JPRS L/10481

27 April 1982

USSR Report

ENERGY

(FOUO 7/82)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000500050057-9

JPRS L/10481

27 April 1982

USSR REPORT

ENERGY

(FOUO 7/82)

CONTENTS

FUELS

Conference Held in Volgograd To Improve Design, Financing of Oil-Well Drilling
(V. V. Zamorov; NEFTYANAYA PROMYSHLENNOST' SERIYA EKONOMIKA NEFTYANOY PROMYSHLENNOSTI, No 12, 1981) 1

Most Promising Areas in Ukraine for Oil, Gas Prospecting Named
(A. M. Paliy; GEOLOGIYA NEFTI I GAZA, Feb 82) 2

Ways To Improve West Siberian Oil-Well Drilling Described
(V. I. Nazarov, et al.; NEFTYANAYA PROMYSHLENNOST' SERIYA BURENIYE, No 1, 1982) 6

Better Procedures, Harder Drill Bits Speed Up Penetration at Kuban' Oil Wells
(O. P. Kol'tsov, et al.; NEFTYANAYA PROMYSHLENNOST' SERIYA BURENIYE, No 12, 1981) 10

PIPELINES

Textbook Published for Main Gas Pipeline Operator
(Viktor Vasil'yevich Gromov, Vitaliy Ivanovich Kozlovskiy; OPERATOR MAGISTRAL'NYKH GAZOPROVODOV, 1981) . 14

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000500050057-9

FUELS

UDC 622.24.003.1

CONFERENCE HELD IN VOLGOGRAD TO IMPROVE DESIGN, FINANCING OF OIL-WELL DRILLING

Moscow NEFTYANAYA PROMYSHLENNOST' SERIYA EKONOMIKA NEFTYANOY PROMYSHLENNOSTI in Russian No 12, 1981, pp 2-3

[Greeting of V. V. Zamorov (Volgogradskaya Oblast Committee of the CPSU): "Improvement of the Financing of Drilling Work (an Introductory Word)"]

[Excerpts] Dear Comrades!

Permit me, in the name of the Volgogradskaya Oblast party committee and the city ispolkom, to greet the participants in the conference on improvement of the financing of drilling operations in the oil, gas and geological branches of the country's industry, which is being held in the hero city of Volgograd!

Your conference, which is dedicated to the problem of improving the design and financing of drilling work, will be of great importance in further raising the effectiveness and quality of geological prospecting for oil and gas, and it will also enable the advanced experience of the country's best drilling enterprises in achieving high indicators at least expense to be further developed. Allow me, representatives of the economic and technical drilling-support services of three ministries--Minnefteprom [Ministry of Petroleum Industry], Mingazprom [Ministry of Gas Industry] and Mingeo [Ministry of Geology]--to wish you great successes in solving the tasks that confront you.

11409
CSO: 1822/124

UDC 553.98:550.812(477)

MOST PROMISING AREAS IN UKRAINE FOR OIL, GAS PROSPECTING NAMED

Moscow GEOLOGIYA NEFTI I GAZA in Russian No 2, Feb 82 pp 1-4

[Article by A. M. Paliy (UkSSR Mingeo [Ministry of Geology]): "The Prospects for Searching for New Oil and Gas Fields in the UkSSR"]

[Text] One of the basic tasks in developing the USSR's national economy during 1981-1985 and during the period up to 1990 that were defined by the 26th CPSU Congress is that of strengthening the country's raw-materials minerals base, primarily of increasing explored fuel and power reserves.

During the 10th Five-Year Plan, UkSSR Mingeo organizations did much work to build up the raw-materials base of the republic's oil and gas recovery industry. Thirty-seven oil and gas fields, two of them offshore, were discovered.

The major share of growth in UV [hydrocarbon] industrial reserves occurred in the DDV [Dneprovsko-Donetskaya depression]--the Ukraine's chief oil and gas bearing region. The main growth in oil and gas reserves was obtained here during exploration of Lower Carboniferous sediments. Five new areas of oil and gas accumulations were found: the Yablunovsko-Koshevoyskaya, Kotelevsko-Berezovskaya, Sementsovsko-Abazovskaya, Rtishchevsko-Korobochkinskaya and Sakhalinsko-Kachalovskaya zones. Regional productivity of the Lower Visean-Turney and Serpukhov sedimentary formations was confirmed.

Six new oil and gas fields were discovered in the republic's west. In the Borislavsko-Pokutskaya zone, the petroliferousness of the pericline of folds screened by lateral faults of the Ciscarpathian trough was established, and the promise of the southwest line of deep folds that are overlapped by the Carpathian overthrust was confirmed by discovery of the South Monastyretskiy field. In the northwestern part of the Bil'che-Volitskaya zone, the prospects for searching for hydrocarbons in Middle Jurassic terrigenous sediments and the Paleogene-Mesozoic complex under the Pokutsko-Bukovinsky Carpathian overthrust were determined. The principal geological achievement was the detection of the Lokachinskiy gas field in Middle Devonian rocks of the Volyno-Podolin: the industrial petroliferousness of this area, which still is practically unexplored, was proved for the first time.

On the Kerch' Peninsula, some deposits were discovered in Lower Maykop sediments. The distribution of reefogenic formations in the Upper Jurassic, at the eastern plunge of the Gornyy Krym', was confirmed. In the western Black Sea region, a flow of oil was obtained from Upper Devonian rocks, indicating the desirability of continuing to prospect in this area.

Fulfillment of the plan to increase oil and gas reserves is the result of a substantial acceleration in the pace of discovering and exploring fields. For the first time, the main increase in reserves was obtained not through large, previously discovered fields but through the study mainly of medium-size or small fields that were discovered during the 10th Five-Year Plan. The increase of prospecting effectiveness in recent years is explained by the growing role of the regionally productive Lower Carboniferous complex of the DDV, where the coefficient of industrial discoveries has its maximum value.

A further buildup of industrial reserves of oil, gas and gas condensate is expected during the 11th Five-Year Plan, through acceleration of the prospecting and exploration pace. Planned development of this work is based upon hydrocarbon reserve forecasts which exceed the explored reserves 2.5-fold for gas and 1.7-fold for oil. Not only does the magnitude of the republic's forecast and prospective reserves testify to the promise of a buildup in the extracting industry's raw-materials base but so does the degree of the conquest of hydrocarbon reserves in the DDV. The potential resources of Lower Carboniferous gas deposits, which lie at depths as great as 7,000 meters, have been realized here by only 15 percent.

Prospects for the discovery of oil and gas fields in the Ukraine are associated mainly with study of strata of the DDV's Lower Carboniferous, with sediments of the Lower Visean-Turney and Serpukhov, whose industrial petroliferousness has been proved in many areas in recent years, having special significance.

A study of the Lower Carboniferous rock, with a view to finding industrial reserves of hydrocarbons, can be most successful in regions where thick sedimentation strata have developed. An analysis of the three-dimensional distribution of oil and gas in the depression indicates that all the main fields are situated in zones where the deposits are more than 7-8 kilometers thick--the Chutovsko-Raspashnovskaya and Lyutenskaya bottom depressions.* The 1977-1978 finding of the Yablunovskoye field in the Zhdanov depression and the Lyutsenkovskoye and Shumskoye fields on the slopes of the Srebnenskiy trough can be considered the start of the assimilation of the large promising depression zones of a region that makes up about 20 percent of the DDV's area. Prospecting drilling in the large depressions, the most promising parts of whose cross-sections have practically not been studied, will enable oil and gas fields to be discovered in the next few years and a basis to be created for further promoting geological exploration. It must be noted that drilling here should be done to a depth of 6,000-7,000 meters, and seismic exploration should raise the quality of mapping of structures in deep Lower Carboniferous horizons. Prospecting for promising features is complicated by the great amplitudes of the structural traps, and the nonlinearity of their location. The great depths (5,500-7,000 meters) of deposition of the regionally petroliferous Serpukhov, Upper Visean and Lower Visean-Turney complexes are hampering the promotion of prospecting also in another highly promising region of the depression--the northern side zone, at a section from the Stepovoye field to the Shebelinskoye field. It is because of the difficulties of drilling at great depths, under AVPD [anomalously high formation pressure], that evaluation of the extremely promising Solokhovsko-Oposhnyanskaya zone of uplifts along the Lower Visean-Turney complex is lagging.

The Lower Permian-Upper Carboniferous complex within the more promising Mashevsko-Shebelinskiy regions has already been explored to a significant extent. Industrial

*P. F. Shpak, S. V. Tkachishin and M. G. Manyuta. "On the Siting of and Conditions for Forming Oil and Gas Deposits in the Dneprovsko-Donetskaya Depression." GEOLOGIYA NEFTI I GAZA [The Geology of Oil and Gas], 1980, No 9, pages 34-41.

discoveries here should be associated mainly with the forebody sections. The promising area of this complex can be expanded later through the Bakhmutskiy and Kal'mius-Toretskaya lobes, which have not been studied by regional research.

The petroliferousness of the Middle Carboniferous deposits in the region's western part will, as usual, be evaluated coincidentally with drilling into Lower Carboniferous formations. In the depression's central parts the promise of the Middle Carboniferous complex, which lies at depths of 5,500-6,500 meters, has been reduced somewhat because of the variability of the rocks' reservoir properties.

Fields might also be found in Devonian sediments during the 11th Five-Year Plan. Industrial and semi-industrial flows of oil and gas have been obtained in some areas. The most interesting regions for prospecting Devonian fields include: the northern side zone of the depression in the Maksaki-Dmitrovka section, where upper salt-bearing strata have developed and there are practically no effusive formations; the oil and gas bearing Akhtyrskiy region, since even the saltfree cross-sections here of the Devonian are promising; and the south side region in the Sagaydak-Zatyshnyan section, where the development of upper saliferous strata has been forecast and, apparently, effusive formations are absent.

In speaking about the prospects for searching for new oil and gas fields in the DDV, the discovery of which is expected mainly at depths that exceed 4,000 meters, the possibility of detecting industrial accumulations of hydrocarbons also in the upper horizons of the sedimentary mantle should be emphasized. Forecast hydrocarbon reserves are distributed at various depth intervals as follows (in meters): 17.9 percent down to 2,000, 23 percent from 3,000 to 4,000, 23 percent from 4,500 to 5,000, and 36 percent from 5,000 to 7,000. These data testify to the considerable promise for prospecting at great depths, especially within zones where nonanticlinal traps have developed, the standard practices for the mapping of which by geophysical methods still have not been worked out.

In order to discover oil and gas fields in the western Ukraine, efforts should be concentrated on new areas for prospecting and exploring. One of the most important tasks is conquest of the Volyno-Podol'skaya edge of the East European platform. Sediments of the Devonian, Silurian and Cambrian, whose structure had not been studied adequately until recently, are promising. As the experience of recent years indicates, the use of multiple and areal systems of observations in seismic exploration and integration of the latter with structural drilling will enable targets to be found for organizing later operations and the necessary inventory of structures for drilling to be prepared.

In the Bil'che-Volitskaya zone of the Ciscarpathian trough, the Miocene complex has been explored to some extent up to the present. Further prospecting for deposits of gas is desirable in the Sarmatskiy sediments of the Krukenchskaya depression to the northwest and southeast of the Zaluzhanskoye field, at structures at the edge of the Samborskaya overthrust zone, and in the belt that lies adjacent to the Krakovetskiy fault. In order to find new fields within this zone, geological exploration should be developed in new areas that are associated with searches for hydrocarbon traps in reefogenic formations of the Upper Jurassic and terrigenous sediments of the Middle Jurassic and Paleogene-Mesozoic complex at the Pokutskiy-Bukovinskiy Carpathians overthrust.

In the Borislavskiy-Pokutskiy trough zone the prospects for searching are associated with study of deep Paleogenic stores of the second and third structural stages. It is planned that prospecting will be pursued in the northwestern part of the zone.

It is also necessary to clarify the prospects for searching for industrial hydrocarbon accumulations in the Lower Cretaceous sediments of the Skibovoy zone of the Carpathians and in formations of the Paleogene zone of the Krosno, which still have not been studied well by geophysical methods.

In the Transcarpathian trough, prospects for the petroliferousness of Miocene mantle rocks and of Mesozoic formations of the folded bottom will be clarified. Previous seismic studies gave extremely rough information about their structure. However, oil and gas fields have been found under similar geological conditions in regions of contiguous countries, and they are especially substantial in the Mesozoic formations of the folded bottom.

In the republic's southern areas, the main directions of searches for oil and gas fields have been refined as a result of a reevaluation of the prospects for various regions and stratigraphic complexes.

In the Indolo-Kubanskiy trough hydrocarbon accumulations should be sought in anticlinal and combined type traps in Lower Maykop-Upper Eocene, Middle Maykop and Neogene sediments. Within the Kerch' Peninsula, the Neocomian-Aptian rocks and the Upper Jurassic reefogenic formations on the eastern continuation of the Gornyy Krym' deserve special attention. In the Cisdobrudzhskiy trough, carbonaceous sediments of Silurian, Early Devonian and Late Jurassic ages are of prospecting interest. In the central and southern parts of the trough, terrigenous rocks of the Middle Jurassic and the subjacent Triassic-Paleozoic formations deserve attention.

A rise in the effectiveness of geological exploration is impossible without the direct and immediate participation of science, without the accelerated introduction of its achievements into practice. UkrNIGRI [Ukrainian Scientific-Research Institute for Mining] and IGiGGI of the UkSSR Academy of Sciences should increase the reliability of the prognoses and scientific substantiation for prospecting for large and medium-size deposits, primarily in the DDV, based upon clarification of the laws of their three-dimensional location, including those confined to traps of the nonanticlinal type, and should develop standard-practice bases for prospecting for them and for exploring them.

In so doing, special attention should be paid to solving the problem of the integrated geological and economic evaluation of large zones and sections for purposes of the most rapid prospecting of the more promising structures and the ensuing concentration of exploration.

The wide introduction into practice of standard procedures for forecasting the petroliferousness of traps for the rapid exploration of fields, especially of developments for optimizing the siting of exploratory wells in an area, choice of the main level for exploration, and so on, should play no small role.

In the area of geophysics, the effectiveness of seismic work in studying the structural layouts of deeplying horizons in areas with complicated geological structure must be raised.

11409
CSO: 1822/124

UDC 622.24.08

WAYS TO IMPROVE WEST SIBERIAN OIL-WELL DRILLING DESCRIBED

Moscow NEFTYANAYA PROMYSHLENNOST' SERIYA BURENIYE in Russian No 1, 1982 pp 2-4

[Article by V. I. Nazarov, I. A. Serenko and N. A. Sidorov (VNIIOENG [All-Union Scientific-Research Institute for the Organization, Management and Economics of the Oil and Gas Industry]): "Reserves for Increasing Drilling Operations Effectiveness in West Siberia"]

[Text] The industry's drilling organizations are to do a lot of work during the 11th Five-Year Plan in constructing production oil wells and in increasing oil reserves, in order to provide in 1985 for the recovery of 620-645 million tons of oil (including gas condensate), in accordance with "The Main Directions for Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1980 [as printed]," which was approved by the 26th CPSU Congress.

In so doing, the main growth in the recovery of oil (and of gas condensate), in the amount of 72-82 million tons, is to be obtained from West Siberia. The oil-recovery industry in Kazakhstan and in the north of the European part of the country will also be developed at an accelerated pace.

The task of increasing drilling effectiveness during the period 1981-1985 and up to 1990 can be solved only on the basis of further developing science, accelerating technical progress, improving work organization, and disseminating widely the work experience of innovative brigades and advanced production workers.

At the same time, drilling work effectiveness will grow substantially if, while introducing measures that have been worked out as a result of scientific developments and while accelerating technical progress, the potential capabilities of serially produced equipment, which is still not being utilized completely, is put to full use and if the whole process of constructing wells is well organized.*

In the indicated plan, the work results of the industry's best drilling and derrick-erecting brigades, which exceed average results for the region as a whole 2-fold or more, are typical. Thus, in West Siberia the collective of the drilling brigade of foreman Hero of Socialist Labor G. M. Levin (now chief of Surgut UBR [Drilling Administration] No 2 of Glavtyumenneftegaz [Main Administration of the Oil and Gas Industry of Tyumenskaya Oblast], using existing equipment and

*N. A. Mal'tsev, "The USSR's Oil Industry in the New Era." NEFTYANOYE KHOZYAYSTVO [The Petroleum Economy], Moscow, No 4, 1981, Nedra.

technology, in 1980 drilled through more than 100,000 meters of rock at an average net effective drilling speed of V_k = 9,000 meters per rig per month.

However, there are drilling brigades in this region whose penetration per year is 50 percent of the annual penetration achieved by foreman G. M. Levin's brigade, despite the fact that the geological conditions, technical resources for drilling wells, parameters of the drilling regime, and organization of work for all brigades are about identical. In this connection, a comparison of the time spent performing various operations, which will reveal the particular areas in which leading brigades achieve high indicators in savings of time, is of practical interest.

Wells drilled by foreman G. M. Levin's advanced brigade (48 of the 51 wells drilled) in 1980 and by foreman V. N. Borisov's brigade (32 of 33 wells drilled) have been selected. Foreman V. N. Borisov's brigade, which drilled through 70,000 meters of rock in 1980, has work indicators that are average for Nizhnevartovsk UBR No 1.

The average work indicators of these two brigades are shown in the table.

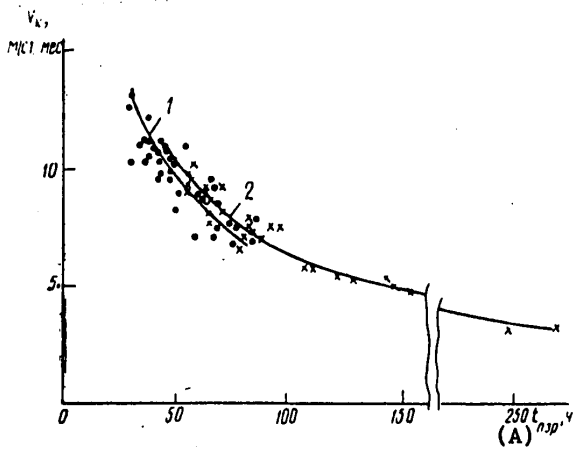
The following are evident from the table:

1) In both brigades, the time spent on round-trip operations $T_{спо}$, mechanical drilling $T_б$, and treating the wellbore and adding drill-string pipe $T_{нар}$ are about equal;

2) G. M. Levin's brigade spent much less time than V. N. Borisov's brigade on casing wells; and

3) The time spent on preparatory and on completion operations ($t_{пзр}$) was much less in G. M. Levin's brigade than in V. N. Borisov's.

The dependence of net effective operating speed (V_k) on time spent on preparatory and completion operations ($t_{пзр}$), which is shown in the figure, indicates a direct dependence on the level of V_k on the value of $t_{пзр}$). When $t_{пзр}$ is reduced, V_k increases, and when $t_{пзр}$ values are equal, there is no essential difference in the net effective operating speeds.



The Dependence of Net Effective Operating Speed on Time Spent on Preparatory and Completion Operations for Wells Drilled by:

1. G. M. Levin's brigade.
2. V. N. Borisov's brigade.

Key:

V_k--net effective operating speed.

m/ct, mec--meters per rig per month.

A. Time spent on preparatory and completion operations, hours.

Data on the wells	h, meters	V_M meters per hr	V_k m/ct-mes	Time breakdown, hours							Well depth, meters
				T_k	$T_б$	$T_{спо}$	$T_{нар}$	T_{kp}	$T_{пзр}$	$T_{рем}$	
For the 10 best	392.8/354	55.9/53.0	11,703/9,442	117/148	34/38	11/12	8/8	25/30	37/58	2/2	1,888/1,937
For all of them	308.6/297	45.0/46.0	9,290/7,123	151/215	48/47	19/22	10/10	27/45	43/90	4/0.7	2,044/2,137

Comments.

1. The numerators are the indicators for G. M. Levin's drilling brigade, the denominators are those for V. N. Borisov's brigade.
2. h is the penetration per bit; V_M is the on-bottom penetrating speed; T_k is calendar time; and $T_{рем}$ is the time spent on repair work.

Key:

m/ct-mec--meters per rig per month.
$T_б$--mechanical drilling time.
$T_{спо}$--time spent on round-trip operations.
V_k--net effective drilling speed.
$T_{нар}$--time spent treating the wellbore and adding drill-string pipe.
$T_{пзр}$--time spent on preparatory work and completion operations.

Thus, an important reserve for raising net effective operating speed in West Siberia consists in reducing the time spent performing preparatory and completion operations: the timely conduct, without delay, of geophysical studies; proper preparation of the casing string and provisioning of cementing equipment and plugging materials; and the timely delivery of spare parts for equipment, chemical reactants and other materials and tools.

In the drive to achieve maximum penetration per drilling brigade per year, in addition to the indicated reserves, timely preparation of a work front for drilling brigades plays a major role, for it helps to avoid idle time during well construction while waiting for a new well-starting point. This is graphically confirmed by the successes of foreman G. M. Levin's brigade, during whose work, as a rule, there have been no "gaps" while awaiting new starting points.

Consequently, solution of the most important tasks--raising the effectiveness of drilling work in West Siberia--depends greatly upon the work-organization level of the derrick-erecting brigades, geophysicists, transport workers, pluggers, and others.

A considerable reserve for raising drilling effectiveness in West Siberia consists in the wide dissemination of the work experience of Belorussia's UBR's, which use five-section A7Sh turbodrills with low-liter regime for circulation, for which one slush pump with 150-mm cylindrical liners is used (a second pump is held in reserve). In this case, the time spent on repair is reduced and drill-bit operation indicators are raised: in the upper interval--at depths down to 1,700 meters--penetration per bit increases by 30 percent, mechanical

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000500050057-9

penetration speed by 19 percent, while at the lower levels (1,700-2,450 meters) these parameters increase by 8.5 and 2 percent, respectively. Transport costs are also reduced by raising the operating reliability of the turbodrills with small drilling-mud consumption.

The creation of more effective and reliable geophysical equipment for slant directional wells is also an important reserve for reducing well-construction time. The use, for example, of AERS (GTM-3) special greases with a view to eliminating cases of failure of casing-string seals will be of help here.

Raising the work indicators of average brigades to the levels of the advanced ones is completely realistic. However, an indispensable prerequisite for successful solution of this task is timely provisioning of all drilling brigades with the equipment, materials and tools needed for well construction. It should also be pointed out that, all other conditions being equal, the achievement of high indicators is unthinkable without increasing vocational skills, coordination in work, thriftiness, the observance of labor and production discipline, enthusiasm and conscientious creative work by all workers engaged in the drilling sphere. The most important prerequisites for success are high levels of planning and performance and labor discipline, as Minister of Petroleum Industry N. A. Mal'tsev points out.

11409
CSO: 1822/125

FUELS

UDC 622.24.082

BETTER PROCEDURES, HARDER DRILL BITS SPEED UP PENETRATION AT KUBAN' OIL WELLS

Moscow NEFTYANAYA PROMYSHLENNOST' SERIYA BURENIYE in Russian No 12, 1981 pp 2-4

[Article by O. P. Kol'tsov, V. F. Klisun, M. I. Biberman and I. M. Shtompel' (VNIPItermneft' [All-Union Scientific-Research and Design Institute for Thermal Treatment of Oil Wells] and NPO Soyuztermneft' [All-Union Science and Production Association for Thermal Treatment of Oil Wells]): "Raising the Effectiveness of Drilling Wells in Krasnodarskiy Kray"]

[Text] The main efforts of NPO Soyuztermneft' and Krasnodarneftegaz [Association for Oil and Gas Recovery in Krasnodarskiy Kray] workers during the 10th Five-Year Plan were aimed at further improving drilling technology and work organization and reducing well-construction time.

Work to perform these tasks was conducted mainly in three areas:

a search for optimal drilling-regime parameters, based upon the sinking of combination exploratory and production wells;

the development and introduction of standing orders for the operating of rock-breaking tools of new design; and

wider use of ISM [Institute of Superhard Materials] drill bits, taking into account the abrasive properties of the rocks that make up the log of Krasnodarskiy Kray fields.

In 1972-1974 two combination exploratory and production wells (OTS's) were drilled in the Severskaya area; and Krasnodarneftegaz Association, with a view to improving drilling regimes, worked out and issued operating recommendations in accordance with the results of the sinking of these holes. Two OTS's were also completed by construction in 1975-1977 in Taman' Peninsula areas, where a definite amount of research was performed and similar recommendations were developed.

During the first 4 years of the 10th Five-Year Plan, 12 wells were sunk in accordance with the cited recommendations. Total penetration during this period was 44,183 meters. The main amount of drilling (72 percent) was done in areas in the West Kuban' trough (in the Severskaya, Afipskiy and North Novyy Dmitriyevskoye areas). More than 12,500 meters of rock were drilled through in Taman' Peninsula areas (Kuchugury and Fontalovskaya).

An analysis of the technical and economic indicators of sinking wells in the areas indicated above showed that wide introduction of the drilling technology that had been developed in accordance with the results of the OTS drilling and substantial improvement in work organization and in the supplying of materials and equipment had enabled penetration per bit to be increased 1.2-fold to 1.3-fold, down time for organizational reasons to be reduced 14-17 percent, and on-bottom penetration speed and net effective drilling speed to be increased, respectively, 1.2-fold and 1.4-fold.

It is planned that during the 11th Five-Year Plan prospecting and exploration for oil in Krasnodarskiy Kray will be conducted at fields that are related to four main geological-structure zones. Paleogene sediments (the West Kuban' trough); a complex of Cretaceous sediments (Taman'), a complex of subsalt sediments of the Jurassic (the East-Kuban' depression and the Adygeyskiy bench, and Mesozoic sediments (the Northwest Caucasus).

As was noted above, work has already been finished at the fields included in the first two zones by the construction of several combination exploratory and production wells, and basic measures aimed at improving the technology have been worked out. In order to optimize drilling-regime parameters, it is planned to sink two OTS's at fields included in the two other zones during the 11th Five-Year Plan.

The development of rock-breaking tools of new design and the introduction of standing orders on their operation have helped to raise technical and economic indicators and to reduce well-construction time. The use of bits that meet GOST 20692-75 requirements began in 1975. During 1975-1979 these bits drilled through 135,400 meters of rock, or 31.6 percent of total penetration for all roller bits.

Table 1 shows the basic indicators for the operation of these bits.

Table 1

Indicators	1975	1976	1977	1978	1979
Total penetration, meters.....	10,824	28,260	21,610	33,210	41,500
Expenditure of bits, each.....	296	718	519	804	1,072
Average penetration per bit, meters	36.6	39.4	45.4	41.3	38.7
Average on-bottom penetration speed, meters per hour.....	2.32	2.48	2.30	2.22	2.15
Average depth of well completed by drilling, meters.....	3,675	3,664	3,869	3,878	3,869

It follows from table 1 that total penetration in 1979 increased 3.8-fold over 1975. However, 1977-1979 saw a reduction in mechanical penetration speed that was caused by an increase in the average depth of the wells completed by drilling. Another no-less important factor was the slightness of use of bits 269.9 and 295.3 millimeters in diameter, which was 22.9 percent. Most drilling was done by 215.9-millimeter bits. These bits penetrated 89,956 meters, or 66.4 percent of the total penetration, 46,147 meters (51.3 percent) during exploratory drilling, where they are being used to drill to depths of more than 3,000 meters. And, finally, a third factor was the less than full use of the service lives of SG and MG type bits because they were used to drill through rock that did not accord with the indicators in physical and mechanical properties of the rigging of these bits.

Well No	Area	Stratigraphy	Drilling interval	Drilling method	Bit designators	Penetration per bit	Penetration speed, on-bottom, m/hr	Operating costs per m. of penetration, depending upon time, rubles	Savings from introducing ISM bits, thousands of rubles
25	Yaroslavskaya	Upper Jurassic (Tithonian)	2232-2850	Rotary Turbine	III295.3S-GV ISM292S-1	11.0 453.0	1.57 2.35	34.80 20.20	59.43
2	Defanovskaya	Lower Carboniferous	1945-2427	Rotary Turbine	III295.3S-TsV ISM292S-1	10.8 1,319.0	1.66 1.60	68.35 26.20	64.70
1	Yuzhno-Neftyanskaya	" "	2121-3335	Rotary Turbine	III269.9M-GV ISM267S-1	8.9 1,041.0	1.88 1.20	60.60 34.90	18.27
40	Mirnaya Balka	" "	4900-5200	Rotary Turbine	III215.9S-GV ISM212MS-4	14.0 52.0	0.93 0.68	122.70 86.60	17.68
160	Levkinskaya	Eocene (Kumskiy horizon)	4300-4800	Rotary Turbine	IV-161S ISM159MS-2	7.0 43.0	1.02 1.10	169.70 61.06	12.02

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000500050057-9

With a view to raising the operating efficiency of these bits, much work was done in the areas of detailed forecasting of the physical and mechanical characteristics of the rock that is included in the logs of West Ciscaucasian fields and of responsive revision of standing orders for operating the bits in accordance with the drilling conditions that actually exist. Moreover, a substantial increase in the industrial introduction of ISM bits has helped to raise drilling operating effectiveness. The use of these bits began for the first time in Krasnodarskiy Kray in 1968, but they began to find their widest use in the 1970's. In 1972 penetration with their use was 5-7 percent of the total amount of penetration by bits of all types.

Table 2 shows the basic indicators of ISM bit operation during 1976-1979.

Table 2

Indicators	1976	1977	1978	1979
Total penetration, thousands of meters.....	7.1	7.1	9.8	11.7
Expenditure of bits, each.....	41	39	31	25
Penetration per bit, meters.....	173	180	313	451
On-bottom penetrating speed, meters per hour..	4.17	4.40	6.60	6.90
Exploratory drilling (included above).....	1.78	1.82	1.87	2.24

It follows from table 2 that total penetration during drilling with ISM bits rose 1.6-fold in 1979 over the figure for 1976; on-bottom penetration speed during exploratory drilling and penetration per bit increased, respectively, 1.26-fold and 2.6-fold.

With correct choice of intervals for using ISM bits, the indicators for their operation increased much more than the indicators for roller bits.

Table 3 shows the comparative indicators of bit operation in various stratigraphic subunits for certain wells.

It is evident from table 3 that the best penetration results at depths down to 3,300-3,500 meters are achieved with the use of ISM bits, in combination with turbine drilling. The rotary method is more effective at greater depths.

The indicators noted above were obtained thanks to a scientifically substantiated approach to the development of standard practices for choosing rock-breaking tools and operating regimes for them. Its bases were laid on the results of research of abrasive wear of the superhard material slavutich, with which the tooling of ISM drill bits has been strengthened for the destruction of rocks.

Thus, the introduction of the operating recommendations on optimization of drilling regime parameters that were worked out on the basis of sinking combination exploratory and development wells, the wider introduction of standing orders for the operation of rock-breaking tools, and an increase in penetration with the use of ISM bits to 30-40 percent of total penetration are enabling the technical and economic indicators of sinking oil and gas wells in the Kuban' to be raised.

11409
CSO: 1822/125

PIPELINES

TEXTBOOK PUBLISHED FOR MAIN GAS PIPELINE OPERATOR

Moscow OPERATOR MAGISTRAL'NYKH GAZOPROVODOV in Russian 1981 (signed to press 3 Apr 1981) pp 1-5, 245-248

[Annotation, foreword, table of contents and new books announcement from book "Main Gas Pipeline Operator," by Viktor Vasil'yevich Gromov and Vitaliy Ivanovich Kozlovskiy, Izdatel'stvo "Nedra," 8,300 copies, 248 pages]

[Text] This book presents the basic information regarding the chief structures of main gas pipelines, compressor and gas-distributing stations, equipment of the line section of the gas pipelines and underground gas storage stations, control and measuring instruments and automatic systems which is sufficient for the duties of main gas pipeline operators. Questions are examined of using the machines and mechanisms for minor maintenance of the pipelines and compressor station equipment, pressure and regulating fittings, the optimal regime for running and operation of the facilities of the main gas pipelines and the compressor stations. Questions are covered of work safety, accident prevention, industrial hygiene and fire-prevention measures.

The book is designed to train and improve the skill of main gas pipeline operators.

Ten tables, 53 illustrations, 48 bibliographic entries.

Foreword

Extraction of natural gas increases every year in the country and a branched gas transport system is being set up which supplies gas for the raw material and technological needs of the chemical industry, ferrous, nonferrous metallurgy, machine construction, construction materials industry, oil and gas industry, and residential-communal services.

Gasification is the most important factor and accelerator of scientific and technical progress, improvement in quality and efficiency of production, and growth in productivity of social labor and the national welfare.

Natural and casing-head gas are over 20 percent of the country's fuel and energy balance. The ever rising demands of the national economy for natural gas can only be satisfied after guaranteeing high rates of development of the gas industry.

The modern methods of burning gas ensure complete combustion with very high thermal loads of the furnaces and stoves and allow the implementation of advanced technological processes in the oil, metallurgical, machine construction, glass, textile, food and other sectors of industry.

The use of natural gas in steel smelting production reduces the sulfur content in the meltable steel, perfects its heating methods and thermal treatment, reduces the cost of the metal and drastically improves the working conditions.

The use of natural gas in place of coal at power plants reduces capital investments needed to build them, improves the efficiency of the plant boilers and diminishes the cost of the generated electricity.

The use of natural gas improves even more the efficient operation of small steam boilers of industrial and communal units.

The use of natural gas in the chemical industry to produce hydrogen, synthetic ammonia, nitrogen fertilizers, carbon black and a number of other products of primary importance is especially efficient.

The use of natural gas allows us to solve a number of important national economic tasks: reduce the expenditures of labor and material resources needed for extraction and shipping of fuel, reduce the cost of fuel, improve the useful duty factor of fuel, intensify the operation of power engineering and production units, completely eliminate pollution of the environment by ash, sulfurous compounds and considerably diminish the discharge into the air basin of carbon monoxide, harmful organic substances which form nitric oxides during incomplete fuel combustion, and significantly improve the working and daily life conditions of the population.

The use of natural gas is effective not only in industry, but also in agriculture. We will examine certain areas of its application.

Capital investments to greenhouse farming total hundreds of millions of rubles. Half of them are spent on heating units and outlays for heating reach 20 percent of the cost of the vegetables grown in the greenhouses. It is efficient to use low-potential heat of power engineering stations, industrial enterprises, compressor stations and main gas pipelines to heat them. The majority of greenhouse farms currently operate with the use of different types of fuel for heating.

The use of gas in greenhouse farms is especially efficient, however, since two problems can be comprehensively resolved: heating of the units of protected ground and supplemental feeding of the plants with carbon dioxide contained in the combustion products of the sulfur-free gaseous fuel. The air usually contains only 0.03 percent CO_2 by volume, therefore, it is easiest of all to intensify the process of photosynthesis through increasing the CO_2 content in the air in protected ground units, hothouses, greenhouses and hotbeds. The use of carbon dioxide fertilizers accelerates growth, maturation and improves the harvest of vegetables and other crops.

The use of gaseous fuel permits heating and ventilation of animal husbandry and poultry farms. Maintenance of the optimal temperature and air humidity on the farms improves the efficiency of animal husbandry and poultry raising.

Units for drying grain, oil-yielding seeds, tea, tobacco, fruits and other agricultural crops are major consumers of fuel. The drying units mainly run on liquid and solid fuel. The use of gas in the process of drying agricultural products is very desirable since it improves the output of the dryers, reduces the specific consumption of fuel and eliminates the possible contamination of the dried food products with sooty substance.

The need to transport large quantities of gas from the extraction site to the consumption site caused the rapid development of main gas pipelines. When gas is transported on pipelines, the losses of pumped product are the minimum because of the high degree of hermetic sealing of the pipelines and the pumping equipment.

The gas industry is developing towards maximum centralization of gas supply. The gas which is extracted in this country is centrally distributed through a unified gas supply system (ESG). This guarantees the possibility of maneuvering the gas streams, economic distribution of the loads between the gas pipelines and fields according to their technical and economic characteristics. A reliable gas supply can be ensured by different technical and power engineering resources, including improving the reliability of the ESG elements.

The task of determining the optimal volumes of reservation for the ESG, its territorial and functional subsystems is one of the most important. The ESG is reserved by using the reserve elements (units, parallel lines, wells), whole subsystems (intersystem and ring gas pipelines), individual gas fields, underground gas reservoirs, liquefied natural gas units, and second fuel services of the consumers.

The extensive use of underground gas reservoirs to create a national economic reserve and switching of a number of fields located close to the gas consumption regions to a regime of underground gas storage will efficiently solve the problem of stable gas supply to the entire country and provide the assigned gas reserve in the minimum time and with the least capital investments.

Guarantee of the reliability and efficiency of the ESG functioning in the country, optimization of the processes of extraction, transport and distribution of gas, and improvement in the technical and economic indicators for the sector's development require the resolution of the most important tasks for long-range planning and rapid dispatcher control of the ESG based on the implementation of a program of comprehensive automation of the production processes and the extensive introduction of automated control systems with the use of computers.

Comprehensive automation and tele-automation as the technical base for introducing automated control systems at all levels and on the whole for the sector automated control system are the most important means for improving reliable gas supply.

Control questions are presented after each chapter to repeat the material which has been covered.

Contents

	Page
Foreword	3
Chapter 1. Main Structures of Main Gas Pipelines	6
Purification of gas from mechanical admixtures	7
Purification of gas from hydrogen sulfide and carbon dioxide	16
Drying of natural gas	19
Separation of condensate	24
Imparting odor to gas	29
Chapter 2. Main Requirements for Main Gas Pipelines	35
Classification and categories of main gas pipelins	35
Selection of route for main gas pipelines	36
Construction requirements for main gas pipelines	38
Passages of main gas pipelines through natural and artificial obstacles	41
	41
Chapter 3. Equipment of Line Section of Main Gas Pipelines	46
Pipes, assemblies, items and connections	46
Pressure and regulating fittings	48
Means of corrosion protection	51
Means of cleaning gas pipeline cavity	55
Insulating, laying, packing and lubricating materials	57
Lines of technological communication of main gas pipelines	66
Chapter 4. Compressor Stations of Gas Pipelines	69
Purpose of compressor stations	69
Types of drives of gas pumping units	69
Production plan of compressor stations	77
Maintenance of gas pumping units of compressor stations	96
Chapter 5. Gas-Distributing Stations of Main Gas Pipelines	107
Purpose and main GDS units	107
Production plans of GDS	120
Operation of GDS	124
Chapter 6. Stations of underground gas storage (SUGS)	132
Purpose of SUGS	132
Main and auxiliary SUGS equipment	134
Plan of technological connection of SUGS	140
Operation of underground gas reservoirs	142
Chapter 7. Operating Regime of Main Gas Pipeline	152
Maintenance of planned gas pipeline parameters	152
Throughput of gas pipeline	155
Methods of increasing throughput of gas pipelines	157
Determination of temperature and pressure in gas pipeline	159
Chapter 8. Control and Measuring Instruments, Systems of Automatics and Remote Control	162

Control and measuring instruments of GDS and measurement points 162
Instruments and systems of technological control of CS 170
Tele-automation of main gas pipeline facilities 184
Maintenance of systems of control and measuring instruments and automatics 190

Chapter 9. Operation of Main Gas Pipeline and CS Pipelines 195
Line-operational service (LOS) and its tasks 195
Care of route of gas pipeline in summer 198
Measures to guarantee reliable operation of gas pipelines in fall-winter period 200
Flood-prevention measures 200
Control of hydrate-formations in main gas pipelines 201
Maintenance of pressure and safety fittings 203
Maintenance of gas pressure regulation points 207
Maintenance of measuring assemblies of compressor station 208

Chapter 10. Drawing Up and Management of Technical Documents for Execution of Repair Work 216
Order of drawing up and tolerance for fulfillment of gas-dangerous and fire work 216
Order of drawing up and execution of maintenance on pipelines and apparatus of CS 219
Order of acceptance of main gas pipelines for operation 220
Order of connecting gasification facilities to GDS 222

Chapter 11. Industrial Hygiene and Accident Prevention at Main Gas Pipelines 224
Basic statutes of Soviet labor legislation on industrial hygiene and safe working conditions 224
Basic properties of gases and their compounds 226
Classification of rooms for fire and explosion danger 227
Features of storing fuel and lubricants 229
Electric lighting in explosive rooms 230
Fire-prevention regime and fire extinguishing tools at the CS, SUGS and GDS 232
Features of using certain chemicals 234
Means of individual protection 237
First aid to victims 238

Bibliography 243

Respected Comrade! The "Nedra" publishing house is preparing new books for print.

Klimovskiy, Ye. M.; Kaganovich, M. N.; Nefel'd, I. Ye.; et al. "Kontrol' kachestva svarnykh soyedineniy truboprovodov dlya nefti i gaza" [Quality Control of Welded Connections of Oil and Gas Pipelines], translation, 1 ruble.

A broad circle of questions is examined regarding quality control of welded connections of main and field pipelines. Attention is focused on the effect

of technological defects of pipeline welding on their strength, and the reasons for the development of these defects. Requirements are stated for the quality of the welded connections and different methods are presented for monitoring their welded seams. Questions are covered of pressure testing the pipelines. Testing methods (hydraulic and pneumatic), stages and parameters for testing individual pipeline assemblies, and a technique for finding and eliminating defects are indicated. The prospects for developing control methods are reviewed.

It is designed for foremen who are building pipelines. It may be of use to engineering and technical workers of operational organizations.

Khamarmer, V. I. "Tekhnicheskiy nadzor na stroitel'stve magistral'nykh truboprovodov" [Technical Inspection in Construction of Main Pipelines], 12 pages (Library of the Main Pipeline Builder), 60 kopecks.

Experience is generalized of technical inspection at all stages of building main pipelines, including their washing, blowing-through and testing for strength. A technique is described for checking and inspecting the quality of work at the construction of main pipelines (welding-installation, earth-moving, insulation-laying, in the construction of junctions and pipelines under complicated climate and geographical conditions, as well as during the installation of the line section, compressor station and gas-distributing station) with regard for the use of new materials, technology and methods of construction.

It is designed for a broad group of readers involved in building main pipelines. It may be of use to specialists in organizing and managing technical inspection and step-by-step control of both the construction-installation and operating organizations.

You can acquire the books you are interested in at the local bookstores which sell scientific and technical literature, or order them through the mail order department of the stores: No 17, 199178, Leningrad, V. O. Sredniy prospekt, 61; No 59, 127412, Moscow, Korovinskoye shosse, 20.

9035
CSO: 1822/127

END