014
3.18.	Magnetic, electrometric observations: study of micro-seismic sections, radon emanation, processes of change of hydrodynamic parameters	NASA	2007 — 2014

3.19.	Study of hydro-chemical parameters of underground and surface waters (macro- and micro-components, temperature and hydrogen indicators)	NASA, MENR	2007 — 2014
3.20.	Based upon multi-zone (multi-channel) pictures of land and sea surfaces, preparation of spectral analysis algorithms, and use thereof in diagnostics and air-space monitoring of minerals, rocks and various objects	NASA	2007 — 2014
3.21.	Based upon chemical composition of fluids in mud volcanoes and registration of debit, creation of network of geo-ecological (geo-chemical) network	NASA	2007 — 2014
3.22.	Improvement of cooperation with international monitoring systems	NASA	2008
3.23.	Experimental methodological testing of received proposals on hydrocarbon fields, sections of passing of offshore and onshore oil pipelines, areas affected by rising sea level	NASA, SOCAR, MIE	2008 — 2009
3.24.	Development and application of new software	NASA, MIE	2008 — 2009
3.25.	Use of periodically registered geodynamic parameters in implementation of forecasting and prophylactic activities	NASA	2008 — 2014
3.26.	Valuation of dangerous engineering geological processes on underwater and offshore constructions, communications infrastructure, including oil pipelines	NASA, SOCAR	2008 — 2014
3.27.	Study of emergency accident situations on offshore and onshore drilling facilities due to unexpected flowing oil, layer waters and gases	NASA, SOCAR MIE	2008 — 2014

### **Acronyms:**

NASA — National Academy of Sciences of Azerbaijan

SOCAR— State Oil Company of the Azerbaijan Republic

ME – Ministry of Education of the Azerbaijan Republic

MENR — Ministry of Ecology and Natural Resources of the Azerbaijan Republic

MIE — Ministry of Industry and Energy of the Azerbaijan Republic

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