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34. AZERBAIDZHAN SCIENTIFIC-RESEARCH PETROLEUM INSTITUTE (AZNI)

P. P. Vlasenko

In accordance with the requirements of the petroleum business and for solution in particular of the problems confronting basic and subsidiary producers of the Azerbaydshan petroleum industry, the work of AZNI is oriented in the following directions: (1) study of technological processes in the petroleum industry for the purpose of mastering and improving them; (2) rendering assistance to production in familiarisation with new installations, apparatus, and equipment and in revealing the optimum values for planning purposes; (3) development of new types of production on the basis of multilateral study of the basic raw material (petroleum), and also of by-products and waste-products of production.

In addition to these basic functions, AZNI is occupied to a considerable degree too with scientific-research problems of a theoretical nature in the field of the petroleum business.

In accordance with these lines of scientific-research activity, AZNI has during the period since 1931 been working on the following very important problems.

In the field of geology projects have been conducted on the stratigraphic correlation of profiles of exploratory and actual fields by various methods (petrographic, microfaunal, chemical, magnetometric). The purpose of the project is to

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provide the petroleum industry with profiles of basic regions with an indication of all correlative signs and to introduce the method of correlation to the daily practice of geologists. In connection with this task new methods of correlation (for rare elements) have been worked out and petrographic, micro-faunal, chemical, and magnetometric study has been performed of the deposits of the profile of the Apsheron Peninsula and adjacent regions.

Further study has been made of the productive layer, the boundaries of its extent, and facies in connection with changes of its oil-bearing properties for the establishment of scientifically founded data on petroleum reserves in deposits associated with the productive layer.

For the purpose of current and prospective planning of oil output AZNIN^I is carrying on the development of a volumar-statistical method of calculating the petroleum below the surface.

Large projects have been carried out by AZNIN^I in the fields of: (a) research on liquids obtained in drilling (particularly for bromine and iodine content, and radioactivity) and new methods of analyzing them; a whole series of hydrochemical laboratories controlled by AZNIN have been founded in the rayons; on the basis of study of drilling liquids a new branch of production has developed -- the recovery of iodine (Nefte-Chala); (b) study of the geochemical processes caused by the micro-fauna

of petroleum-producing rocks and liquids from boreholes in connection with the problem of the origin of fuel gases in petroleum regions; (e) research on bituminous substances and determination of the sulphur contained in rocks, thanks to which it is possible to establish a number of signs of the nearness of petroleum deposits when searching for petroleum in prospecting regions.

The development of methods of investigating clay deposits as applied to problems of correlations, and study of the possibility of determining horizons in drillings based on micro-fauna specimens from the circulating mud solution, and also study of Foraminifera from deposits of the productive layer, have provided extensive material for increasing the precision of correlation methods.

Mastery of these methods and introduction of them into practice provides an opportunity to become rapidly oriented to the profiles of oil fields on the basis of the circulating mud solution without stopping drilling to analyze the earth deposits, which has a noticeable effect on increasing the speed of passes. The introduction of these methods has caused the creation of a whole network of production correlation laboratories, which are under the supervision of the Geology Section of AZNII. On the basis of the AZNII experiment subsidiary laboratories adopted in Grosneft' and Grusneft', it is obvious that they will gradually be introduced into practice in all the petroleum regions of the Union.

The work of ^IAZNI^I in the field of electrocarottage on the basis of the method of the French professor, Schlumberg, which is directed toward study of the theoretical basis of this method of prospecting and toward the addition to it of changes and corrections arising from the specific peculiarities of the application of carottage under the conditions imposed by our fields, has received approval from the author of this method, Professor Schlumberg. Unfortunately, the development of this work has hitherto been hindered by the absence of a staff and insufficiency of suitable apparatus.

In the field of productive work (drilling and the exploitation of drillings) mention should be made first of all of the problem of the mud circulating solution, which plays an essential role in the process of drilling: a large project has been carried out on the study of the physico-chemical and hydraulic essence of mud solutions and on improving their quality (addition of "aqua-gel", etc). As a result, hydraulic theory of mud solutions has been developed and it has appeared possible to establish qualitative standards for the latter for normal drilling conditions and for dealing with complicated instances, such as: cast-offs, maintenance of circulation, etc.

Brigades of ^IAZNI^I in the fields are, by way of direct assistance and training, eliminating failures associated with the use of the mud solution, as a result of which the number of collapses and cast-offs has been noticeably reduced. According

to preliminary calculations, the economic effect of using AZNIN^I methods in dealing with cast-offs and circulation maintenance and of the results of research of local clays suitable for the preparation of solutions will produce a saving of about 7,000 rubles for every drilling.

Projects on increasing the speed of the pass of the bit by means of improving the quality of its facing with hard alloys (finding the optimum facing procedure for various alloys, comparative study of the latter, improvement of their qualities, etc) increases the stability of the bit by 20 to 30 percent.

Investigation of gas-lift and pump applications with respect to finding better designs as well as the optimum conditions of procedures for the various conditions of their operation has been performed by AZNIN^I at the oil fields im. Ordzhonikidze and Stalin, as a result of which optimum values for application of gas-lift wells have been established and have been put into practice in experimental application groups; these have produced a definite effect as far as increasing production (approximately 10 to 15 percent). The immediate task is to extend such methods to all operating fields. With respect to the so-called single-row lift, the expediency of its application has been proved and means of eliminating its shortcomings have been found. This method is also beginning to gain for itself a worthy place in the matter of exploiting oil wells, in view of the indubitable advantages of its application; in inaugurating the single-row lift at 90 oil wells 45,000 meters of 4-inch compressor pipe have been saved.

Work in the field of gas-lift corrosion has revealed that it is caused by the hydrogen sulphide found in the composition of natural gas of certain oil-bearing areas. Means have been found of combatting corrosion by means of purifying the gas and on the basis of AZNII^I plans an installation for gas purification has been constructed.

Extensive work has been done on the investigation of drilling equipment (construction, quality of metal, etc). As a result, the inadequacies of Soviet, as well as imported, equipment have been established and a number of pointers have been given to planning organisations and plant-producers on construction changes and the quality of materials.

In particular, considerable work has been done on the examination of fountain fittings and other equipment with X-rays. At the advice of AZNII^I following such examination changes have been made in the technological process of casting at the Plant imeni Lieutenant Schmidt, which has improved the quality of production.

In the field of turbine drilling, work has been done on the investigation of the process of turbine drilling itself; in the main, tests have been performed on materials used in the manufacture of turbo-drill parts, with respect to the possibility of resisting the considerable wear to which the turbo-drill is exposed in operation, in particular due to rubbing with sand.

Research has been performed on the processes of automatic drilling (the Skvertsev and Shakhmasarov automatic devices, the Zaplyushnikov-Salkin control panel). Detailed examination of the Skvertsev-system automatic device has shown a number of deficiencies in its construction; in the course of this means of eliminating them were contemplated. It has been proposed to use in operation of the automatic device a variable-speed box, which under working conditions provides considerably more even operation of the equipment, facilitating reduction of the number of cases of drilling-tube breakdowns. Planning and designs have been completed for a new AZNIN^I-system automatic device, subject to approval of manufacturing on a production scale; the AZNIN automatic device has the advantage that it will be self-regulating for different earth conditions.

^I
AZNIN^I has developed a plan for dispatcher control of drilling, and a corresponding panel is being installed at the Oil fields imeni Ordzhonikidze; first to be placed in operation will be the part which registers the production of individual processes. Secondary equipment, which makes it possible to watch over process-flow and control it, will be completed later on.

With respect to deep-pumping exploitation of oil fields the optimum operating procedure for pumps has been revealed (depth of lowering, number of strokes, length of stroke). This work has been performed experimentally at the oil fields imeni Ordzhonikidze and its applications has provided a substantial

increase in petroleum production (almost two-fold). Utilization of the conclusions arising from this project and their application at other oil fields is undoubtedly producing a great economic effect.

Investigation of replacement pumps, for the purpose of using them mainly in oil wells with a low liquid-level, has been performed with primary emphasis on study of the ones constructed by the Baku inventor, Comrade Dunin. Through work with this apparatus it has been established that it operates as a replacement pump and with a fully satisfactory efficiency. A defect discovered in its construction (the necessity of change-over by hand) was eliminated by means of a contest, as the result of which an automatic changer was constructed which has justified itself in experimental testing.

Further, the Institute has undertaken experimentation with American replacement pumps (Jett) for the purpose of determining the conditions of their suitability for our own applications, having in view a simultaneous comparison of their operating characteristics with the Dudin apparatus.

In the field of petroleum-processing large-scale multi-lateral analyses have been performed of various petroleums from the physico-chemical and technological standpoint. As a result it was found necessary to classify petroleums and the most suitable set-up for processing them was discovered. Work on the mixing of various types of petroleums has expanded the raw-material

base for oil, and a mixing formula has been introduced into production. As a result of study of the petroleum of various regions (Lok-Satan, Kara-Chukhur, Sulu-Tepe) methods of correctly processing them have been indicated which are being put into practice at the plants. Simultaneously a possibility of obtaining bright stock from more tarry oils (than formerly) has been exposed; this circumstance led to expansion of the raw-material base for the extremely important production of bright stocks as well as exposing the possibility of operating without the help of imported equipment.

As the result of completion of a cycle of projects on petroleum, the possibility of expanding the types of oils being produced, as well as improving their quality, has been revealed.

With respect to preparation of petroleum for processing, i.e. purification of petroleum from contaminants (dehydration), a whole series of investigations have been made, and their results are being utilized by the plants. The economic effect of using the methods of hydration which have been worked out is a reduction in stopped-time of equipment and burning up of stills, and also attenuation of the corrosion of oil-distilling apparatus. Projects on dehydration are continuing in the Institute, and at the same time control of dehydration equipment at oil fields and plants is being effected.

An extensive project has been performed on study of the competition of natural and artificial gases (cracking and pyrolysis)

for the purpose of finding means of utilizing them in production and as fuel, and for obtaining more valuable products. A number of laboratory projects have been performed on the recovery of various alcohols on the basis of natural and artificial gases. Recovery of ethyl alcohol has been tested at a pilot-plant installation of AENIN's original construction, and the results of this project have led to planning of a plant for obtaining ethyl alcohol from a pyrogas base. These same results have been the basis of work on the recovery of synthetic rubber in Azerbaydshan. Methods have been worked out and amyl alcohols have been obtained in practice from vapor-phase cracking head. Work on the pre-processing of gases into more valuable chemical products is being continued.

It has been learned concurrently that benzene (about 20 percent) is carried away in cracking gases, on the basis of which a plant installation is planned for recovering it. Through oxidation of gas with air in the presence of vanadium-penta-oxides as a catalyst, it has been possible to obtain formalin in the laboratory and further experiments are being performed on obtaining it at a pilot-plant installation.

Large-scale projects have been performed in the Institute on study of the essence of the cracking process with respect to a variety of crackable raw-material as well as with respect to the yield of production and its quality (particularly expert production).

The problem of highway construction on petroleum asphalt has in turn provoked a number of problems embracing the raw-material resources of asphalt production, its technology, and investigation of the physico-chemical properties of finished asphalts. As a result of this work the types of petroleum from which asphalt (including that for exportation) of suitable condition may be obtained have been revealed, the possibility of obtaining asphalt from left-over products of cracking has been studied, and experiments have been performed on obtaining suitable commodities by means of mixing finished asphalts.

Certain modifications, which increase the output capacity of the plant installation and reduce almost four times the length of time of the process of obtaining asphalt, have been introduced into the technological process of asphalt production which was formerly employed. On the basis of this project pointers were obtained which have been used as the basis for planning construction of a new asphalt plant in Batum.

From the field of oil production we shall note the following very important results of AZNII^I projects:

1. Work on the deparaffinization of Baku and Grosnyy paraffin-containing crude products, which has produced positive results, has revealed the preferential conditions of thermal treatment of paraffin-containing crude products and purification of distillates in the recovery of mineral lubricants for tractor engines.

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Study has been made of the problems of deparaffinisation of light distillates at the bright stocks plant (Max Miller system) and deparaffinisation of Surakhan masout for the purpose of obtaining low-congealing industrial oils.

An original method of obtaining high-grade mineral lubricants for tractor engines, aviation oil, and bright stocks, based on the method of AZNII Associate R. L. Shapiro, has been tested with good results.

Concurrently, the problem has been solved of the replacement of Grosnyy petroleum, used up to now, with a product of heavy Bibi-Rybat petroleum, which eliminates halting of production of bright stocks at a plant based on the Max Miller system.

The majority of methods designated above are being employed successfully in production.

2. Study has been made of the problem of using bleached earths for purification of petroleum products; specifically, the suitability of using native gumbo soils for purification purposes, completely replacing imported floridine, has been established.

Methods of evaluating bleached earths, which have been adopted as a standard, have been worked out. Study has also been made of the problem of activation of bleached earths.

3. Investigation has been made of the possibility of obtaining transformer oils of export quality not only from oil

petroleums of the first grade, but also from light and heavy Bibi-Kybat petroleums, thereby expanding the raw-material base of such production.

Proof has been given of the possibility of obtaining from Baku petroleum white (medical) oils which satisfy export requirements, and also of the possibility of obtaining white vaseline, AENI^I having pointed out that the use of Kara-Ghukhur petroleum increases the yield of light-colored vaseline by one and one-half times and improves their quality. Application of the results of this project in the practice of a vaseline plant will save no less than 100,000 rubles.

4. Final work has been done on the problem of the newest methods of purification of petroleum products, including the so-called method of "inverted purification". Proof has been given of the possibility of purifying oils from heavy petroleum with the help of sulphuric acid, thus obtaining a finished product of export quality.

Projects have been performed on the purification of oils with the use of selective solvents as factors improving the quality of production.

Testing and modification have been made of the American method of manufacturing the preparation "Paraflew", application of which provides an opportunity to obtain oils with low congealing properties (cylinder oils with a -40 degrees Centigrade freezing-point have been obtained).

AZNI^I has developed further a method of purification of cracking-bensines with the help of bleaching earth; this method makes it possible to increase the stability of the bensines. The method is being introduced at cracking-plants.

Experiments have been performed on the purification of aviation bensines with aluminum chloride, with positive results: a product of high stability is obtained with simultaneous reduction of the materials consumed in purification.

Projects carried out on the distillation of mascuts with re-agents (at a Badger plant installation) have made it possible to introduce into practice distillation in the presence of calcinated soda, which almost eliminates corrosion of equipment and cuts in two the duration of the purification process.

In the field of work on the utilization of waste- and refuse-products of production, AZNI^I has performed a considerable project on determination of the potential content of naphthenic acids in petroleum and distillates and on increasing the efficiency of extraction of them. The most sound methods and systems of leaching factory installations have been revealed.

The data obtained have made it possible to comprehend the causes of incomplete extraction of naphthenic acids at plants, to determine the amount of losses of them in distillation and purification, to augment the precision of plant production plans for the extraction of naphthenic acids, and to improve control of their production. Concurrently with these projects, investi-

gations have been made of the processing of naphthenic acids into naphtha soap and acidol, which has made it possible for plants to intensify and improve production of substitutes for soap-making.

A new method has been worked out of alcohol-leaching of distillates which has demonstrated the advantages of this method as far as improvement of the quality of the product and its by-products as well as in the sense of reducing the time spent on the process of purification. Projects are also being conducted on obtaining synthetic naphthenic acids for soap-making by means of oxidation with air of solar fractions from Surakhan crude products.

Projects have been performed on obtaining a "contact" (sulphonaphthenic acids) and the possibility of coordinating this production with the purification of transformer and white oils has been pointed out.

The splitting property of a "contact" of different origin has been revealed.

Proof has been furnished of the possibility of using sulphonic acids (obtained in the purification of kerosene) for purposes of soap-making without expenditure of caustic soda.

Study has been made of the possibility of processing petrolatum (a waste-product in the production of bright stocks at a Max Miller-system plant) into paraffin, ceresin wax, and vaseline.

The pointers obtained have been turned over to planning organizations for execution of the construction plan of suitable plants, with primary emphasis on plants for obtaining ceresin wax. With reference to the ceresin plant further projects are being contemplated on the utilization of deceresinized petrolatum.

With respect to utilization of acid wastes from the purification of petroleum products have been performed for determination of a combined method through which it would be possible to use reclaimed sulphuric acid as well as the organic portion of wastes. In particular, at the Max Miller-system plant the factors which impede correct utilization of acid sludge have been ascertained and eliminated; experiments have been performed on a factory scale at an oil-purification plant on the reclamation of acid with subsequent processing of the organic portion into coke and pitch; on the basis of these experiments and the pointers obtained the construction of a suitable distilling installation has been undertaken. Application of this method makes it possible to put back into production (on the scale of 1954 operations) up to 6,000 tons of sulphuric acid and eliminate burdensome waste.

With respect to utilization of oil alkali wastes (so-called "white liquids"), a number of projects have been carried out which have shown the possibility of processing the latter to obtain soap solutions which may be further processed into naphtha soap and acidol, increasing in the end the raw-material base for soap-making. The results of laboratory experiments have been tested at a pilot-plant installation.

On the utilization of waste bleaching clays, completed projects have revealed:

(a) at a bright-stocks plant, the possibility of reverse recovery of a solvent (naphtha), which is absorbed by clay in the amount of 12 to 14 percent (calculated on the basis of the waste clay);

(b) at ^{the} an oil-purification plant (MOI), the possibility of reverse recovery of oil which can serve either as raw material for cracking or as a fuel product; the waste clay can find application in cement production. These means of utilization will help relieve the territory of plants from the landslides of waste clay which are beginning to threaten it at present.

Considerable projects are being conducted at the testing stage on study of the behavior of various kinds of fuel and lubricants in stationary engines and indications have been given which determine the character of the petroleum products being produced at plants. This research serves as a foundation for modification of the operating procedure in the obtaining of certain products for purposes of making them conform as well as possible to the operation of the engine.

In particular, exhaustive experiments are being performed with Yokesh equipment on study of the properties and characteristics of the benzines which are being produced (mainly for detonation).

Study has been made of the problems of using leached kerosene in tractors, and as a result proof has been given of the possibility of making a transition from purified to leached gasoline, whereby a great saving in the expenditure of reagents is achieved.

Particular mention should be given to the large-scale project on examination of the Azerbaydshan MTS. This examination has revealed the completely unacceptable state of supply management at the MTS and at Soyuzneftetorg bases, and has indicated means of avoiding all shortcomings.

Examination of the new Badger, Pengu-Gurvich-Neresov, Alko, Max Miller, and MOZ plant installations has provided a whole series of design and engineering pointers, which have been turned over for planning purposes to the appropriate organizations (Neftestroy and Azneftesavodstroy).

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**34. AZERBAIDZHAN SCIENTIFIC-RESEARCH PETROLEUM
INSTITUTE (AZNIN)**

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**AZNIN is under the Main Administration of the Petroleum Industry
(Glavneft' NKIP).**

Director -- Kapelyushnikov, M. A. (Order of Lenin).

Assistant Director for the Scientific Division -- Sheynin, B. M.

**AZNIN CONDUCTS SCIENTIFIC-RESEARCH PROJECTS IN THE FIELD
OF THE PETROLEUM INDUSTRY: ON OIL-FIELD TECHNOLOGY AND
GEOLOGY, ON THE PROCESSING OF PETROLEUM, PURIFICATION OF
PETROLEUM PRODUCTS, METHODS OF ANALYSIS OF PETROLEUM PRO-
DUCTS, AND TESTING OF FUELS AND LUBRICATING OILS, AND
ALSO ON UTILIZATION OF WASTES.**

Founded in 1929

Scientific Departments and Laboratories

The Petroleum-Processing Section

Departments:

- Raw Materials**
- Testing of Fuels and Lubricating Oils**
- Asphalt, Cracking, and Pyrolysis**
- Analytic**
- Gas**
- Design-Technical Indices**

Oil

Economic Research

Experimental Plant. Section of Oil-Field Technology and Geology.

Department of Testing Materials

Laboratories:

Mechanical

Metallurgical

Tamponage and Construction Materials

Chemical, and

Thermal

The X-Ray Room

Managerial Scientific Workers

For the Section of Oil-Field Technology

**Apresov, K. A. -- Manager of the Section of Oil-Field Technology
and Geology.**

Avdusin, P. N. -- Manager of the Petrographical Department.

Ali-Zade, K.

Ashurli, S. I.

Bogdasarov, V. G. -- Manager of the Exploitation Department.

Baklanov, V. D.

Buzdakov, A. P. -- Manager of the Metallurgy Department.

Bulakh, N. Ye.

Bartanesov, P. L. -- Manager of the Drilling Department

Coroyan, V. I.

Ilovayevskiy, I. I.

Kasarov, A. B. -- Manager of the Department of Economic Research.

Komarov, S. G.

Kochmarev, A. G. -- Manager of the Bitumen Laboratory.

Kutsev, V. P. -- Chief Geologist.

Livental', V. N. -- Manager of the Paleontological Department.

Lutsenko, N. A. -- Manager of the Construction Department.

Maliyant, A. A.

Malyahak, V. T. -- Manager of the Geochemical Department.

Negreyev, V. F. -- Manager of the Chemical Department.

Shakhnazarov, A. I.

Shishchenko, R. I. -- Manager of the Petroleum-Hydraulics Department.

Shishchenko, S. I. -- Manager of the Mechanical Department.

For the Processing Section

Anfinogenov, P. S. -- Manager of the Petroleum-Processing Section.

Blagodarov, M. L.

Bukh, D. N.

Gerr, V. F. -- Manager of the Cracking Department.

Gol'dberg, D. S.

Gukhman, A. A. -- Head Chemist of the Petroleum-Processing Section.

Yelanskiy, V. Yu. -- Manager of the Testing Station.

Kalantar, N. G.

Likhushin, K. P. -- Manager of the Oil Department.

Lutsenko, M. I.

Malyatskiy, A. B.

Mirsoyeva, Ye. A. -- Manager of the Department of Procedures.

Nakashidse, V. M.

Pipik, O. G.

Plotko, A. M. -- Manager of the Raw-Materials Department.

Polotovskiy, A. A. -- Manager of the Gas Department.

Rosenfel'd, S. D.

Stepanov, E. D. -- Manager of the Analytical Department.

Trevubov, A. M.

Experimental Installations

For the Section of Oil-Field Technology and Geology:

Rigid drilling installation

Flexible drilling installation

Experimental oil bed

Laboratory bore-hole

Chrome-plating installation

The Section of Petroleum-Processing

²
Badzher-vacuum installation for distillation of mazout.
Capacity -- 2 tons per day.

Periodic stills for distillation of petroleum products
(capacity from 50 to 2,000 kilograms, 4 installations).

Installation for obtaining petroleum ether (capacity about
0.5 tons per day).

Installation for obtaining alcohols (from petroleum gases).

Bural apparatus for obtaining asphalt emulsion.

Linde machine for obtaining liquid air.

Glass-blowing and mechanical shop.

Overall number of workers -- 513

Scientific workers -- 170

Annual Budget -- 2,630,000 rubles

AZNI
Basic Problems Being Solved At Present By Azni

The operation of the bit on the stope -- manager, Vartanesov,
N. L.

Combatting collapses in drilling -- manager, Shishchenko, R. I.

Providing automatic and dispatcher operation of drilling --
managers, Goroyan, Z. I., Ashurli, S. I.

The problem of the gas-lift cycle.

Practical operation of replacement pumps in the exploitation
of wells -- manager, Bagdasarov, V. G.

Problems of the corrosion of oil-well equipment and plant
apparatus for the processing of petroleum.

Chrome-plating of parts of oil-production equipment -- manager,
Negreyev, V. F.

Geophysical methods of studying petroleum fields (secreting, electro-prospecting, magnetometry) -- manager, Komarov, S. G.

Application of X-rays in the petroleum industry (examination of parts of oil-field and plant equipment) -- manager, Afonskiy.

Problems of hydraulics in the petroleum industry. The hydraulics of the petroleum bed. Practical transfer of petroleum and taking-care of pumps -- manager, Shishchenko, R. I.

Study of oil-field equipment from the standpoint of the behavior of metal as a result of the mechanical reaction on it of various technological processes -- manager, Shishchenko, S. I.

Paleontological correlation of profiles of petroleum wells as a method of orientation in drilling -- manager, Livalent', V. E.

Petrographic correlation of profiles of petroleum wells as a method of orientation in drilling -- manager, Kutsev, V. P.

Study of drilling liquids as a correlation factor and as a source of raw material for obtaining bromine, iodine, radium, etc. -- manager, Malyshek, V. T.

Methods of sulphate sounding in the quest for new petroleum beds -- managers, Levenson, Kochmarev, A. G.

Problems of metallurgy in the petroleum industry -- manager, Buzdakov, A. P.

Methods of analysis of petroleum products, testing of instruments and apparatus, and instruction for the laboratories of

petroleum-distilling plants -- managers, Stepanova, E. D., Malyatskiy,
A. B.

Testing fuel and grease in engines -- managers, Yelanskiy,
V. Yu., Rosenfel'd, S. D.

Obtaining alcohols from artificial gases -- managers,
Potolovskiy, A. A., Pipik, O. G.

Oxidation and chlorination of petroleum gases (obtaining
formalin and carbon tetrachloride) -- manager, Tikhomirova.

Problems of the stability of cracking-benzines.

Influence of the raw material on the yield of the products
of pyrolysis -- managers, Gerr, V. F., Pipik, O. G.

Polymerization of unsaturated hydrocarbons (drying-oils
and lacquers) -- manager, Potolovskiy, A. A.

Utilization of acid and alkaline wastes obtained in the
purification of petroleum products -- managers, Likhushin, K. P.,
Gol'dberg, D. S.

Problems of deparaffinization and obtaining aviation oils
and bright stocks -- managers, Shapiro, G. A., Gol'dberg, D. S.

Problems of application and utilization of bleaching earths
-- manager, Elagodarov, M. L.

Purification of crude petroleums -- managers, Bukh, D. N.,
Mirzoyeva, Ye. A., Nakashidze, B. M.

Application of selective solvents in the purification of oils -- manager, Iikhushin, K. P.

Problems of the production of insulating oils -- manager, Kalantar, N. G.

Investigation of crude petroleum for the purpose of expanding the raw-material base for obtaining petroleum products -- manager, Plotko, A. M.

Obtaining anti-detonating benzines. Expansion of the raw-material base for cracking -- manager, Gorr, V. F.

AZNI
Enterprises Regularly Served By Azni

The correlating laboratories of Azneft' and Aznefterazvedka.

The hydrochemical laboratories of Azneft' and Aznefterazvedka.

The Mechanical Plant imeni Dzerzhinskiy (Azneft').

The Mechanical Plant imeni Rykov (Azneft').

The Mechanical-Metallurgical Plant imeni Shmidt.

The Bakinskiy Rabochiy Plant

The Mechanical-Experimental Shop imeni. Myasnikov.

The Auto-Repair Plant of Azneft'.

The Mechanical Plant imeni. Montin, of Azneft'.

The main laboratory of the Petroleum-Distillation Plant imeni. Stalin.

The main laboratory of the Petroleum-Distillation Plant
in Azeri. Pyatakov.

The main laboratory of the Petroleum-Distillation Plant
in Azeri. Dshaparidze.

The main laboratory of the Petroleum-Distillation Plant
in Azeri. Sturu and Budenyy.

The main laboratory of the Petroleum-Distillation Plant
in Batum.

The main laboratory of the Commercial Transport Admini-
stration.

Rayon laboratories of the Petroleum-Pipeline Administration.

Rayon laboratories at the Azneft' Oil-Fields.

The laboratory of Soyuznefteekspert.

Foreign Institution With Which ^{AZNI} Azeri Maintains Contact USA

Princeton, Princeton University.

Technical Assistance Is Rendered To Industry By ^{AZNI} Azeri on the Following
Problems

Correlation of oil-fields by various methods.

Micro-biological research on oil.

Mud solutions; the theory of mud solutions as colloids;

standards of mud solutions for various conditions of drilling and measurement apparatus for solutions; evaluation of earths and admixtures for manufacturing aqua-gel, improvement with them of the quality of mud solutions.

Turbine drilling.

Automatic drilling.

Curvature of bore-holes; methods of determining and correcting curvatures which have been allowed to occur; instruments for determination of curvature.

Hard alloys applicable for facing drill-bits of various construction under different conditions of drilling, and methods of facing.

Drilling rigs: design of rigs and experimental determination of stresses in their elements.

Drilling and casing pipes -- design, construction, and materials for drilling and casing pipes.

Tamponage of wells; tamponage cement for normal and deep drilling.

Exploitation of wells with deep pumps.

Pipeless exploitation.

Air-and-gas lifts: selection of the optimum procedure for exploitation of wells with a gas-lift.

Control-measurement apparatus applicable for drilling and

exploitation of oil wells.

Acid sludge: utilization of it as a fuel; reclamation of sulphuric acid.

Newest methods of purification of petroleum products.

Purification of petroleum products with bleaching earths.

Automobile and tractor fuel. Methods of its testing and evaluation.

Bright stocks: high-viscosity oils obtainable from paraffin petroleums (residuals and distillates).

Ceresin wax -- from wastes in the production of bright stocks (petrolatum).

Vaselines: obtaining them from paraffin petroleums, from the wastes of bright-stock production (petrolatum).

Petroleum gases -- natural and artificial.

Materials for oil-field equipment.

Corrosion of oil-field and petroleum-distilling equipment and methods of combatting it (chrome-plating).

Amyl, isopropyl, butyl, and ethyl alcohols: obtaining them from the gases of pyrolysis and cracking of petroleum.

Methods of analysis of petroleum gases.

Methods of control of petroleum-products.

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Iodine, bromine, and other elements in drilling liquids.

Obtaining asphalt from products of distillation of petroleum and methods of evaluation of them.

Research on cement and its preparation of concrete.

Carbon-black and its application in the construction industry.

Research on various porous construction materials.

Transport of petroleum. Design of pipelines for petroleum.

Centrifugal and piston pumps for transfer of petroleum.

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