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# USSR Report

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6 July 1984

## USSR REPORT

## ENERGY

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## NEW WELL-HEAD GAS SEPARATOR DESCRIBED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 1, Jan 84 pp 39-41

[Article by E.S. Sadykh-Zade, I.M. Mardakhayev and A.A. Bagirov, Azerbaijan Institute of Petroleum and Chemistry imeni M. Azizbekov: "Optimum Use of Gas's Bed Energy for Its Preparation at Marine Gas-Condensate Deposits"]

[Text] The extraction of gas in Azerbaijan is based primarily on marine gas-condensate deposits, some of which are more than 50 km from shore.

The preparation of the output of wells drilled into marine deposits consists of its preliminary separation near the well or at marine gas and oil collection points and subsequent separation at facilities on shore. During the initial period of development, the collection and intrasite transportation of the well output is carried out with a single-pipe system that changes gradually into a two-pipe system. However, even the two-pipe system does not eliminate the two-phase nature of the flow in the collecting mains that connect the well site to the facilities on shore. The length of these collecting mains is commensurate with that of trunk pipelines, and the transportation of the two-phase system results in significant losses of pressure and the creation of emergency situations related to pressure pulsations and the formation of hydrate plugs.

The significant pressure losses in the collection system that has been described make it impossible to use the gas's reserve of bed energy for its preparation at the facilities on shore. The use of other energy sources for gas preparation results in large capital expenditures. Therefore, the plan of an installation for the preparation of gas right at the well, using the energy of the gas's expansion in the mouth sleeve, is a matter of interest (Figure 1). Under marine conditions, preliminary cooling of the gas with sea water before it is choked makes it possible to make rational use of the previously lost energy, and the recovery of the cold in a heat exchanger makes it possible to obtain low temperatures with comparatively low pressure gradients. In this installation, the gas-condensate mixture from the well enters separator C-1, where preliminary separation of the gas and liquid flow takes place. The gas is then cooled by sea water in heat exchanger T-1 and a back flow of processed gas in T-2. The cooled gas is choked in regulatable connecting pipe ShR, which acts as a mouth sleeve at the same time, and is separated in separator C-2. The separated liquid and gas are then transported to the shore. Gas processed by this method requires no further preparation for transportation, and the

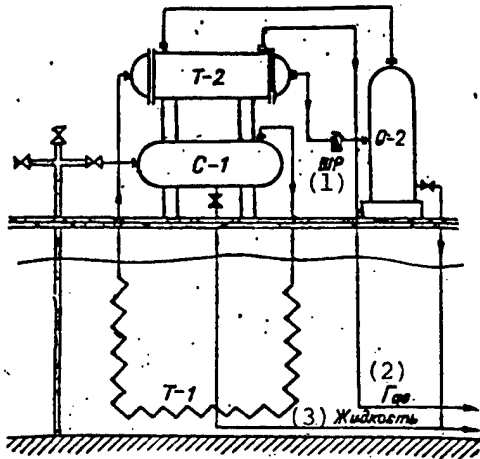


Figure 1.

Key:

1. ShR (regulatable connecting pipe)
2. Gas
3. Liquid

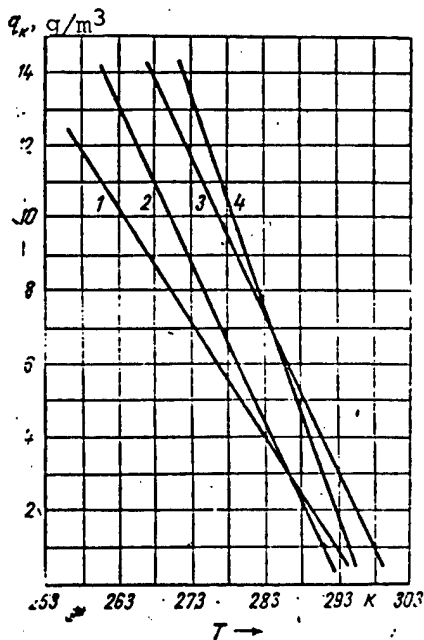


Figure 3.

(1, 2, 3, 4 correspond to wells 32, 31, 42 and 38, respectively.)

mouth were studied with the help of the "Kondensat-2" unit. From the gas condensation isobars obtained as the result of the investigation (Figure 3), it is obvious that the additional extraction of condensate at low temperatures will be more than  $7 \text{ g/m}^3$ , because of which the capital expenditures for the well-mouth equipment for this installation will be recovered in 2 years.

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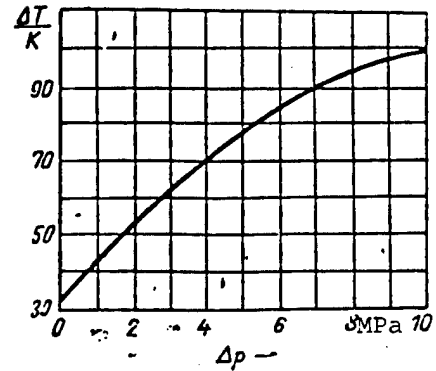


Figure 2.

liquid is processed on shore. The combination in one unit of the functions of regulating the well's operation and choking the gas for the purpose of cooling it makes it possible to use the gas's reserve of bed energy optimally.

The effectiveness of cooling the gas for different pressure gradients in the connecting pipe was determined by calculations, the results of which are presented in Figure 2. The initial data for the calculations were taken in accordance with the parameters of the Bullamore deposit. The initial point on the graph (see Figure 2) corresponds to the magnitude of the reduction in the gas's temperature because of cooling with water along. From the graph it is obvious that in order to obtain low temperatures when this method is used to process the output of wells in the Bullamore deposit, where the mouth temperature is  $60^\circ\text{C}$ , a pressure gradient of at least 3 MPa is required. The actual pressure gradients in this deposit fluctuate from 3 to 8 MPa, which makes it possible to cool the gas at some wells to minus  $20\text{--}25^\circ\text{C}$ .

The phase transformations of gas samples taken at low temperatures at the well

DISCOVERY OF NEW OIL FIELD IN WESTERN AZERBAIJAN DESCRIBED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 1, Jan 84 pp 1-6

[Article by A.N. Guseynov and A.M. Akhmedov, State Association of the Azerbaijan Petroleum Industry: "On the Discovery of the Tarsdallyar Field"]

[Text] The exploratory surveying work being done in Western Azerbaijan has been crowned with the discovery of a new oil field--the Tarsdallyar field--that is the first one to be found in the Kura-Iori interfluve.

Well No 1, the "discoverer" of the Tarsdallyar field, came in as a "gusher" (depth--2,882 m; daily oil flow rate--300 t through a 9-mm sleeve, with a pressure of 8.5 MPa at the mouth; oil density--870 kg/m<sup>3</sup>).

The obtaining of an industrial flow of oil from the field is noteworthy in that it means the discovery of an oil region in the western part of the republic, which is of great national economic value both from the viewpoint of providing a current flow of oil and preparing new reserves of gas and oil and--which is particularly important--for evaluating the presence of gas and oil in the western regions of the republic as a whole, with primary emphasis on the Kura-Iori interfluve and the adjacent areas of Adzhinour, the Yevlakh-Agdzhabedinskiy depression and Southern Kakhetiya (Georgian SSR).

The Tarsdallyar structure was discovered in 1977 and prepared for deep exploratory drilling by the Azneftegeofizika [Azerbaijan Administration of Geophysical Exploration of the Ministry of the Petroleum Industry] trust. The OGT [expansion unknown] method was used to survey the SG-III stratum, which is confined approximately to the upper levels of the Upper Cretaceous. Subsequent work based on the data obtained from Well No 1 made it possible to define more precisely the stratigraphic position of SG-III and assign it to the lowest beds of the Middle and upper parts of the Lower Eocene. In addition, the SG-IV stratum was distinguished in the upper parts of the Upper Cretaceous (Figure 1).

According to seismic surveying data, the brachyantycline has a sublatitudinal strike with 10-14° angles of incidence of the wings. The northern wing is broad in comparison with the southern one, which is complicated by a longitudinal dislocation. The eastern pericline of the fold is also intersected by a fault; the magnitude of the displacement is 1,000 m. The fold's undulating axis forms two small domes.

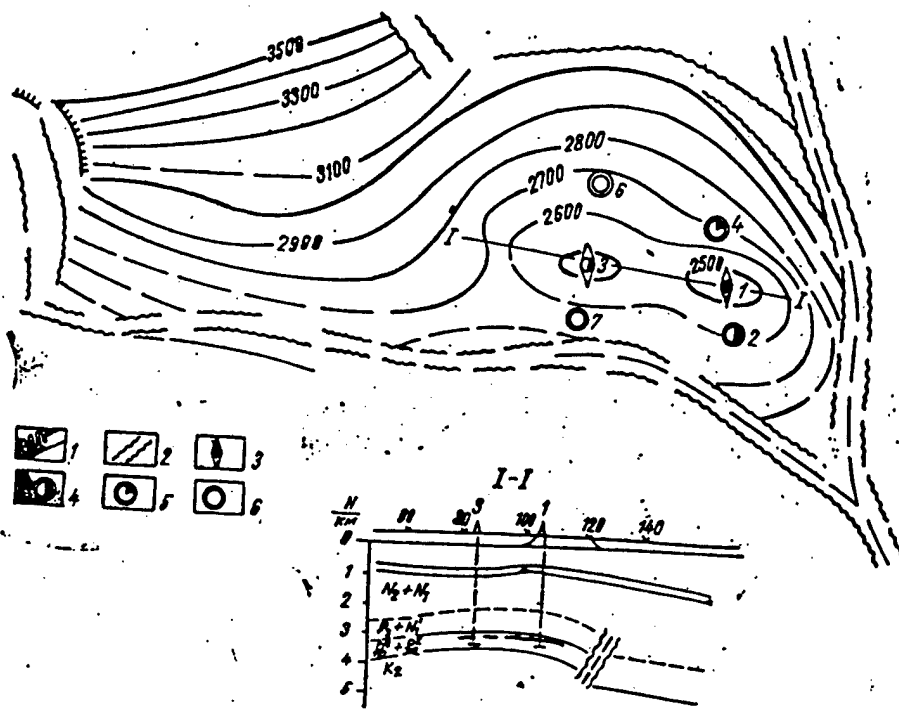


Figure 1. Schematic structural map of Tarsdallyar field in SG-III stratum (Middle Eocene and upper parts of Lower Eocene): 1. contour lines of seismic horizons; 2. zone of complicated seismic information; 3. exploratory well that yielded oil; 4. exploratory and surveying well where drilling is being done; 5. surveying well under construction; 6. planned surveying wells.

The drilling of Well No 1 was provided for in the 1980 plan for surveying work. However, because of a delay in getting it set up, drilling actually began only on 29 October 1982, and the depth of 2,882 m was reached in September 1983. It went through deposits from the Upper Pliocene, Miocene and Oligocene (the Maykopskaya Suite), and at a depth of approximately 2,760 m it entered the Upper Eocene. The well was logged to a depth of 2,870 m.

Oil and gas manifestations--interruption by gas of the drilling solution, which had a density of  $2,040 \text{ kg/m}^3$ --were seen as the drilling passed through the Maykopskaya Suite deposits at the 1,810-2,760 m level. In the primarily argillaceous Maykopskaya Suite layer, logging revealed bands of beds with increased resistance that merit testing for gas and oil.

The upper formation of the Eocene, represented by clays with thin interlayers of aleurolite, was encountered at the 2,760-2,865 m level.

The Middle Eocene deposits (the upper parts of them were encompassed by the logging) were only 17 m thick and were encountered at the 2,865-2,882 m level; they are characterized by an increase in resistance from 2 to  $15 \Omega \cdot \text{m}$ .

From a depth of 2,872-2,882 m, a core bit was used to raise a core sample 6 m long that consisted of pelitic-argillaceous marls that were fissured and had



traces of petroleum adhering to the fissures, alternating with interlayers of aleurolite and clay that were 3-5 cm thick.

During the drilling at the 2,882 m level, 6 m<sup>3</sup> of drilling solution with a density of 2,000 kg/m<sup>3</sup> was absorbed in 1.5 h.

After a cement cup was put in place opposite the absorbing bed and a column 193.7 mm in diameter was lowered to a depth of 2,865 m, Well No 1 went into experimental operation, taking oil from Middle Eocene deposits through an unreinforced borehole at depths of 2,865-2,882 m.

Thus, the industrial flows of oil obtained from Middle Eocene deposits in Central and Western Azerbaijan in recent years, in addition to data obtained by geological and geophysical investigations, indicate that Eocene deposits (Middle Eocene, in particular) are the most promising for gas and oil, and as far as their significant and potential reserves are concerned, in all probability they will be in the second rank of productive strata.

Eocene deposits in the greatest stratigraphic volume, with a thickness of about 2,500 m, occur in the Pritbilisskiy region of Eastern Georgia.

Here (Samgori-Patardzeuli) the basic gas and oil reservoir is the middle formations of the Eocene, particularly its upper half, which is up to 250-300 m thick and is known by the name "Complicated Bedding Horizon." This horizon consists mainly of tuff breccias in blocks and tuff conglomerates with different-sized fragments of volcanogenic and sedimentary rocks having various compositions. It is characterized by variability in the lithological composition and thickness over the area until it tapers out completely. The bottom parts of the Middle Eocene are represented by bituminous clays and argillites with interlayers of sandstones.

In the Kura-Iori interfluvium, the Eocene deposits have been explored to various depths by structure-exploring wells drilled by the GRK [State Rayon Committee] of Azneft' [Azerbaijan Petroleum Industry State Association] in the southwestern part of the oblast in areas located along the Kura River valley (Khatunly, Kaflandere, the Gyrahkhesaman-Kukhetskiy prominence). Here the Lower Eocene is represented by clays with interlayers of calciferous, tuffaceous sandstone; in the northeastern direction the arenosity increases as the depth of the section does, and argillaceous marls and tuff breccias appear. The formation is up to 510 m thick.

The Middle Eocene is represented by an alternation of tuffaceous sandstones, tuff breccias and tuffaceous gritstones with pebble sizes of up to 1.5 cm and separate interlayers of argillaceous marls and pelitomorphic limestones. From the elevated parts of these structures as they sink toward the northeast, the thickness increases from 50 to 135 m, it being the case that in contrast to the tuffaceous lower part and upper band, its middle becomes more argillaceous.

The Middle Eocene is characterized by finely alternating colored clays in its lower parts that are replaced by arenaceous-argillaceous interstratification as the depth decreases and then by gray and dark-gray clays. The thickness of

220 m in the elevated parts of the structures increases to 400 m as they sink toward the northeast.

The Eocene deposits have also been explored with individual prospecting and parametric boreholes that were drilled in areas located in the inner parts of the depression--the Dzheyranchel'skiy synclinorium, Damirtepe-Udabno, Mamedtepe, Sazhdag, Gyurzundag and Tarsdallyar, with the full thickness being explored only in the first two. However, because of the insignificance of the core material that has been gathered, the lithological characteristics of the Eocene deposits as a whole and the Middle Eocene in particular have not been studied adequately. The limited data that are available indicate the prevalence in the Middle Eocene deposits of aleurolitic marls and pelitomorphitic limestones with minor interlayers of clay, argillite, tuffaceous sandstone and tuffaceous gritstone. The profile becomes enriched with pyroclastic and effusive materials as the depth increases,

The interstratification with rocks of differing lithological compositions is indicative of the development of reservoirs of a complicated nature in the Middle Eocene. There is a quite abrupt change in the thickness of the deposits for both the entire Eocene and its middle section, which is the basic object of the prospecting work.

For instance, although in the area of Mamedtepe (Well No 1) the total thickness of the Eocene deposits is 960 m, of which 145 m belong to the Middle Eocene, in the Damirtepe-Udabno area (Well No 1) to the north, these figures drop to 260 and 110 m, respectively. At the same time, in the Sazhdag structure, which is 10-12 km to the east of the other two, the thickness of the Middle Eocene deposits increases to 185 m.

It should be mentioned here that although the "Complicated Bedding Horizon" has still not been profiled thoroughly by drilled boreholes, it is very probable that the Middle Eocene profile that has been explored in the indicated areas of the interfluvium is its analog.

As is obvious from the data that have been presented, the thickness of the Eocene deposits as a whole and of its middle formations decreases substantially in the general plan from northwest to southeast; that is, from Eastern Georgia to Western Azerbaijan. In the same direction the size of the rock fragments becomes smaller and the block breccias and conglomerates are replaced by finely fragmented, rubblelike tuff breccias and tuffaceous gritstones enriched with stratified aleurolitic marls, argillites and tuffaceous sandstones.

The presence of Paleocene deposits in the interfluvium has been established on the slope of the northeastern subsidence of the Kukhetskii prominence. Deposits in the lower part of the profile that are 80 m thick are represented by marls that are replaced by sandstones, tuffaceous sandstones and tuffaceous gritstones as the depth decreases. In the southern direction, toward the arch of the prominence, the Paleocene tapers out and Lower Eocene deposits lie on top of a Cretaceous formation.

The Cretaceous deposits in the interfluvium were discovered on the Kukhetskii prominence by structure-exploring boreholes and in the Mamedtepe area by Parametric Well No 1.

In the elevated part of the Kukhetskii prominence, the Upper Cretaceous that has been discovered is represented by tuffaceous sandstones and brecciated argillites alternating with tuffaceous aleurolites, tuffites and sandstones in a stratum 250 m thick. In the upper part of the stratum there is also a band of argillaceous marls that changes into pelitomorphic limestones in its upper part; the band itself is 46 m thick. As it sinks to the northeast, the Cretaceous profile is augmented by a carbonaceous stratum that lies on top of it, is up to 125 m thick, and consists of an interbedding of gray, pink and brown limestones, colored clays and interlayers of tuffaceous sandstones.

In the area of Mamedtepe Well No 1, which was drilled to a depth of 3,442 m, an Upper Cretaceous bed was discovered. It is represented at depths of 2,550-2,850 m by limestones and marls; below that, to a depth of 3,400 m, there is a volcanogenic-sedimentary complex consisting of tuffaceous sandstones, tuffaceous gritstone, tuff breccia and tuffaceous conglomerates with interlayers of clays, marls and limestones. Porphyrites occur from a depth of 3,400 m to the bottom of the borehole.

Cretaceous deposits have also been found on the right bank of the Kura River by structure-exploring boreholes that were drilled in a strip from the Dallyar railroad station to the city of Kazakh. Here the Upper Cretaceous is represented by limestones and marls with infrequent interlayers of tuffaceous sandstone from the Danian-Campanian age; the whole complex lies beneath Cenozoic formations in the Kura-Iori interfluvium. The thickness of these deposits, which lie on top of effusives (liparite), increases toward the northwest from 260 m near Dallyar to 700 m in the Akstafa-Kazakh region. There is also an increase in thickness as the complex sinks to the northeast.

In the Kura-Iori interfluvium, geological surveying work has resulted in the mapping of more than 40 folds in Neogenic deposits. Part of them have also been confirmed by structure-exploring drilling. However, the field geophysical investigations (gravimagnetic and seismic surveying) conducted in recent years indicate that the underground structure is quite complicated.

A significant part of the folds seen on the surface disappear as the depth increases and do not reflect the structure of the underlying Paleogene and Cretaceous deposits or the structural plans of the latter turn out to be displaced considerably.

The surface of the effusive formations lying at the base of the Upper Cretaceous sedimentary complex has a different structural plan. It is expressed in the time profiles by the loss of correlatable entries. In the gravitational field, which probably reflects the morphology of the effusive mass, a number of extended prominences are visible. It is possible that they were caused by the dissected nature of the mass's surface, which is the result of erosive and tectonic factors. Inside the Dzheyranchel'skiy synclinorium, the prominences are stretched out in the southeastern (away from the Caucasus) direction; that is, across the folding of the overlapping deposits, and in the Chatminkaya zone they basically have a northwest-southeast strike.

A characteristic of the tectonics of the Neogenic deposits in the presence of predominantly longitudinal regional faults of an upthrust fault-overthrust type

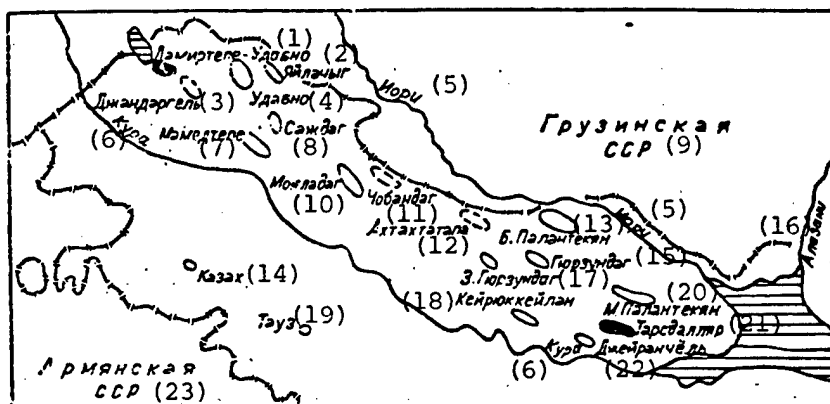


Figure 2. Map of location of basic areas in the Kura-Iori interfluvium that are promising for gas and oil prospecting.

Key:

- |                     |                          |
|---------------------|--------------------------|
| 1. Damirtepe-Udabno | 13. Bol'shoi Palantekyan |
| 2. Yaylachyg        | 14. Kazakh               |
| 3. Dzhandargel'     | 15. Gyurzundag           |
| 4. Udabno           | 16. Alazani River        |
| 5. Iori River       | 17. Zapadnyy Gyurzundag  |
| 6. Kura River       | 18. Keyryukkeylan        |
| 7. Mamedtepe        | 19. Tauz                 |
| 8. Sazhdag          | 20. Mladshiy Palantekyan |
| 9. Georgian SSR     | 21. Tarsdallyar          |
| 10. Molladag        | 22. Dzheyranchel'        |
| 11. Chobandag       | 23. Armenian SSR         |
| 12. Akhtakhtatapa   |                          |

that was caused by the lifting of the arches and the northern wings of the folds over the narrow southern wings.

The different structural plans of the separate stratigraphic complexes of deposits, the variability of their thickness, the intensive dislocation of overlapping surveyed objects in Neogenic formations, and the intersecting nature of the relief in this area all make the preparation of the structures for seismic surveying more difficult.

Nevertheless, in recent years the use of the OGT seismic method and profile data from even the small number of boreholes that have been drilled in separate parts of the interfluvium by Azneftegeofizika made it possible to prepare the Gyurzundag, Tarsdallyar, Bol'shoi Palantekyan, Molladag and Dzhandargel' structures for deep exploratory drilling and to discover a number of new areas-- Zapadnyy Gyurzundag, Akhtakhtatapa, Karadyuz, Kyasaman, Saloglu, Mamedtepe, Gushguna and others (Figure 2)--that require additional seismic surveying work in order to prepare them for drilling.

However, practice has shown that because of the lack of physical boreholes for the conduct of SK [probably seismic logging] and VSP [vertical seismic profiling] for the purpose of determining the medium's velocity and density parameters and the stratigraphic correlation of the seismic horizons, after the

first deep boreholes are drilled in the already prepared areas, it will be necessary to make substantial corrections in their structural bases.

The primary goals of this prospecting drilling are to accelerate the mapping of the oil deposits that have been discovered and to search for new ones in the known structures and to carry out parametric drilling, for which the following are necessary:

in 1985, to complete the high-quality construction of Wells Nos 2, 3, 4, 6 and 7 (Middle Eocene) and begin the drilling of Wells Nos 8 and 9 into the Upper Cretaceous level in the Tarsdallyar area;

evaluate the gas and oil content of the Middle Eocene level in the Keyryukkeylan and Gyurzundag areas in 1984;

in order to improve the effectiveness of geological prospecting work and select the primary objects for surveying, as well as to evaluate the gas and oil content of the entire Kura-Iori interfluvium, to begin exploratory drilling in the Bol'shoy Palantekyan, Molladag, Akhtakhtatapa and Zapadnyy Gyurzundag structures and to resume drilling in the Dzhandargel' structure. In 1984-1985 the primary goal should be the drilling, as soon as possible, of parametric boreholes in the Dzheyrancheh', Mladshiy Palantekyan, Kyasaman, Karadyuz, Chobandag, Mladshiy Udabno and Yaylachy areas, with integration of the geophysical investigations;

to continue seismic surveying work to look for new structures and prepare those already discovered for drilling into the Paleogenic-Mesozoic deposits in the eastern and western parts of the region and in the Kura River valley;

to determine, by means of seismic surveying, the nature of the jointing of the tectonic structures in the Kura-Iori interfluvium with those of the Yevlakh-Agdzhabedinskiy and Adzhinourskiy regions;

to carry out, with the republic's scientific research organizations, an operational analysis and discussion of the new geological and geophysical data that have been obtained, for the purpose of defining more precisely and determining the most effective areas for exploratory and prospecting work;

in order to improve the effectiveness of the work being done, to formulate an integrated program to strengthen the geological, geophysical and exploratory drilling work and the delivery of the necessary equipment to the work areas, and to implement organizational and technical measures that will bring the service base and the geological, technological and technical leaders closer to the area where the work is being done.

Failure to implement the measures mentioned above can lead to unsubstantiated siting of exploratory wells with the loss of much time and many facilities used to drill unsuccessful wells and create a false picture about the prospects for finding gas and oil in the individual structures in the interfluvium.

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BRIEFS

GEOLOGICAL SEMINAR HELD--The 2-day scientific seminar organized by Azerbaijan's young geologists of the Geology Institute of the Azerbaijan Academy of Sciences has ended. Akif Alizade, corresponding member of the Azerbaijan Academy of Sciences, addressed the seminar on the great importance of holding such seminars and on the role of young scientists and experts in developing geological sciences. Over 30 reports were heard at the seminar. Scientific reports were presented to the seminar on Azerbaijan's oil geology, seismological issues, the learning of the scientific and geological results of the [word indistinct] of the (Saki) well which is regarded as one of the deepest oil wells in the Soviet Union, and other matters. [Text] [GF311852 Baku Domestic Service in Azeri 1600 GMT 31 May 84]

NEW CASPIAN OIL RIG--Dear listeners, today's newspapers published interesting reports concerning work in Azerbaijan. One of the reports say that a new rig is being set up in the Caspian Sea. The rig is being set up at a point where the depth of the water is 111 meters. The drilling of 24 oil wells will be possible with the new rig. [Text] [From the press review] [GF172022 Baku International Service in Azeri 1200 GMT 17 May 84]

OIL COLLECTIVE AWARDED--The oil and gas extraction collective of Karadag has been awarded the Challenge Red Banner Order of the CPSU Central Committee, the USSR Council of Ministers, the All-Union Central Council of Trade Unions, and the All-Union Komsomol Central Council, for the second consecutive time. The August Award has added to the high political spirit and work organization of the oil workers. The tasks of 1984 are being fulfilled by the collective in an auspicious way. Compared with the output in the same period last year, the daily oil production at the present time increased by 15 tons. Extraction of gas, on the other hand, increased by 21,000 cubic meters. A total of 80 tons of oil and 142,000 cubic meters of gas over the planned targets have been extracted since the beginning of the year. [Text] [GF071023 Baku Domestic Service in Azeri 0205 GMT 6 Mar 84 GF]

BAKU OIL EXTRACTION INCREASES--The workers in one of Baku's oldest oilfields--the (Dibiheybet) oilfield--maintained production levels in all fields last year. In fact they increased their output. They extracted 2,466 tons of oil and 1 million cubic meters of gas more than the estimated amount. Oil workers of the [words indistinct] Rayon have been the workers who have achieved the first success in the new year. The collective of the second oilfield, which is headed

by Iskandar Gusaynov, has proved its skill and marked this festive occasion with success. The workers of the collective have completed repairing well No 3,440 and have acquired 6 tons of oil from it. A new well, which has a plan depth of 1,300 meters, has been put into operation in the same oil field. The daily output of this new well is 8 tons. [Text] [GF030711 Baku Domestic Service in Azeri 0205 GMT 2 Jan 84]

OIL FIELD REACTIVATED--New success has been achieved in the old (?Azizbeov) oilfields. The director of the first oilfield, Muship Asadov, has informed our correspondent that oil well No 1,509 was put into operation yesterday. It has produced 5 tons of high quality oil. The collective of the fourth oilfield has repaired oil wells No 1,070 and 1,182 and put them into operation. The wells are producing over 3 tons of oil each. Yesterday, 15 tons of oil and 100,000 cubic meters of gas in excess of the plan were acquired from the wells reactivated by the Administration of Mines. [Text] [Baku Domestic Service in Azeri 0205 GMT 2 Jan 84 GF]

NEW FIELD DRILLED--The collective of the Serebrovskiy Oil and Gas Extraction Administration has completed drilling operations in well No 109 in the (Bahar) oilfield. Pipes are now being placed in the well. The new well, whose plan depth is 4,500 meters, will be put into operation during the first 10 days of January. Geologists believe that the new well is rich with oil and gas. The chief engineer of the administration has informed our correspondent that 12 deep wells are being drilled at the present time on individual islands in the (Bahar) oilfield. These wells will be transferred to miners during the forthcoming months. [Text] [Baku Domestic Service in Azeri 0205 GMT 2 Jan 84 GF]

CSO: 1831/121

COAL

LEAD-UNIT MANAGERS HEAD MOVE TO MEET 1984 GOALS IN ADVANCE

Moscow UGOL' in Russian No 3, Mar 84 pp 3-4

["An Appeal by the Managers of Advanced Brigades and Sections to All Coal-Industry Workers to Fulfill the Plan for the Fourth Year of the Five-Year Plan Ahead of Schedule"]

[Text] The party-style task can be posed only in this fashion: it is necessary to provide for unconditional fulfillment of the plan, but, in so doing, all possibilities for overfulfilling it must be used.

Dear Comrades!

The collectives where we work have adopted with great inspiration the decisions of the December 1983 CPSU Central Committee Plenum and the Ninth Session of the USSR Supreme Soviet which approved the plan for economic and social development and the state budget of the country for 1984. The contemplated plans for further dynamic development and for an increase in the effectiveness of social production, an increase in the people's welfare, and the support of our motherland's defense capability at the proper level gladdens us.

We well realize that practical solution of the tasks that have been set is completely in our hands and depends directly upon the level of our organization and discipline and on our labor spirit and creative initiative. This is confirmed by our experience and the results of our work.

During the third year of this five-year plan our collectives mined 1.4 million tons of coal above the plan, disposed of 740,000 m<sup>3</sup> of overburden rock, did 400 meters of preparatory excavation, and did 1.2 million rubles' worth of mine-development work.

In accordance with tradition, representatives of advanced workers' collectives have been taking part at a joint session of the USSR Minugleprom [Ministry of Coal Industry] Board and the Presidium of the Central Committee of the Trade Union of Coal Industry Workers in a discussion of the results of fulfilling commitments and have been planning new goals for raising the effectiveness and quality of work and ways of achieving these goals.



Let us say frankly that, from the standpoint of the requirements of the December 1983 CPSU Central Committee Plenum, we are worried by the state of affairs in the industry, by the fact that, along with many labor achievements by advanced miners' collectives, there are still frequently cases of nonfulfillment of the state plan. The causes are known: late and poor-quality preparation of a front for breakage operations, idle equipment time and losses of worktime, slow introduction of the achievements of technical progress and the experience of advanced workers, and violations of production and labor discipline.

In 1984 coal-industry workers are to increase considerably the amount of fuel mined, to radically improve the qualitative indicators of the work, and to provide for the rhythmic delivery of coal to customers. We consider it an obligation of our workers' honor to make a maximal personal contribution toward the fulfillment of these tasks of the Communist Party and the Soviet Government.

After studying the possibilities for further raising the yield of existing equipment, making more rational use of each minute of worktime, and saving material and power resources, and after having been included in the socialist competition for successful fulfillment of the plan for the fourth year of the 11th Five-Year Plan, and also, in sustaining the initiative of Moscow and Leningrad enterprises and of workers of Donetsk Oblast and other parts of our country, we have decided to adopt our workers' counterplan--to exceed planned labor productivity by 3-10 percent, to reduce the prime cost per unit of output by at least 1 percent, and to operate on saved resources for 3 days during the year.

Five miners' collectives have committed themselves to mining at least 1 million tons of coal each, another five collectives to surpassing the goal of 500,000 tons of coal per year.

The tunnelers have undertaken a commitment to make excavations only at rapid rates. It is planned to do 4.2 million rubles' worth of construction and installing work on the rebuilding of mines, under brigade contracts.

Mine-transport brigades at strip mines will surpass the standards for raising excavator productivity by more than 10 percent.

In increasing the workload on equipment, we accept it for communist preservation, and we shall exceed the standards for service life of the equipment.

In regard to brigade accounts of savings, we shall save more than 0.5 million rubles' worth of resources.

Each of our brigades has undertaken the commitment of a collective mentor and has decided to help partners in competition to master advanced work methods.

The number of brigades at our industry's enterprises and construction projects now is about 50,000. The CPSU Central Committee decree, "Further Development and Increase in the Effectiveness of the Brigade Form of Organization and Work Incentives in Industry," opened up new possibilities for

expanding the scale and for raising the effectiveness of this progressive form of work organization and pointed out the need to gradually introduce brigade cost accounting and the brigade contract and to evaluate the individual's contribution to collective work results by use of the labor participation factor.

In accordance with the mission of our comrades in labor, we call upon our colleagues in the trades and all workers of the industry to open up brigade and individual personal accounts of savings and to insure a reduction in the expenditure of labor versus the plan by at least 1 percent and of material, power and other resources by 0.5 percent.

We call upon labor collectives to promote competition to increase the number of highly productive brigades and to achieve specified goals for increases in labor productivity growth, increases in product output, and improvements in product quality.

Let there be an expansion in the number of participants in the traditional miners' competition for making the best use of equipment, for producing an average daily output of 1,000 or more tons of coal for each mine face equipped with longwall miners and 500-700 tons per mine face at thin or steep seams, for surpassing the norms for rapidity in making excavations at underground mines and for increasing the productivity of mine-transport equipment at strip mines.

Let engineering preparation and active joint creative search by specialists, engineers, technicians and innovators for ways to curtail nonproductive work-time and to eliminate labor-intensive work and manual and heavy physical labor be a pledge of successful fulfillment of 1984 plans and commitments by each brigade, in each section, and at each workplace.

We call upon the industry's workers to mark the day of the elections to the USSR Supreme Soviet with record labor achievements.

In the name of the collectives of our brigades and sections, we express firm confidence that the coal industry's blue-collar workers, engineers, technicians and white-collar workers will support our Appeal and employ all their strength and skills and multiply labor activeness and creative initiative in order to improve radically the industry's work and to insure unconditional fulfillment of the state plan, counterplans and commitments for 1984 by each working collective, and thereby to make a meaningful contribution to successful realization of the program for the economic and social development of the country's economy during the 11th Five-Year Plan.

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COAL

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STEPS TO RAISE LABOR PRODUCTIVITY AT COAL MINES URGED

Moscow UGOL' in Russian No 3, Mar 84 pp 5-8

[Editorial: "Use Reserves for Increasing Labor Productivity More Widely"]

[Text] Major complicated tasks in implementing the Energy Program--a most important component of the state plan for the USSR's economic and social development--face coal-industry workers during the fourth year of the 11th Five-Year Plan. They should mine 715.8 million tons of coal--7.7 million tons more than in 1983. Preparation plants must process 304.3 million tons of coal and give metallurgists and power workers about 170 million tons of concentrate. The output of underground mine equipment and apparatus is to be greatly increased at VPO Soyuzuglemash [All-Union Association for the Production of Coal Machinery] and Soyuzugleavtomatika [All-Union Association for Automating the Coal Industry] plants, and, in so doing, main attention should be concentrated on producing machinery at a higher technical level and raising the quality and reliability of mining equipment. Capital construction is being increased, the pace of erection of fuel-and-power complexes is being accelerated in the country's eastern regions, and special importance is being attached to introducing housing and facilities for social, cultural and personal-services purposes. It is very important to improve the use of production capacity, raw materials, power and worktime. Increasing labor productivity is a key task. It is planned to increase this indicator by 1.2 percent, and thereby to provide for an 80 percent growth in production volume.

The papers of the December 1983 CPSU Central Committee Plenum pointed out that, while implementing the plan, a constant and persistent search must be made for additional reserves, to insure uninterrupted operation of the national economy. In implementing the plenum's decision, coal-industry workers should display a better degree of organization, increase planning, technological and labor discipline, use new equipment more effectively, and get greater yield for each ruble of funds spent.

One of the more effective reserves for increasing labor productivity in the coal industry is the dissemination of the advanced work experience of brigades and sections that have promoted the socialist competition to mine 1,000 tons or more of coal per day per mine face that has been mechanized in integrated fashion. This patriotic movement was approved by the party central committee and was recommended for wide dissemination not only in the coal industry but also in other branches of the national economy.

In continuing the glorious traditions of the Stakhanovite movement, collectives of advanced mineworker brigades and sections, skillfully using new, highly productive equipment, are showing labor heroism, worker gumption and resourcefulness in finding production reserves. Most mineworkers possess vocational skills to perfection, are working creatively and in constant collaboration with engineers, technicians, scientists and designers and are seeking ways to further improve the equipment and technology, which will enable the mining of coal to be built up in ever-increasing amounts, working conditions to be improved, and accidentfree work to be provided for. They are constantly increasing their production and social activeness and are indoctrinating each member of the collective in high moral qualities. Technological and labor discipline are strictly observed in these brigades, and there is an absence of personnel turnover.

It has become a tradition to examine at the start of the year the results of the work of the "thousand-tonners" at a conference of the USSR Minugleprom [Ministry of Coal Industry] Board and the Presidium of the Central Committee of the Trade Union of Coal-Industry Workers. This year 18 supervisors of advanced brigades and sections were invited to Moscow. The results of their work in 1983 were discussed and measures for fulfilling counterplans and for further developing the "thousand-tonners" movement were determined in light of the decisions of the December 1983 CPSU Central Committee Plenum and the Ninth Session of the USSR Supreme Soviet.

USSR Minister of Coal Industry B. F. Bratchenko, who spoke at the conference, noted that, in analyzing the industry's work results for last year, among the reasons for nonfulfillment of the plan for mining coal was a weakening of attention to the "thousand-tonners" movement, the work results of which exert considerable influence on the technical and economic indicators not only of individual enterprises and associations but also of the branch as a whole.

In 1983, the thousand-ton workload was reached by 427 brigades and sections, which mined 181.8 million tons of coal and shale, 7.8 million tons of it above the plan, or 43.6 of all underground mining of solid fuel. The collectives of 102 brigades and sections sent to the top 500,000 or more tons each, and 7 of them exceeded the million-ton mark for mining coal.

The work experience of highly productive collectives of Yuzhkuzbassugol' [South Kuznetsk Coal Basin Coal Production Association] deserves attention. Here, 1,000 or more tons of coal per day were mined from each of 47 mine faces equipped with longwall mining machines, 500,000 or more tons were mined per year from 13 mine faces equipped with longwall mining machines, and the brigades under M. Reshetnikov (the Zyryanovskaya Underground Mine) and P. Frolov (the Raspadskaya Underground Mine) exceeded the million-ton mark. In 1983 M. Reshetnikov's brigade mined 1,558,000 tons of coal and won the prize of the newspaper TRUD for the best average monthly labor productivity per worker-- 1,075 tons. P. Frolov's brigade achieved a record for daily mining. On V. I. Lenin's birth date, using a 2UKP longwall mining machine, it sent to the top 11,350 tons of coal. A high level of organization of operations enabled the association as a whole to achieve an average daily workload of up to 1,120 tons, mining up to 397,000 tons annually per work face equipped with integrated mechanization. Precise organization of labor and engineering support

promoted stable work by the association, whose plan for mining coal was carried out by 102.5 percent, giving the country 670,000 tons of coal above the plan.

The Donetskugol', Krasnoarmeyskugol', Torezantratsit, Sverdlovantratsit, Gukovugol', Rostovugol', Novomoskovskugol' and Tulaugol' Associations not only fulfilled the plan for mining coal and the task for the number of "thousand-tonner" brigades successfully but also sought out possibilities for increasing mining by these collectives.

The Vorkutaugol' Association also operated successfully--the plan for mining coal from mine faces with integrated mechanization was met 104 percent. The shock-work drive of the "thousand tonners," who sent 15.4 million tons of coal to the top, or 83.6 percent of all the mining from mine faces equipped with integrated mechanization, helped greatly in this.

However, as B. F. Bratchenko noted, there are substantial deficiencies in the development of the "thousand-tonners" movement. As a result of the declining attention of individual supervisors of enterprises and associations to organizing the work of brigades that have undertaken the commitment to achieve the high workloads, the established task for the number of "thousand-tonner" brigades for UkSSR Minugleprom alone proved to be underfulfilled by 20, for VPO Kuzbassugol' [All-Union Kuzbass Coal Basin Coal Production Association] by 19, and Karagandaugol' and Chelyabinskugol' Associations by 9 and 4, respectively.

Serious engineering miscalculations, unsatisfactory upkeep of mine workings, delayed repair of longwall miners and of underground-mine equipment, violations of deadlines for the preparation and introduction of breakage faces, an inadequate level of organization of work and production, and incomplete manning of the integrated-mechanization equipment of mine faces with workers affected negatively the fulfillment of socialist commitments by some of the underground-mine collectives that were among the "thousand-tonners" and the "million tonners." For the industry as a whole, there was a shortfall in plan fulfillment of more than 7 million tons of coal and shale because of failure to meet the goals for converting mining brigades to highly productive operating modes.

Mine-geology conditions are being degraded at underground mines because of the transfer to deeper horizons. New, complicated equipment is arriving at mine faces. These require, above all, improvements in the engineering support of operations, timely preparation of the breakage front, constant improvement of the technology and organization of work, the selection of optimal operating modes, and precise coordination of the joint efforts of the main and auxiliary production sections. The role of engineers and technicians in providing the prerequisites for those who are competing to fulfill the adopted commitments is growing. Creative and businesslike contacts among scientists and specialists of enterprises and innovative workers must be expanded. And, where there is such collaboration, meaningful results are achieved. Thus, it is right for the mine's engineers and technicians, the scientists of ShakhtNIUI [Underground Mine Scientific-Research and Design Development Institute for Coal] and PNIUI [Moscow Area Scientific-Research Institute for Coal] and workers of the Druzhkov and Gorlovka Machinebuilding Plants to share in the successes of the

miners of the brigade of Twice Hero of Socialist Labor M. Chikh of the May-skaya Underground Mine of the Rostovugol' Association, which mined more than 1 million tons of anthracite from a shearing longwall for 8 years.

Deliveries of metal supports to underground mines should be increased in order to organize highly productive work and to support safe working conditions for the miners. At present, the share of excavations reinforced by this type of support is 67 percent.

Not everywhere is the repair of equipment, especially of highly productive equipment, organized. More than 20 percent of the mine faces do not earmark a special time for repairing it. As a result, idle equipment time at breakage faces with integrated mechanization equipment was, according to stop-watch observations (in percents of total length of shift time): 26 at UkSSR Minugleprom underground mines, 34.3 at VPO Kuzbassugol' mines, and 39.7, 37.2, 37.8 and 35.5, respectively, at Vorkutaugol', Chelyabinskugol', Sredazugol' and Primorskugol' Association mines.

Competition to achieve the highest labor productivity, following the example of the "thousand tonners," has been promoted among mine-tunneling brigades at underground mines, among excavator, locomotive and truck brigades at strip mines, and among construction brigades at construction projects. In 1983, 603 tunneling brigades operated by the high-speed method, and 403 excavator, 134 locomotive and 353 truck brigades and crews exceeded the standards for increased productivity. In underground mine construction, 933 collectives mastered the brigade-contract method, 378 of which did 500,000 or more rubles' worth of construction work.

In the Leninskugol', Yuzhkuzbassugol' and Gidrougol' Associations, the share of high-speed tunneling was 36-48 percent. Various tunneling brigades in other associations of VPO Kuzbassugol' also achieved high indicators. Thus, the brigade of Ye. Bragin (of the Karagaylinskaya Underground Mine) brought the pace of making preparatory workings up to 730 meters per month, Yu. Dunayev's brigade (of the Tsentral'naya Underground Mine) to 1,200 meters per month, and A. Solov'yev's brigade of the Underground Mine imeni Dzerzhinskiy to 1,705 meters per month.

However, the work experience of advanced high-speed brigades is still being poorly studied and generalized, and it is not being disseminated sufficiently to other enterprises, as a result of which certain associations met the goal for number of high-speed brigades by only 50-60 percent. Thus, in Karagandugol' Association, out of 39 tunneling brigades converted to high-speed operations, 32 coped with the task. As a result, this association carried out the excavation plan for 1983 by only 89.8 percent. Twenty out of 26 underground mines did not carry out the tunneling plan, and 16 of these did less excavating than in 1982. The cause of this lag was the involvement of tunnelers in unrelated work. In 1983 Karagandugol' Association as a whole spent 61,000 fewer mandays tunneling than were called for, and 324,000 mandays of the tunnelers were spent doing other work.

In speaking at the conference, the Honored Underground Mine Worker Ye. Koshelov, leader of a tunnelers' brigade of the Pavlogradskaya Underground Mine of the Pavlogradugol' Association, told about the highly productive work

of his brigade, which has been a communist-labor collective for 15 years. However, tunneling has been reduced recently because of the poor work of underground mine transport, unsatisfactory repair of electric locomotives, and forced idle time.

N. Koroteyev, Hero of Socialist Labor, USSR State Prizewinner and brigade leader of mine-construction workers from Voroshilovgradshakhtostroy [Voroshilovgrad Combine for Underground-Mine Construction], told about the need to improve equipment for making underground-mine pillars.

The supervisors of advanced tunneling brigades noted that the delivery of materials and equipment to the working face has been a bottleneck during excavation. The labor intensiveness of these operations is 40-50 percent of total labor intensiveness of the operations. Engineering support for doing this work should meet the demands of the times.

The dissemination of advanced experience at strip mines is of special importance, since coal mining by the open-cast method will be the main direction of technical progress in the industry. More than 40 percent of all the country's coal is now being mined at strip mines, and in the long term the share of open-cast mining will increase. In 1984, coal mining at strip mines is to reach 295 million tons, which is 6.4 million tons more than in 1983, and the amount of stripping work should exceed 1 billion m<sup>3</sup>.

High-powered mine-transport equipment is being used at strip mines: rotary excavators with productivities of up to 5,000 tons/hr, draglines and power shovels with shovels of 4-100 m<sup>3</sup> capacity, dump trucks of 27-180 tons' load capacity, modern locomotives and other equipment. Since nonproductive idle excavator time at various strip mines reaches 14 percent of calendar time, it is important to develop socialist competition more widely for meeting the standards for increasing the equipment's productivity, using the experience of advanced collectives.

In 1983 highly productive excavator brigades did about 63 percent of all the operations. At the Nazarovskiy Strip Mine of Krasnoyarskugol' Association, the excavator brigade under USSR State Prizewinner P. Cherpakov got high results. Using the ER-1250 rotary excavator, it mined 3,545,000 tons of coal during the year, which is 70,000 tons more than the plan goal and 45,000 tons above the socialist commitments adopted.

V. Gusevskiy's brigade from the Azeyskiy Strip Mine of Vostsibugol' Association. V. Duvents's BELAZ-548 dump-truck crew from the Tomusinsk Motor Pool of Kemerovugol' Association, G. Babkin's locomotive brigade from the Ekibastuzugol' Association and many others showed an example of a communist attitude toward work.

A. Zelenkov, leader of an excavators' brigade from the Severnyy Strip Mine of the Ekibastuz Coal Mining Association, told about his collective's work experience. His collective is working under the brigade contract. It has undertaken socialist preservation for the excavator. The brigade's forces maintain and relay 4 km of railroad track. The excavation norms are fulfilled 103-114 percent. During 1983, 7,000 rubles' worth of materials and 1,200 rubles of

the wage fund were saved. Shift output per person rose by 100 m<sup>3</sup> over the 1982 level.

The work experience of advanced strip-mine collectives testifies to the existence of major reserves for increasing labor productivity. However, underestimation by individual supervisors of the importance of using them has led to the nonfulfillment of tasks by some highly productive brigades in the Ekibas-tuzugol', Chelyabinskugol', Dal'vostugol' and Bashkirugol' Associations.

A most important factor in raising production effectiveness is introduction of the brigade form of organization and work incentives. The CPSU Central Committee adopted the decree, "Further Development and Increase in Effectiveness of the Brigade Form of Organization and Labor Incentives in Industry," by which it is planned to improve the system for planning, accounting for and organizing production, to provide for the training of workers in second and related trades, to improve work on raising workers' skill levels and to intensify the role of the councils of brigades and of brigade leaders and of material incentives for work by blue-collar workers who have the responsibility of brigade leaders and of foremen of production sections and engineers who are engaged in organizing stable and effective work by brigades. It defines the tasks of enterprise supervisors and trade-union committees on the development within brigades of competition that is aimed at achieving high final work results, at educating people in a communist attitude toward work, and at discovering the creative capabilities of each worker.

There are now about 50,000 brigades at enterprises and construction projects. In the 1950's, for the first time in the country, so-called straight-through integrated brigades of breakage-face mineworkers, who work under a single daily work order, were established at underground mines. The wage fund for brigade members is set to depend upon the work results of all three shifts. This has helped to increase the responsibility of each member of the collective for the work of his shift and of the brigade as a whole, education in a feeling of mutual assistance, and a striving by the laggards to pull themselves up to the leaders' level.

With development of the Stakhanovite movement, which later grew into the competition for a communist attitude toward work, and of mineworkers' collectives, other patriotic beginnings and initiatives also arose that were aimed at uncovering internal production reserves and reserves for more complete and rational use of equipment, improving all technical and economic work indicators and raising production sophistication.

Competition to reduce the prime cost of and to raise the quality of the coal has been promoted in the Donbass [Donets Coal Basin] at the initiative of Hero of Socialist Labor A. Kol'chik at the Underground Mine imeni L. I. Lutugin. The brigade from Mine No 4-9 that is headed by Hero of Socialist Labor M. Telitchenko has come out with an initiative to work on saved materials. The competition to make better use of equipment for breakage faces at steep seams was initiated by P. Gurzhiy from the Underground Mine Komsomolets.

A movement that was started at the initiative of the breakage-face mineworkers' brigade under Hero of Socialist Labor I. Rogovskiy at the Underground



Mine imeni S. M. Kirov in the Donbass has been widely promoted in the industry. The collective came out with an initiative to carry out monthly the state plan for all breakage and preparatory brigades a day ahead of schedule and to operate on the last day of the month on the basis of materials that have been saved.

The competition to introduce widely mechanized equipment for manual operations, which was started at the initiative of young Komsomol member workers of the Underground Mine imeni 50-letiya Oktyabrya, was organized under the motto, "Smash manual labor!", at Karaganda's underground mines.

Mine-face workers under Hero of Socialist Labor V. Dovbysh of the Underground Mine imeni N. A. Izotov of the Artemugol' Association developed a personal plan for fulfilling five-year plan tasks ahead of schedule.

Mineworkers of the Underground Mine imeni V. M. Bazhanov of the Makeyevugol' Association began the competition to increase yield on capital and to make a maximum reduction of material expenditures. They committed themselves to the mining of more coal of better quality at lower cost. The competition included tunnelers, breakage-face workers and transport workers, who concluded an agreement on mutual help for each other.

The buro of the CPSU's Kemerovo Oblast Committee approved the patriotic initiative of Underground Mine Nagornaya workers, who were competing under the slogan, "A creative search is everyone's business."

The movement for collective mentorship was promoted in accordance with the example of a distinguished Kuzbass miner, Hero of Socialist Labor G. N. Smirnov.

However, not all of the miners' numerous initiatives were further developed, and some of them were practically forgotten last year. The December 1983 CPSU Central Committee Plenum devoted serious attention to this phenomenon, which is characteristic also for other branches of industry. A specific task was set for party, trade-union, and Komsomol organizations and labor collectives--to increase labor productivity 1 percent above the plan and to reduce the prime cost of output by an additional 0.5 percent.

Mineworker collectives which, from the first days of this year, set for themselves the aim of doing shock work, adopted this task as an urgent party mission. Eighteen advanced brigades and sections whose leaders participated in the joint conference of the USSR Minugleprom Board and the Presidium of the Central Committee of Trade Union of Coal-Industry Workers became the initiators of socialist competition. Sustaining the initiative of laboring collectives of Moscow, Leningrad, Donetsk Oblast and other parts of the country, they adopted their workers' counterplan--to exceed planned labor productivity by 3-10 percent, to reduce the prime cost per unit of output by at least 1 percent, and to operate on saved resources 3 days in the year. Each brigade took upon itself the commitment to act as a collective mentor and resolved to help partners in competition to acquire advanced work methods.

The brigade of Twice Hero of Socialist Labor Ye. Drozdetskiy from the Nagornaya Underground Mine, which is to mine coal seams under most complicated mine-geology conditions, adopted more strenuous commitments. The celebrated brigade committed itself to mining at least 500,000 tons of coking coal during the year.

As B. F. Bratchenko noted in his speech: the new initiative of the advanced mineworkers' brigades and sections are not only of great national-economic but also political significance. Overfulfilling the plan for labor productivity for the branch as a whole by just 1 percent means a yield to the national economy of an additional 7 million tons of coal, and a 0.5 percent reduction in the prime cost of coal will enable 48 million rubles of state funds to be saved.

The USSR Minugleprom Board and the Presidium of the Central Committee of the Trade Union of Coal-Industry Workers approved the patriotic initiative of the advanced brigade and section supervisors who signed the Appeal to all the industry's workers to develop socialist competition to fulfill the 1984 plan ahead of time, and they proposed that UkSSR Minugleprom, the supervisors of All-Union and production associations, combines, enterprises and construction projects, the Ukrainian-Republic and regional trade-union committees, and the trade-union committees of the industry's enterprises and organizations widely acquaint blue-collar workers, engineers, technicians and white-collar workers with the advanced workers' Appeal at meetings.

Organizational work in collectives should concentrate on further dissemination and introduction of advanced experience and an increase at mines of the number of brigades and sections that mine at least 1,000 tons of coal or shale per day each, or 500-700 tons per day at steep or thin seams, and also in the number of high-speed mine-tunneling collectives, and, at strip mines, the number of highly productive excavator, locomotive and motor-vehicle transport brigades; and, at construction projects, an increase in the number of brigades that do 500,000 or more rubles' worth of construction and installing work per year.

It is necessary to provide at each workplace and in each brigade and section a high level of engineering preparation and an active creative search by engineers, technicians and innovative workers for production reserves, to aim their efforts at more effective use of mine equipment and labor resources, and to reduce labor-intensive operations, especially manual and heavy physical work.

It is recommended that brigades and individual personal accounts of savings be established, that the conclusion of agreements on mentorship, which will help to bring laggards up to the level of advanced workers, be organized everywhere, and that the competition of brigades of interdependent workers be developed in all possible ways under the motto, "The partner in work needs the maximum favorable conditions for highly productive work."

The USSR Minugleprom Board and the Presidium of the Central Committee of the Trade Union of Coal-Industry workers' express confidence that all the industry's workers will follow the example of these collectives and will make a worthy contribution to the matter of successfully fulfilling 1984 plan tasks and socialist commitments.

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COAL

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EXHIBITS AT INTERNATIONAL COAL-MACHINERY SHOW DISCUSSED

Moscow UGOL' in Russian No 3, Mar 84 pp 9-11

[Article by V. P. Gerasimov, Deputy USSR Minister of Coal Industry: "The Results of the Ugol'-83 Exposition"]

[Text] The Second International Exposition, "Equipment, Machines, Instruments and Means for Automation of the Coal Industry"--Ugol'-83.

The Second International Exposition Ugol'-83, in whose work 109 companies and organizations of Hungary, the GDR, Poland, the People's Republic of China, the USSR, Yugoslavia, Czechoslovakia, Austria, Belgium, Great Britain, India, Italy, Canada, the USA, Finland, the FRG and Japan participated, was held from 27 August to 10 September 1983 at Donetsk. The exposition was attended by 557,000 people.

The Soviet Union presented the largest number of models and instruments. More than 120 enterprises of 25 ministries and agencies showed 400 exhibits, including: equipment for protecting labor, mine-safety equipment, breakage-face equipment, tunneling equipment, equipment for strip mining, modern means for automation and communications, equipment for coal preparation plants and equipment for mine rescue and fire protection.

Equipment that was created as a result of scientific and technical collaboration of the socialist countries, the use of which at CEMA-member country enterprises helps greatly to improve the technical and economic indicators of coal-industry operation, was widely displayed.

The exhibition's Organizing Committee, the USSR and UkSSR Ministries of Coal Industry, jointly with ministries and agencies participating in the exhibition, did much work, with the cooperation of the VO [All-Union Association] Ekspoztsentr of the USSR Chamber of Commerce and Industry, the GKNT [State Committee for Science and Technology] and Minvneshtorg [Ministry of Foreign Trade], to choose the exhibits, prepare for and hold the exposition, evaluate the technical level of the displays, purchase more modern instruments, machinery and equipment, and sell domestically produced products.

During the exposition, Soviet foreign-trade associations and organizations concluded contracts with foreign firms and enterprises at the Minvneshtorg

Commercial Center. The USSR Chamber of Commerce and Industry and the exposition's Organizing Committee awarded certificates to more than 150 enterprises and organizations that participated in the Soviet exposition.

In order to prepare for and to conduct the Ugol'-83 exposition, the Scientific and Technical Center, which consists of a buro and 18 sections that included leading specialists of the industry, was created as a working organ of the Organizing Committee.

A symposium was conducted at the exposition, at which 29 reports were heard--6 by Soviet and 23 by foreign specialists, and 15 reports by foreign firms were presented through the USSR Chamber of Commerce and Industry. More than 2,000 specialists took part in the symposium's work.

The general direction of development of equipment for open-cast coal mining in the USSR and foreign countries that have a developed coal industry coincide. The equipment for open-cast mining made by foreign firms was presented at the exposition basically in models and prospecti. Full-scale models and operating models of equipment were displayed in the Soviet division.

Foreign firms paid great attention to reducing time for servicing machinery and to raising their reliability. According to the Krupp (FRG) company's data, continuous-action stripping equipment should operate 5 days during a 7-day week, including only one shift for preventive maintenance. Acceptance and turnover of the shift is performed on the run. Mining equipment operates 6 days, with one off-work day per week, and there is one shift for preventive maintenance. A machine can operate 5.5 days without stopping.

A family of high-powered 680-W dragline excavators of the Bucyrus-Erie (USA) company, the design of which calls for a sharp reduction in time for erection and the complete exclusion, in this case, of welding operations, as a result of the bolted joints of module sections, was presented at the exposition.

The development of equipment for drilling blastholes is going the route of increasing the equipment's diameter and drilling speed. The drilling equipment of foreign companies has a high degree of unification of components and parts, which enables the production of a frame for one model for drilling holes of various diameters and depths at least cost.

Drills with electric drive instead of diesel drive, and thyristor drive instead of bulky generator-motor installations, are finding increasingly greater use in foreign practice.

Attention should also be paid to the fact that domestically produced stripping excavators have a power capability per unit 10-50 percent higher than similar types of excavators produced in the GDR. However, the reloaders manufactured in the GDR weigh less than similar domestically produced reloaders.

Domestic apparatus for automating the reporting of excavator operations that was displayed at the exposition and which provides for the transmission by radio of digital central-control type data, and also an equipment complex for central control of a strip mine, provoked great interest on the part of foreign specialists.

Domestic equipment for making mine excavations was represented by three tunneling cutter-loaders of the GPKS, GPK-2 and 4PP-5 types, along with drilling machines, and the MPK-3 rock-loading machine, which has side unloading of the shovel, and other machinery.

Foreign tunneling equipment was displayed at the exposition basically in the form of operating models and mock-ups, and it also was advertised in the prospecti.

Among the Soviet displays, the 4PP-5 cutter-loader, with a rated power of 340 kW and 200 kW of power for working-implement drive, attracted the most attention from the specialists.

The self-propelled UBG-1r hydraulic installation, which was created by TsNII-podzemash [Central Scientific-Research and Design-Development Institute for Tunneling Machinery and Complexes for the Coal and Mining Industries and for Underground Construction] jointly with Avtomatgormash, provoked great interest among the specialists. Its distinguishing capability consists in programmed control of the location and direction of blastholes, with automatic regulation of the drilling mode.

Another interesting exhibit in this section was the B100-200 drill, which was intended for drilling degassing holes 100 and 130 mm in diameter and up to 200 meters long. The main constructional feature of the machine is the presence of a device for automatic extension of the drill shaft and remote control of the machine from a panel up to 40 meters away.

Among the equipment for mechanizing auxiliary operations, the self-propelled general-purpose Shtrek-5 machine should be noted.

An analysis of the tunneling equipment that was shown at the exposition indicated that it is necessary: to speed up work on creating reliable designs for medium-size and heavy type tunneling cutter-loaders with boom-type working implement and continuous tunnelers of lightweight structure, based upon rotary type cutter-loaders that weigh less than 150 tons and have a power capability of up to 700 kW, for enabling conversion to lateral development; to improve drilling and blasting technology for making excavations by the substitution of shovel-type loading machines and of machines with raking teeth for loaders, with side discharging of the shovel; to organize the output of toolbar equipment and lining placers; and to create equipment for erecting supports by the concrete-spattering method.

The exposition indicated that a trend in the development of designs for excavating cutter-loaders has been contemplated: the use of auger-type operating implements under a scheme for two augers on rotary reduction gear along the ends of the cutter-loaders permits the power capability of cutter-loaders to be increased up to 300 kW for excavating thin seams and up to 600 kW for digging medium-thickness seams; the cutter-loaders should be produced only with a chainfree mechanism. A trend toward increasing the operating front width to 1 meter is being noted and wide use is being made of electronic systems for diagnosing and for automatic control. Because of this, the mastery of serial production of RKU-10.25 cutter-loaders of a unified series should be speeded, to enable the technical level of breakage equipment to be raised sharply.

Among the shearing installations shown were models in which only individual components and installation members had been improved. There is a trend toward equipping shearers with roller supports, a trend that deserves attention and constructional analysis.

An installation for moving people along the longwall when thin seams are being excavated was of great interest.

In regard to mine-face flight conveyors that were shown at the exposition, increase in the drive's power capability, strength of the tractive component and reliability were observed. Simplicity of joining of the chutes and of the suspension equipment were characteristic of them.

Scraper conveyors with centrally located chains of 29-92 gage or 30-108 mm have been disseminated most widely abroad.

The mechanized supports in the Soviet section, which were manufactured by VPO Soyuzuglemash [All-Union Association for the Production of Coal-Industry Machinery] plants, were presented most widely and completely at the exposition. Thirty-two full size models of mechanized supports, as well as the 1KM-103, KMT, 1UKP, 2UKP and other longwall mining machines, for practically all mine-equipment conditions, were exhibited.

The designs of some supports made by foreign companies contained new technical solutions for various components. It should be noted that the supports have hydraulically separating parts at the overlaps of the sections, as a result of which full support of the roof is provided for. Five companies presented new electronic systems for controlling mechanized supports, a conceptual innovation, which were shown for the first time at the exposition. With a view to increasing the service life of mechanized supports, heat-treated rolled metal was used for metal structure.

Equipment for hydraulic coal mining was presented only in the Soviet section. The absence at the exposition of this type of equipment from other countries testifies that the world level of equipment for hydraulic mining is now defined by Soviet developments.

For underground transport, the PS-3.5-900 sectional train, which was shown in the Soviet section of the exposition, provoked great interest among the specialists.

An analysis of the exhibits shown at the exposition indicates the necessity to: speed up work on mastering conveyors that are assembled from unified modules and have a belt width of 800 and 1,000 mm; raise conveyor quality by using wear-resistant polymers, shaped section and more durable and better-quality fabric and rubber cable belts; increase the drawbar weight and traveling speed of underground mine locomotives; introduce automated control for rail transport; and expand the sphere of use of monorailways for hauling people. Foreign firms widely presented vulcanizing presses for joining and repairing conveyor belts.

Moreover, the exposition showed that much progress has been planned in the area of coal preparation, automation of underground mine equipment and production processes, communications, and equipment for safety and for improving the miners' working conditions.

A comparison of the machinery, equipment and instruments for the most important areas of technology and for mining coal that were shown at the exposition indicate that the technical level of domestic and foreign underground-mine equipment are approximately identical, that some types of equipment created in the USSR outperform foreign models. These are the 2UKP, KMT and 1KM-103 longwall mining machines, the K-103/3 and Poisk-2 cutter-loaders, a system for controlling cutter-loaders by means of infrared rays, the UBG-1r drill, equipment for hydraulic coal mining, liquid-filled electric motors for coal cutter-loaders, certain hydraulic equipment for mechanized supports, and so on.

The Ugol'-83 exposition exposed the results of many years of work by Soviet machinebuilders of the coal, automotive, electrical-equipment and other industries to create and produce equipment for the coal industry. At the same time, the most immediate task of the machinebuilders and workers of scientific-research and design-development institutes is to achieve a high level of quality of the whole complex of machines, instruments and materials for the coal industry. Collaboration with other countries, primarily socialist countries, should be aimed at solving these tasks.

A study by Soviet specialists of foreign coal machinebuilding and instrument-making and the technical literature, meetings of specialists, and lectures and reports enabled Soviet scientists and specialists to obtain a great deal of information that will enable domestic and foreign experience and the technical level of the underground mining equipment that has been developed to be evaluated and the basic directions for further improving the equipment and technology for mining coal to be improved.

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## NUCLEAR POWER

### NEWS FROM ATOMMASH

#### Planned Targets, Productivity Discussed

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Feb 84 p 2

[Text] The 1984 socialist commitments of the Volgodonskenergostroya Combine and its subcontracting organizations' collective are published in the No 7 (267) issue of "SOTSIALISTICHESKAYA INDUSTRIYA at ATOMMASH." Having taken a hard line on maximum use of its available reserves, the development of creative worker initiatives and acceleration of scientific-technical progress, the builders decided to complete the annual plan for turning over of commercial construction production by 22 December, Energy Day.

Their socialist obligations outline the growth of labor productivity by 1.2 percent above the plan and reduction of construction-assembly work cost by 12 percent. Builders have planned to put a number of plants into operation in the ATOMMASH factory through the output of comprehensive equipment for the AES [nuclear power plant] and to put 140,000 square meters of residences and a significant number of cultural-domestic projects into service.

The newspaper is continuing to cover the course of the USSR Supreme Soviet electoral campaign. The minutes of the 269th Volgodon Electoral District pre-election meeting of representatives from social organizations and labor collectives were published in the issue.

This year great changes have been introduced into the ATOMMASH repair service. Its structure has been improved and the circle of responsibilities of its subelements and the criteria for evaluating work activity have been changed. These issues are covered in an article by ATOMMASH PO [planning section] Chief Engineer L. Popov entitled "We Are Working In A New Way". The editor used this article to complete the "Introduction" series which ran in the paper.

In the issue correspondence from Z. Bibikovaya entitled "Bureaucratic Games" was placed under the rubric "To The Team Method--A Wide Road."

The paper is continuing to discuss the project of school reform by publishing the article "Master and Pupil" by V. Odintsov.

Kuz'ma Volgodonskiy offers readers humoresque "Kruzhkovets" and "Avral."



## Available Reserves, Problems Outlined

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Feb 84 p 2

[Text] People of the Volgodon met the CPSU Central Committee Appeal to all voters and citizens of the Union of Soviet Socialist Republics with unanimous approval. Work for the glory of the Motherland and the world is the main thought in the speeches of builders and workers in issue No 8 (268) "Socialist Industry in ATOMMASH." Having extensively opened competition in honor of the USSR Supreme Soviet elections, the foremost collectives adopted increased socialist commitments and successfully met them.

Under the rubric "An Effective Leader: His Role and Responsibility" there is an article by chief of ATOMMASH Cadre Section V. Slutskiy entitled "Reserves to the Forefront." In it the author thoroughly analyses the work done in the enterprise in developing management cadre.

"Socialist Industry in ATOMMASH" has often written about the problem of putting a 15,000-ton load on a giant press. Returning to this important topic in Z. Bibikovaya's correspondence "They Were Uncovered by Addition," the paper writes about the unacceptably slow preparation of equipment and the continuing downtime of the powerful press.

"Taming the Whirlwind" was the rubric over the correspondence from casing equipment plant lathe operator Yu. Rodchenko. The innovator tells about progressive methods of mechanically developing parts.

The paper is publishing a report by V. Suroyedovaya from the Volgodon Sports Flying Club, answers to critical correspondence, and a letter to Kuz'ma Volgodonskiy from chairman of the No 12 barracks soviet S. Shcherbakovaya entitled "It Does Not Spill Over the Commission."

### Relay Race Agreement Signed

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Mar 84 p 2

[Text] An open letter from "Energomashspetsstal". ATOMMASH workers offered to conclude an agreement of creative cooperation on the principle of "worker relays". The agreement was signed and specific ways of improving the delivery of products for ATOMMASH were outlined. A. Zornin's correspondence "Levels of Mutual Cooperation" tell how this cooperation is being done.

An article by the deputy general director of ATOMMASH, A. Litvinenko, entitled "Prepare for the Sowing" provides information about the successful preparation for spring work by a subsidiary economic collective and is under the rubric "Industry To The Village".

The paper is running an article by Chief of the Technology Department of Functional Cost Analysis A. Kazankov, "In the Moneybox of the Thrifty," and Kuz'ma Volgodonskiy offers the readers a humorous piece "What To Give As a Gift?" The answers to critical letters is in the issue and sports information is found throughout.

## Innovations, Delays at ATOMMASH

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Mar 84 p 2

[Text] The No 12 (272) issue of "SOTSIALISTICHESKAYA INDUSTRIYA at ATOMMASH" is publishing an article by the chief of Planning and Budget for the Volgodonskenergostroy Combine entitled "Helping The Innovators". In his article the author relates the interesting experiences of a public construction bureau which has patronage of innovators and inventors.

The paper is running the sharply critical correspondence from Z. Bibikovaya and V. Navozov, "The Last Day of the Month", which discusses the practice of addition which is still continuing in the enterprise. The authors write, "A lot is being said in Volgodon now about how it is necessary to return to the past glory of ATOMMASH. The truth is the truth, but you do not do it by addition."

What contribution are subelements of the Volgodonskenergostroy making to increasing the material-technical base of kolkhozes and sovkhoses in neighboring areas? Combine partkom instructor S. Tugushev answers this in his article "Improve Construction Tempo."

Putting a glavanic plant into operation is critical to ATOMMASH, but the project's success is being unjustifiably delayed. The reasons for this are analyzed by V. Lovyannikov in his article "Indefensible Defense".

An essay by N. Bakinaya about future factory workers, the Volgodon Pogudins, is being published under the rubric "ATOMMASH Worker--A Name to be Proud of".

The paper is publishing answers to critical letters, the Kuz'ma Volgodonskiy satire "Acts and Facts" and is introducing cultural and domestic news.

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## COMPRESSOR STATIONS

UDC 621.643:621.51.002.2

### METHODS OF LABOR COST REDUCTION IN COMPRESSOR STATION CONSTRUCTION

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 1, Jan 84 pp 11-13

[Article by R.P. Polyanskiy, Ministry of the Gas Industry, and M.S. Fedorov, USSR Gosstroy]

[Text] During the 11th Five-Year Plan the volume of compressor station (KS) construction is growing by a factor of more than 1.5 in comparison with the 10th Five-Year Plan. Even if the KS engineering decisions used at the end of the 10th Five-Year Plan were to continue to be used during this period, it would be necessary to utilize 27 million man-days more to cover the increased level of KS construction during this period.

What measures have been adopted to reduce the labor-intensiveness of the work and how effective are they?

The primary ones are the introduction in KS's of highly productive equipment and installations and gas-pumping units with a high capacity and a significant enlargement of the volume of equipment installation in individual unit boxes and containerized versions. Other important measures are an increase in the degree of plant finishing of equipment, structural parts and products delivered to the builders; standardization of planning decisions on the basis of standardization of volume-planning, design and engineering decisions; the use of progressive construction methods and effective forms of organization of the construction process that will insure an increase in labor productivity. A significant effect is being achieved by the use of the most economical construction, transportation and lifting facilities, which make it possible to standardize the set of machines and machinery in use.

In order to determine the effect of these factors on the labor-intensiveness of KS construction, special calculations were made.

The total labor costs for 1976-1980 were determined with the formula

$$\tau_{\text{tot}} = \sum_1^i \left( \tau_{\text{ks}} - \frac{1}{2} \Delta \tau_{\text{ks}} \right), \quad (1)$$

where  $\tau_{\text{ks}}$  = labor costs for a single KS, as computed according to the standards in effect on 1 January 1976 (according to construction organization plans);

$\Delta T_{KS}$  = reduction in labor costs because of organizational and technical measures, as determined for the entire period covered by the calculations;  $i$  = number of KS's constructed during the five-year plan.

It is the case that

$$T_{KS} = \sum_1^i T_{Ob} = T_{kt} + \sum_1^{i-1} (T_{Ob} - \Delta T_{Ob}), \quad (2)$$

where  $T_{Ob}$  = labor costs for the construction of each object and structure that is part of a KS;  $T_{kt}$  = labor costs for the construction of the compressor shop;  $i$  = number of objects and structures that are part of a KS;  $T_{Ob} - \Delta T_{Ob}$  = labor costs for the construction of KS objects, allowing for the introduction of organizational and technical measures reducing the labor-intensiveness of the construction of the given object alone.

Given standardization and unification of the planning decisions for KS's (particularly for the auxiliary objects and structures), formula (2) can be represented as follows:

$$\sum_1^{i-1} (T_{Ob} - \Delta T_{Ob}) = T_{aux} = \text{const.}$$

It is then the case that

$$\begin{aligned} T_{KS} &= T_{kt} + \text{const.} \quad \text{or} \\ T_{KS} &= \sum T_{kt} + \text{const.} \end{aligned}$$

For the conditions given, the labor-intensiveness of the construction of KS's depends on the labor-intensiveness of the erection of the compressors shops or the type of basic equipment that is used.

The theoretical conclusions were confirmed by labor cost calculations that were made for KS's with different types of basic equipment (see table on next page).

From the table it is obvious that gas-pumping units with an aviation-type drive that are delivered to KS's as complete units produce the greatest effect as far as reducing labor-intensiveness and make it possible, in comparison with the GTK-10-4, to reduce labor costs for the basic shop by a factor of 7, and for the complex of auxiliary objects by 20 percent.

Depending on the equipment that is used, the labor-intensiveness of the construction of compressor shops can change within wide limits and can be 20-60 percent of the labor costs for the erection of auxiliary structures, and for KS's with the GTK-10-4 can exceed them by a factor of 1.8.

During the 11th Five-Year Plan, provisions have been made to equip the KS's of the Urengoy-Pomary-Center and Urengoy-Uzhgorod (lines I and II) with gas-pumping units with increased capacity (the 16- and 25-MW GTN-25, GTN-16 and GPA-Ts-16 units). The installation of these units instead of the GTK-10-4 makes it possible to reduce: the construction area by 1.2 hectares (22 percent); capital investments in compressor shops by 2.8 million rubles (20 percent); cost of construction and installation work (SMR) by 1 million rubles (26 percent); metal-intensiveness of engineering communications by 39 percent.

Labor Costs for Construction of KS's

Оборудование (1)	Привод (2)	Трудовые затраты по нормативам действовавшим на 1.01.76, тыс. чел.-дней (3)	Снижение трудовых затрат за пятилетие, тыс. чел.-дней (4)	Трудовые затраты, подсчитанные по нормативам действовавшим на 1.01.81 (5)		$\frac{T_{kt}}{T_{aux}}$	$\frac{T_{aux}}{T_{kt}}$
				тыс. чел.-дней (6)	%		
ГТК-10-4 (7)	Газотурбинный (8)	150,0	19,0	131,0 (40,3)	100	1,76	0,56
ГТН-6 (9)		70,6	7,0	63,6 (38,3)	95	0,47	2,08
СТД-4000 (10)	Электрический (11)	49,2	4,0	45,2			
ГПА-Ц-6.3 (12)	От авиатурбин (13)	48,0	3,6	44,4 (31,4)	79	0,19	5,01
ГПУ-10 (14)	Газотурбинный (8)	91,5	7,6	84,9 (39,8)	99	0,61	1,61

Примечание. В скобках даны трудовые затраты на вспомогательные сооружения.(15)

Key:

1. Equipment
2. Drive
3. Labor costs, computed for standards in effect on 1 January 1976, thousands of man-days
4. Reduction in labor costs for five-year plan, thousands of man-days
5. Labor costs, computed for standards in effect on 1 January 1981
6. Thousands of man-days
7. ГТК-10-4
8. Gas turbine
9. ГТН-6
10. STD-4000
11. Electric
12. GPA-Ts-6.3
13. From aviation turbine engines
14. GPU-10
15. Note. Labor costs for auxiliary structures are given in parentheses

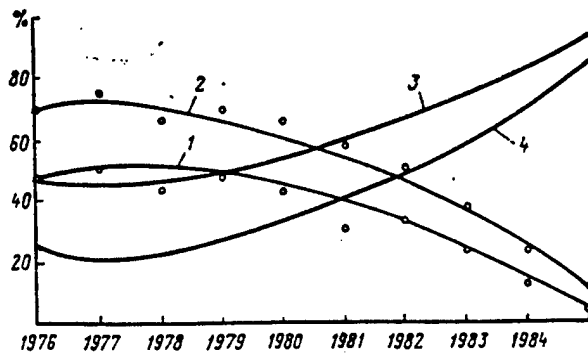


Figure 1. Dynamics of construction of KS's with new GPA's requiring lower labor costs for erection: 1. change in volume of KS construction with GPA-Ts-16, GTN-25 and others; 2. change in percentage of labor-intensiveness of construction of KS's with GPS-Ts-16 and GTN-25; 3. change in volume of KS construction with GTK-10-4; 4. change in labor-intensiveness of KS construction with GTK-10-4 units.

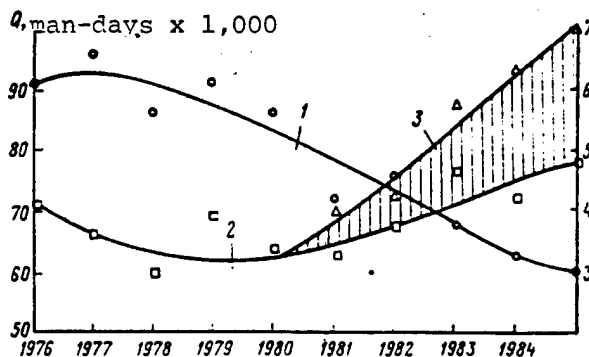


Figure 2. Effect of type of basic equipment, degree of industrialization and standardization on labor-intensiveness of KS construction: 1. change in average labor-intensiveness of construction of a single KS; 2. change in total labor-intensiveness of KS construction; 3. calculated values of total labor-intensiveness relative to the level achieved in 1980; hatched section indicates effectiveness of change in structure of basic equipment and new KS construction methods.

GPA-Ts-16 gas-pumping units, which are driven by aviation turbine engines and will be delivered to construction sites as containerized units, will be used extensively. In comparison with the GTK-10-4, the cost of construction of a compressor shop with these units will be reduced by 3 million rubles (30 percent), including 2.2 million rubles (by a factor of 2.1) for the SMR.

Because of the use of full-pressure force pumps (two-stage units instead of the previously used one-stage ones), the gas framework layout is simplified considerably and the use of thick-walled pipes is reduced. There is also a reduction in the labor-intensiveness of KS construction by 38 percent, with a total reduction in capital expenditures of 0.8 million rubles per KS.

An increase in the degree of industrialization of KS construction is being insured by the implementation of a number of measures. Among them are the use of packaged individual buildings and shelters with lightweight enclosure panels for GTN06, GTN-16 and GTN-25 gas-pumping units and containerized units for KS's with GPT-Ts-6.3 and GPA-Ts-16 units; later on, the latter will also be used for the GPU-10 and STD-12500 units. The use of unified structural solutions for the framing of two-stage force pumps of all types makes it possible to organize centralized production of units that have to be installed and semi-finished articles under plant conditions and in prefabrication and completion enterprises. A significant effect is being achieved by the use of auxiliary structures in blocs for multipurpose use that can have much of the finishing work done at the plant (warehouses for fuel and lubricant materials and methanol, water conduit and sewage structures, washers and

units for heating motor vehicles and others); the assembly of a production and power unit (PEB) from units of varying height, along with a distribution pipeline level; the introduction of a unified installation, as a complete unit, for the preparation of fuel and start-up gas. Other important measures are the elimination of "wet processes" in the construction of buildings and the laying of distribution pipelines and thermal networks on the KS site on low poles and scaffolding, using a heating cable for the pipelines transporting freezing liquids.

Calculations show that the change in the structure of the gas-pumping equipment, the introduction of industrial construction methods and the other organizational and technical measures during the 11th Five-Year Plan are resulting in a significant reduction in material-intensiveness, capital expenditures and construction time. This is making it possible to reduce the total labor-intensiveness of the work by 6-8 million man-days (Figures 1 and 2).

The planning organizations of Mingazprom [Ministry of the Gas Industry] and Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises], together with USSR Gosstroy's Glavgosekspertiza [Main Administration of State Experts], have completed the first stage of the work to standardize KS planning decisions utilizing different GPA's [gas-pumping unit].

The basic principle during the development of the planning decisions was "multiple" standardization, which makes it possible--regardless of the type of GPA being used--to obtain unified technical decisions for all installations, buildings and structures except for those related to the specific nature of the GPA's design (the compressor shop and GSM [fuel and lubricating materials] warehouse). In accordance with this principle, a unified, standardized, general KS plan has been created for all types of units; this plan is divided into production and auxiliary zones with a common set of buildings and structures that make it possible to increase construction site density by up to 45 percent. The standardized planning decisions insure a reduction in the type sizes of KS's and the elimination of different varieties of plans for KS's, assemblies and individual elements. The conditions are being created for centralized production and delivery of designs that are used repeatedly, as well as for minimization and standardization of the types of transportation and lifting facilities in use.

During the development of the standardized type KS plans, the advantages of new units were utilized to the maximum extent: high unit capacity, placement on the zero mark, a two-stage force pump, a high level of factory finishing, the possibilities of automation in an autonomous operating mode and remote control, and placement in separate shelters or containers.

The planning decisions provide for complete-unit delivery of KS's, utilizing standardized structural elements for buildings, boxed units, units and parts and semifinished parts for installation that were made under plant conditions.

The production services that provide the control over and power supply to the technological installations (operator, equipment, KTP [probably technological control point], battery and others), as well as a number of other auxiliary services, are situated in a single building (the PEB).

The auxiliary services--communication center, machine shop, garage, chemical laboratory, KIPiA [Control and Measuring Instruments and Automation] Laboratory and a number of other administrative and domestic areas--are grouped together in a service, operational and repair unit (SERB).

Allowing for the different conditions encountered in different areas where KS's are built, the SERB and PEB have been designed in two versions: frame panel (for all climatic regions) and complete unit (for the northern regions).

The external gas framing of the force pumps is done above ground. The oil, antifreeze and compressed air collecting mains and the heating lines are mounted on low posts. For complicated geological conditions, there are provisions for laying cable in ground-level gutters or on scaffolding, whereas under normal geological condition, cables are placed in underground conduits.

The planning documentation for the framing pipelines and reinforcement assemblies, GPA fuel- and starting-gas units, motor and force pump oil filters, pipe blanks and much other equipment have been developed with due consideration for their production under plant conditions.

The standardization of the planning decisions makes it possible to increase structure density by up to 45 percent (40 percent for the KS's on the Chelyabinsk-Petrovsk gas line) and reduce SMR volume and labor-intensiveness on a KS site (in comparison with KS analogs) by 12-15 percent for KS's with GTK-10-4 units and 35-40 percent or more for KS's with other types of GPA's. The metal-intensity of KS's is being reduced by about 800 t (11 percent) for KS's with GTK-10-4 units and 2,000 t (28 percent) for those with GPU-10P units.

By now, much has also been done to determine the optimum lifting and transportation facilities for the hauling of units and complete-unit installations.

Units and containerized units are transported from the producer plant and installed on the construction in a set sequence. All unitized installations are broken down into assembly groups. The work production plan establishes the installation relationship among the units in a group and among the groups. An assembly and installation work schedule is drawn up on the basis of this, and each group and unit is assigned a number that determines the sequence in which it is transported and delivered for installation at the construction site.

For KS's at which the basic equipment is installed on the zero level, special rigging devices that have been developed by NIPiOrgneftegazstroy [probably Scientific Research and Planning Institute for the Organization of Petroleum and Gas Industry Construction] can be recommended instead of heavy crane equipment.

The loading and unloading of unitized devices is accomplished with the help of collapsible (sectional) inclined scaffolding. The scaffolding has a set of stock sections that make it possible to collocate and combine loading and unloading areas of different heights. For instance, by using only a single section of sloping scaffolding, it is possible to carry out loading and unloading operations with a semitrailer, whereas if two sections are used, these



operations can be carried out in combination with a railroad platform or with trailers or airplanes.

The individual sections can also serve as transportation facilities, which makes it possible to combine the unloading and transportation operations.

The following method is recommended for unloading the heaviest units (such as gas turbine units) from motor vehicle trailers, railroad platforms, barges and other transportation facilities. The unloading platform and whatever form of transportation is being used are arranged so that they are parallel to each other. A lattice-type cage is set up between the vehicle and the scaffolding. Special unloading beams, which are joined together by plates at the points where they abut each other, are placed on the vehicle and the scaffolding. Guide skids are placed on the unloading beams. The beams' sliding surface is lubricated ahead of time with graphite or lubricant grease. Winches or skidding tractors are put in place. The cables of the winches (including the anchor winch) are attached to the units' rigging framework. The units are moved by two winches working together. The loading of unitized equipment onto transportation facilities is done analogously.

Heavy units weighing more than 40 t are pushed into place on the foundation with the help of winches, hydraulic jacks, tow tractors, or other special equipment.

The creation of self-unloading transportation facilities that combine the functions of transportation and installation of unitized devices on the zero level will help the further development of lifting and transporting facilities; other equipment being developed includes a transportation platform on an air cushion (The PVP-40) that has a lifting capacity of 40 t and a transportation and installation unit that can lift up to 30 t and will be used to install and remove unitized devices that are located in separate shelters.

The extensive use of standardized, complete-unit equipment in KS construction makes it possible to standardize the lifting machinery that is being used and create the prerequisites for a changeover to standardized work production plans for KS sites.

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## COMPRESSOR STATIONS

UDC 621.643:621.51.002.2

### USING FLOW-LINE METHOD OF CONSTRUCTION TO CUT LABOR COSTS

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 1, Jan 84 pp 13-15

[Article by Ye.I. Ivanov, Construction Engineering Institute, Tyumen': "Flow-Line Construction of KS's--A Reserve for Cutting Labor Costs"]

[Text] The results of an analysis of the planning decisions for compressor stations (KS) indicate the presence of reserves for improving the organization and technology of their construction.

It is a well-known fact that the flow-line construction of KS's can be accomplished only as a nonrhythmic flow<sup>1</sup>. Considering the complexity of the organization of nonrhythmic flows for the construction of KS's (because of the presence of a number of mutually dependent specialized operations), in the calculations we will assume the following conditions. Every process in nonrhythmic flows is carried out with its own variable rhythm, and the duration of the work in the flow is the sum of the durations of the processes. All the specialized adjacent flows are technologically interrelated in such a fashion that subsequent processes can be begun only when the work front is ready. In order to reduce the total duration of the construction process and save labor costs, it is necessary to bring all the specialized adjacent flows closer to each other; the point of the critical approaches of two adjacent flows is the provisional section of the model where a subsequent flow is begun after the completion of the preceding one in the section, in connection with which the calculation of the nonrhythmic flow is carried out with the help of a matrix algorithm.

Let us discuss this, using as an example the construction of a KS's compressor room. The basic construction processes are combined into separate flows, and the compressor room is divided into four zakhvatki [areas]. The results of an analysis of the work lying on the critical path of the network models that are formulated during planning are presented in the table.

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<sup>1</sup>"Instruktsiya po organizatsii potochnogo stroitel'stva nazemnykh ob'yektov v komplektno-blochnom ispolnenii (VSH 2-113--79)" [Instructions for Organizing Flow-Line Construction of Ground-Level Objects in a Complete-Unit Version (VSN [expansion unknown] 2-113--79)], Moscow, VNIIST [All-Union Scientific Research Institute for the Construction of Trunk Pipelines], 1980.

Compressor Room Construction Work Lying on the Critical Path  
of a Network Model (Example for Calculation of a Matrix)

Поток (1)	Захватка (2)	Продол- жительность, (3) дни	Начало работ (с дня) (4)	Оконче- ние работ (день) (5)	Трудоза- траты, чел.-дни (6)
Земляные работы (7)	I-СВП (8)	2	42	44	18
	II-КЦ	6	44	50	54
	III-КЦ(9)	5	50	55	45
	IV-КЦ	6	55	61	54
		<u>19</u>			<u>171</u>
Забивка свай (10)	I-СВП (8)	6	44	50	72
	II-КЦ	8	50	58	192
	III-КЦ(9)	7	58	65	168
	IV-КЦ	10	65	75	240
		<u>31</u>			<u>672</u>
Устройство фунда- ментов (11)	I-СВП (8)	6	50	56	288
	II-КЦ	10	56	66	480
	III-КЦ(9)	8	66	74	384
	IV-КЦ	12	74	86	576
		<u>36</u>			<u>1728</u>
Сооружение здания (12)	I-СВП (8)	12	56	68	576
	II-КЦ	25	68	93	1200
	III-КЦ(9)	21	93	114	1008
	IV-КЦ	27	114	141	1296
		<u>85</u>			<u>4080</u>

Key:

- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1. Flow                             | 7. Earth-moving work                 |
| 2. Area                             | 8. SVP [service and auxiliary annex] |
| 3. Duration, days                   | 9. KT's [compressor room]            |
| 4. Beginning of work (from day #..) | 10. Setting of pilings               |
| 5. Completion of work (day #..)     | 11. Placement of foundations         |
| 6. Labor costs, man-days            | 12. Construction of building         |

Using the technique recommended by G.E. Paraubek ("Matrix Description of Non-rhythmic Flows and Special Features of Their Calculation," Moscow, PROMYSHLENNNOYE STROITEL'STVO, No 12, 1978 p 39), a matrix of the algorithm for a nonrhythmic flow has been drawn up (Figure 1). For convenience in the calculations, the beginning of the work (the 42nd day) is taken as the origin of reading for the matrix. The value obtained in the last cell--100--will determine the final data of construction of the framework (42 + 100 = 142 days).

An analysis of the matrix shows the shifts in time between adjacent flows and in each area. This is the time of organizational interruptions or work front down time:  $\Sigma t_{org} = 60$  days.

The time shifts in areas III and IV, between the placement of the foundations and the construction of the compressor room's building and the service and auxiliary annex, which are 19 and 28 days, respectively, indicate the presence of reserves for shortening the construction period and reducing labor cost by implementing organizational measures. In order to investigate these possibilities with the help of the matrix, a cyclogram in horizontally linear form has been constructed (Figure 2). The intervals between the beginnings of adjacent flows are determined:  $2 - 0 = 2$ ,  $9 - 2 = 7$ ,  $15 - 9 = 6$ . Analogously, the intervals between the endings of the flows are found on the last line of the matrix.

Задача- ку (1)	П о м о щ ю (2)				$\frac{\sum t_i}{\sum t_i + \sum t_{опз}}$
	1	2	3	4	
I	0	2	9	15	$\frac{26}{27}$
	2	6	1	12	
II	2	8	15	27	$\frac{49}{52}$
	6	8	1	10	
	8	16	25	25	
III	8	16	25	52	$\frac{41}{65}$
	5	3	7	2	
	13	23	33	73	
IV	13	23	33	73	$\frac{55}{87}$
	6	4	10	12	
	19	33	45	100	
$\sum t_i$	19	31	36	85	$\frac{171}{231}$
$\sum t_{опз}$	7	4	4	49	



Figure 1. Matrix of algorithm for calculating a nonrhythmic flow: 1. shift between adjacent flows (number = magnitude of shift); 2. absence of a shift.

Key to Figures 1-4:

- 1. Areas
- 2. Flows
- 3.  $M_{sbl}$

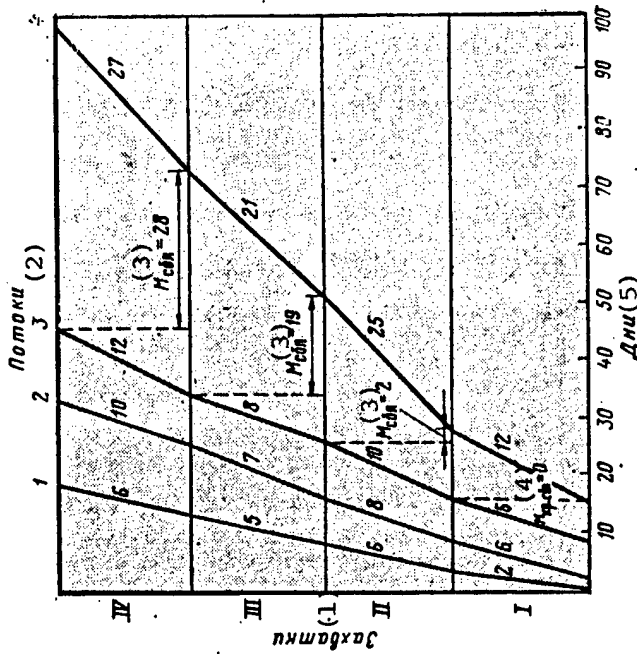


Figure 2. Cyclogram of nonrhythmic flows for construction of SVP and KTs building (points of approach are designated by conventional symbol  $M_{sbl}$  between third and fourth flows.

- 4.  $M_{kr.sbl}$  [critical approach]
- 5. Days
- 6.  $\Sigma t_{org}$

Захват- ки (1)	П о т о к и (2)				$\Sigma t_i$
	1	2	3	4	$\Sigma t_i + \Sigma t_{оп2}^{(6)}$
I	0 2 2	2 6 8	9 *1 6 15	19 *4 6 25	$\frac{20}{25}$
II	2 6 8	8 8 16	15 *1 10 25	25 12 37	$\frac{36}{37}$
III	8 5 13	16 *3 7 23	25 *2 8 33	37 *4 10 47	$\frac{30}{39}$
IV	13 6 19	23 *4 10 33	33 12 45	47 *2 14 61	$\frac{42}{48}$
$\Sigma t_i$	19	31	36	42	128
$\Sigma t_{оп2}^{(6)}$		7	4	10	149



Figure 3. Matrix of algorithm for calculating a nonrhythmic flow with consolidated assembly of SVP and KT's framework: 1, 2 = the same as in Figure 1.

tion of KS's can have different variants. Some of them are as follows. Division of the work front into a large number of areas in order to increase the degree of coincidence of processes (this is difficult because of the small area occupied by the room). Gradual assimilation of the work front in the next process before total completion of the preceding process in the area. Use of the principle of independence of processes: although, for example, it has been established that pipe framing, electrical installation work, sanitary engineering and other types of work depend only on the prior installation of structures and equipment, they do not depend on each other and can be done in parallel. The realization of processes of long duration in parallel, by two subunits, it being the case that it is advisable to check the effectiveness of this method on the matrix during the planning stage, since the different types of work being done in an area can have different degrees of labor-intensiveness and different distributions, so that there may be no efficiency but, on the contrary, the work completion data may be extended. At the same time, an analysis of many planning decisions shows that with the introduction of some progressive technological measures, such as consolidated assembly of the compressor room's building with a changeover from flat units to solid ones, by examining and organizing the consolidated assembly as an independent process (or with the use of super-large units), it might be possible to reduce the nonproductive labor costs  $\Sigma T_{Org}^i$  by an amount equal to about 1,176 man-days (24 x 49). In order to test these propositions, let us draw up a matrix of the algorithm for

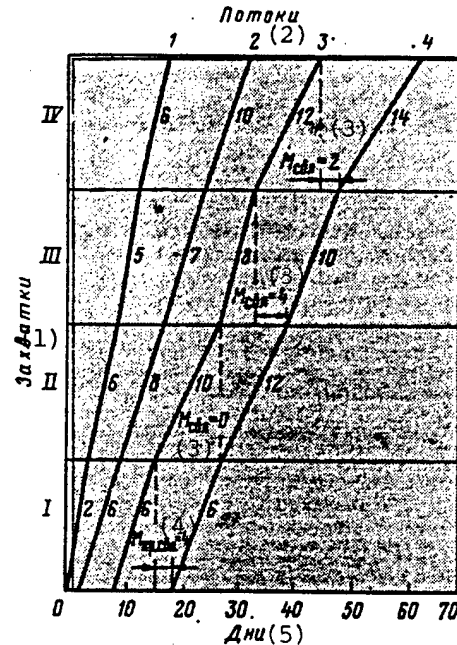


Figure 4. Cyclogram of nonrhythmic flows of construction of SVP and KT's building when consolidated assembly of framework is placed in a separate flow.

The possibilities for reducing the duration of organizational and technological interruptions during the construc-

calculating a nonrhythmic flow for the consolidated assembly of a compressor room and SVP (Figure 3). Here we assume the possibility of isolating consolidated assembly (when planning the three-dimensional structural units of the shelter) as an independent process taking place in parallel with the other flows. On the basis of the data obtained from the matrix a cyclogram is constructed (Figure 4). An analysis of the data indicates the feasibility of using the matrix calculation algorithm when evaluating the reserves for reducing labor costs during the comparison of different organizational and technological decisions for KS construction.

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GENERAL

GEOLOGY MINISTER DISCUSSES DEVELOPMENT OF EXPLORATION WORK

Moscow RAZVEDKA I OKHRANA NEDR in Russian No 3, Mar 84 pp 2-8

[Article by USSR Minister of Geology Ye.A. Kozlovskiy: "The Dynamic Development and Further Increase in the Efficiency of Geological Exploration Work"\*]

[Text] The December (1983) CPSU Central Committee Plenum, which wholly and fully approved the work of the CPSU Central Committee Politburo in implementing foreign and domestic policy, was an important event in the life of the Communist Party and the Soviet people. The Plenum approved in general the projects of the State Plan for Economic and Social Development and the USSR State Budget for 1984, and the Ninth Session of the USSR Supreme Soviet confirmed them. The confirmed plans comply with the Party's economic strategy, and in them are outlined the further dynamic development and increase in efficiency of national production and the growth of the people's well-being, and everything necessary to maintain our country's defense capacity at the proper level is specified. The State plan determined the tasks for further increase in mineral-raw material resources.

In 1983, just as in the three years of the five-year plan as a whole, the collectives of the geological organizations worked quite well. Substantial geological results were obtained, including that of carrying out the assignments of the USSR Energy and Food programs. A great deal was done to reinforce and expand the raw materials base of the oil and particularly of the gas industry. Completing exploration and affirming the reserves of a number of large deposits--Bovanenkovskoye and Yamburgskoye, by Glavtyumengeologiya, Astrakhanskoye by Nizhnevolzhskgeologiya and the Dauletabad-Dokmezkoye by the Turkmen SSR Administration of Geology--made it possible to fulfill ahead of schedule the five-year plan for growth and affirmation of gas reserves. The perspectives for the oil and gas content of Western Siberia, the Caspian basin and Eastern Turkmeniya were considerably expanded. Positive results were obtained in prospecting and evaluating oil and gas deposits on the Siberian Platform and in the Timano-Pechorskaya oil and gas bearing province.

The coal prospectors fulfilled all the established assignments for increasing the capacities and confirming the reserves explored in basic coal basins--Donetsk, Kuznetsk, Kansk-Achinsk, Yuzhno-Yakutsk and others. In the three

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\* Abbreviated text of a report at an expanded session of the Board of the USSR Ministry of Geology and the Central Committee of the Trade Union of Geological Exploration Workers

years of the five-year plan, exploration of 32 coal deposits with total reserves of 11.4 billion tons was completed, by virtue of which construction of mines and quarries with a total capacity of 156 million tons of coal per year is ensured. Fundamental reevaluation of the coal content of the Ulugkhemskiy basin in Tuva was carried out, showing its great perspectives.

Exploration of the extremely large deposit of chromic ore at Almaz-Zhemchuzhin has been completed. Work is being carried out successfully to establish the country's third manganese ore base in Kazakhstan. The raw materials base of the mining-enriching and mining-metallurgical combines of the USSR Ministry of Non-Ferrous Metallurgy at Rudnyy Altaysk, in Central Kazakhstan, Kirgiziya, Yakutiya, the Ukraine and other regions has been considerably strengthened. Large new mineral-raw materials bases for non-ferrous metallurgy—for copper, lead, zinc, molybdenum, tungsten and other minerals—have been prepared for industrial development.

Of great importance for the purpose of carrying out the assignments of the USSR Food Program is completing the exploration of large apatite deposits of the Rasvumchorrskiy and the Apatitovyy cirque on the Kol'skiy peninsula, high-quality phosphorites of the Gimmel'farbskoye deposit in Kazakhstan and also exploring large deposits of subsurface waters to irrigate arid lands and supply water for pastures. New deposits of phosphorites in Uzbekistan and Estonia, of apatites in Yakutiya and the Ukraine and of potassium salts in Eastern Siberia will contribute to an improvement in the geographical distribution of raw material bases for fertilizer production on the nation's territory.

As a result of geological exploration, the mineral-raw material base of many existing mining enterprises has been substantially strengthened, and the perspectives for the bases established, including those in the regions of the TPK [territorial production complex] being formed and outline, have been increased. In connection with the approaching completion of construction of the Baykal-Amur Main Line, revealing the large mineral-raw material potential in the zone of its transport-economic effect plays an important role.

In accordance with the assignments of the 26th CPSU Congress, geological exploration work is being developed at high rates. In the three years of the five-year plan, its volume increased by 20.4 percent, for capital investments for oil and gas by 26 percent, volume of deep drilling—by 15 percent, and for Glavyumengeologiya—by over 30 percent. Introduction of fixed capital in the three years rose 1.3-fold and of housing area—1.2-fold. The housing and cultural-everyday base of organizations and enterprises was considerably strengthened. Therefore, in the sector, just as on the whole for the national economy, positive movement toward increasing production growth rates has been outlined.

The plan for geological exploration work in 1984 is directed toward consolidating and developing the positive trends achieved in 1983, creating favorable conditions for fulfilling the five-year plan for all minerals and more efficient use and further strengthening of the production and scientific-technical potential. Particular attention has been paid to developing geological



exploration for oil and gas in Western and Eastern Siberia the Caspian Basin, the Timano-Pechorskaya oil and gas province and promising regions of Turkmeniya. Work is being continued on oil and gas in the Ukrainian, Belorussian, Uzbek and Tajik SSR's. As before, there are large tasks to expand the raw material bases in the regions of existing enterprises and prepare new bases for the TPK being formed and outlined. Growth of the reserves is specified for 17 minerals, and of them, for 4--iron ores, zinc, natural gas and apatites--with an increase in the assignments of the five-year plan in 1984. The volume of geological prospecting work due to all the financing sources in 1984 will be increased by 7.5 percent as against that fulfilled in 1983. Some 3,864,000 meters of deep-drilling wells should be drilled--8 percent more than in 1983, as well as almost 23 million meters of continuous coring wells, about 300,000 meters of underground mine workings are to be tunneled, construction-installation work amounting to over 270 million rubles is to be fulfilled, and about 480,000 square meters of total housing area, or 26 percent more, are to be put into operation. The assignments for the plan in 1984 are very stepped-up. From the first days of the year, in each labor collective the available reserves should be revealed and specific measures determined to ensure fulfillment and overfulfillment of the plan. Attention must be concentrated on the most critical problems, the so-called bottlenecks, on the solution to which the success of the matter depends.

Despite the indicated positive results of geological exploration, the overall state of work with respect to petroleum cannot be admitted as satisfactory. The organizations of the RSFSR Ministry of Geology have permitted lagging behind in fulfilling the plan for increasing oil reserves. The deep-drilling plan for oil and gas was fulfilled by only 94 percent by the USSR Ministry of Geology in 1983, and by the RSFSR Ministry of Geology--by 92 percent, and by the Kazakh SSR--by 97 percent. As before, many records with calculation of the reserves of oil and gas are of poor quality. The subdivisions established in VNIGNI [All-Union Petroleum Scientific Research Institute of Geological Exploration] and ZapSibNIGNI [Petroleum Scientific Research Institute of Geological Exploration in Western Siberia] to determine the oil-yield coefficients should be strengthened. In 1984 and 1985 greater assignments are specified for the growth and affirmation in USSR GKZ [State Commission on Mineral Resources] of the oil deposits explored. The situation is aggravated by the fact that a considerable number of oil reserves should be confirmed at deposits with complex construction, where work must be intensified to complete exploration, experimental-industrial operation and special research. The RSFSR Ministry of Geology, in conjunction with Glavtyumengeologiya and other geological production associations, should draw up a detailed program for plan fulfillment of reserve growth for each deposit, compile rigid schedules for all types of work and--the main thing--ensure their fulfillment. Oil and gas extraction organizations, above all the Novosibirskgeologiya, Tomskneftegazgeologiya, Vostsibneftegazgeologiya associations and the Tajik SSR Geology Administration, must work seriously on increasing the efficiency of oil and gas work.

The most important work assignments for oil and gas are: in Western Siberia--intensify prospecting and exploration of oil and gas deposits in the Lower

Cretaceous and also in Jurassic deposits, particularly in the northeastern regions and at deep horizons (more than 3.5 kilometers); in the Caspian basin--prospecting and exploration of deposits of oil, gas and condensate in subsalt deposits, completing exploration of the Permian-middle carbonaceous beds of the Karachaganakskoye deposit and estimate of the total scale of the Astrakhanskoye deposit; in the regions of the European north--acceleration and increase of deposit exploration efficiency; in Eastern Siberia--realizing the perspectives of the oil and gas content on the basis of increasing the efficiency of geological and geophysical work and increasing the volumes of deep drilling, and accelerating the evaluation of open oil and gas deposits, obtaining a growth in the reserves.

In a number of regions work is being carried out at inadequate rates with respect to iron ores for preliminary exploration of the Oktyabr'skoye deposit and for prospecting in the regions of activity of the Korshunovskiy Combine and Rudnogorskiy mine in Irkutsk Oblast and for prospecting-evaluation work in the Larbinskiy iron ore region of Amur Oblast. The efficiency of prospecting work in Gornaya Shoriya and Gornyy Altaysk is low. The Proozhinskoye manganese ore deposit in Krasnoyarskiy Krai is being explored slowly.

A major potential in increasing the efficiency of work on ferrous metals lies in eliminating these shortcomings. To fulfill the assignments of the five-year plan it is necessary to complete: exploration of iron ore deposits with total reserves of 3.8 billion tons, including, in 1984, for the deposits--Lebedinskoye in the KMA [Kursk Magnetic Anomaly], Tarynakhsokoye, Desovskoye and Tayezhnom in the Baykal-Amur Mainline zone; preparation of the third manganese ore base with confirmation of the reserves of the Ushkatynskoye (1984) and Zapadnyy Karadzhay (1985) deposits. The reserves of manganese ore deposits, Chiaturskoye in Georgia and Bol'shoy Tokmak in the Ukraine, should also be confirmed, and evaluation of new deposits in Arkhangel'sk Oblast and Novaya Zemlya be accelerated.

As has been shown, the raw materials base for non-ferrous metallurgy has undergone major reinforcement in the current five-year plan. At the same time, despite the measures adopted, so far there has been no solution to problems of improving the state of the ore base at a number of existing non-ferrous metallurgy enterprises: for copper--in the Central Urals, lead and zinc--in the Eastern Transbaykal region and in the Northern Caucasus and for high-grade copper-nickel ores--on the Kol'skiy Peninsula. Of course, discovering new deposits in these often prospected regions is not an easy task, but ways must be sought to increase work efficiency through using the entire store of the newest technical devices and methodological developments. The most important tasks of the forthcoming work are completing exploration of large deposits: Aydarlinskaya copper, Novo-Leninogorskiy and Maleyevskiy lead and zinc in Kazakhstan, Agaskyrskiy molybdenum in Krasnoyarskiy Krai, Kti-Teberdinskiy tungsten in the Northern Caucasus and Sobolinyy and Pravo-Urmiyskiy tin in Khabarovskiy Krai, for the purpose of expanding and reinforcing the raw materials bases of large combines, as well as completing exploration of deposits in new regions, including the Kholodninskiy lead and zinc deposit in the Baykal-Amur Mainline zone, etc.

In 1984 technical ore tests should be made and a constant condition TEO [technical-economic organ] established for the Seligdarskoye apatite deposit in Yakutiya and phosphorite deposits in Uzbekistan, and detailed exploration of apatite deposits--Novopoltavskoye in the Ukraine and Oshurkovskoye in Buryatiya, Nepskoye potassium salts in Irkutsk Oblast, Shevchenkovskoye native sulfur in the Ukraine and Ansayskoye barite in Kazakhstan should be continued and expedition work be intensified for natural sodium carbonate within the limits of the Khibinskiy mass, for bischofite in the Central Volga region, of non-traditional types of raw material for agriculture and mineral building materials in the non-chernozem regions. Prospecting and exploration for reserves of fresh, thermal and mineral subsurface waters must be expanded and sources explored for water supply of over 100 cities, workers' settlements and industrial and rural regions and hydrogeological substantiation be given of measures to reclaim land, as well as beginning advanced engineering-geological charting of the territories outlined for large-scale construction.

Exceptionally great attention is being paid by the CPSU Central Committee and the Soviet Government to problems of accelerating scientific-technical progress and rapid introduction into production of the achievements of science, technology and advanced experience. In the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures To Accelerate Scientific and Technical Progress in the National Economy" and the decree of the CPSU Central Committee "On the Work of the Ural Scientific Center of the USSR Academy of Sciences" the state of affairs was deeply and thoroughly analyzed, serious shortcomings were revealed and tasks were set for fundamental improvement in all the work in this sphere. The USSR Ministry of Geology has done specific work to concentrate the potential of scientific research organizations on solving basic problems and putting into effect comprehensive scientific-technical programs. In the three years of the five-year plan and in 1983 all the assignments of the State Plan for Economic and Social Development of the USSR for the science and technology division have been fulfilled. Putting into effect the measures for scientific-technical progress contributed to the successful fulfillment of geological tasks and improving the technical-economic indicators. With the participation of scientific research institutes --VSEGEI [All-Union Scientific Research Institute of Geology], TsNIGRI [Central Scientific Research Institute of Prospecting for Non-ferrous, Rare and Noble Metals], VIMS [All-Union Scientific Research Institute of Mineral Raw Materials] and others--predictive resources of minerals were approved both for the most important mining industry regions and for the country as a whole and directions of development were determined for the mineral-raw materials base in the 12th Five-Year Plan and the more distant future. This will make it possible to intensify the scientific substantiation of geological exploration work and to concentrate it on the most important directions and objects. VNIGNI [All-Union Petroleum Scientific Research Institute of Geological Exploration] and the Nizhne Volzhskiy Scientific Research Institute of Geology and Geophysics are giving important assistance to production organizations in evaluating the perspectives of the oil and gas content in the Caspian basin. Scientists from the Neftegeofizika and Soyuzpromgeofizika NPO [Scientific-Production Association] have taken a large part in exploring and calculating reserves of the

Yamburgskoye gas deposit in the north of Western Siberia. VIMS, TsNIGRI, KazIMS [Kazakh Scientific Research Institute of Mineral Raw Materials], IMR [Institute of Mineral Ores] and ZabNII [Transbaykal Scientific Research Institute] are carrying out in-depth study of the material composition and technical properties of the ores of the explored deposits. VIMS has designed semi-industrial units for radiometric concentration of ores, which make it possible to draw into the finishing work balanced ores of tin, tungsten, gold, cobalt, rare metals and boron, and to increase the carrying capacity of concentrating mills.

At the same time, a number of scientific research institutes are not participating sufficiently in introduction of their recommendations and have little concern for problems of large-scale prediction (VNIIGeolnerud [not further identified], KIMS [Caucasian Institute of Mineral Raw Materials] and VostSibNIIGGIMS [Eastern Siberian Scientific Research Institute of Geology, Geophysics and Mineral Raw Materials]). Often the organizations carrying out predictive research, do not take part in putting into effect the predictions (VSEGEI, DVIMS [Far Eastern Institute of Mineral Raw Materials] and VostSibNIIGGIMS). Efficient methodology for geological-geophysical prospecting of concealed and deep-lying deposits is insufficiently developed. Greater attention should be paid to coordinating scientific-research and subject work, by specifically linking the plans with the problems of increasing the efficiency of prospecting and exploration, development and introduction of methods for local prediction of ore fields.

Today, more than ever before, the activity of scientific research institutes and design buros should be subject to the problems of developing and reinforcing the country's mineral raw materials base, on the basis of raising the efficiency and quality of geological exploration work and improving the technical-economic indicators of the sector's work. It is a question of raising the scientific and technical level of developments and the scale of their introduction. A fundamental reorganization is required of evaluation of the activity of scientific collectives, planning, incentive, financing and introduction and monitoring their activity.

The services of geophysicists in revealing deposits of oil and gas, diamonds, iron ores and pyritic ores of non-ferrous metals is well known. At the same time, there are serious omissions in their organization and procedure. One of the reasons for this is the insufficiently close coordination of the entire research complex--geological, geophysical and others--at all stages of geological exploration production. Geophysical work should be planned and fulfilled in close contact and with coordination with other geological exploration work at all stages and in all links of the geological exploration process.

The December (1983) CPSU Central Committee Plenum posed a specific task--to achieve above-plan labor productivity increase by 1 percent and reduce the production cost of the output by an additional 0.5 percent. Included today in the movement to increase labor productivity by 1 percent and reduce the production cost of geological exploration work by an additional 0.5 percent are many organizations and enterprises in the sector, and among them--the Ukhtaneftegazgeologiya Association, initiator of socialist competition in 1984,

the Chernigovneftegazgeologiya, Vostkazgeologiya associations and others. All organizational work of economic, party and trade union organs should be aimed at this, as well as developing specific measures in all labor collectives.

In accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers "On Increasing the Efficiency of Utilizing Motor Vehicle Transport Means in the National Economy, Intensifying the Struggle Against Additions When Hauling Loads by Motor Vehicle Transport, and Ensuring the Safety of Inflammable Lubrication Materials", decisive measures should be taken for fundamental improvement in the organization, planning and calculation of motor vehicle transport work and for implementation of monitoring the efficiency of their operation. Constant work on efficient utilization of air transport is also necessary.

Despite the fact that in 1983 a 4.7 percent increase in the output of industrial products at the sector's plants was ensured, the state of affairs in this sphere is not satisfactory. Five plants of the Soyuzgeotekhnika Association failed to fulfill the plan for output and sale of the most important types of products. The plants fail to meet the deadlines for supplying equipment to the explorers of the earth's depths and items, in accordance with cooperation, for other enterprises of the sector. The quality of the items produced also causes serious anxiety. The problem of raising the shift coefficient of equipment in the national economy was posed sharply at the December (1983) CPSU Central Committee Plenum. This situation is unfortunate for us as well. In the Soyuzgeotekhnika Association the shift work coefficient of metal-cutting equipment is on the average 1.16, and of the forging and pressing equipment and casting equipment--0.6-0.76. At other plants of the sector and in large central workshops it is still lower. The problem of increasing the efficiency of their use emerges more and more critically in connection with the continual disruption of the computer equipment potential.

Utmost saving of material resources, particularly fuel-power, is an extremely important factor in production intensification. The ministry has established assignments for saving the most important types of resources, has set up commissions for economy, has intensified monitoring of the use of material resources, and resource-saving techniques and technology are being introduced in many types of work. At a number of geological organizations, however, the monitoring of a proprietary and cautious attitude toward material resources and the questioning of squandering and excessive consumption of materials and fuel are still inadequate. Certain norms and normatives do not always stimulate a cautious attitude toward resources. Stepped-up assignments for saving material resources were established for 1984. Each work collective must determine precisely which ways and methods are to be used to carry out these assignments. Particular attention should be paid to developing and introducing resource-saving technology and economical methods for performing the geological exploration work and to improving the use of fuel-energy resources through improving the norm-setting and establishing the proper order for storage, accounting, reporting and transport.

Increasing the production potential and improving the housing-everyday conditions depends directly on increasing the efficiency of capital construction.

In 1983, by virtue of all the financing sources, there were put into operation apartment houses with a total area of 800,000 square meters, which made it possible to improve housing conditions for approximately 80,000 persons, children's preschool institutions for 4700 places and the number of children in departmental preschool institutions was increased to 57,000. At the same time, the plan for construction and installation work and for the volume of housing construction and introduction of housing area was not fulfilled. The growth of unfinished construction continues. At the December (1983) CPSU Central Committee Plenum it was emphasized that what was needed was not explanations, but an actual improvement in construction matters--the key to success here, by the way, just as everywhere, lies in increasing the responsibility of the personnel, in high exactingness for them for irreproachable execution of their duties, precision and initiative and unconditional fulfillment of the existing tasks.... Fulfillment of the plans for construction of housing, schools, hospitals, children's preschool institutions and municipal and everyday projects should be demanded particularly rigorously.

In 1984 the volume of capital construction is increasing 1.5-fold as compared with that put into operation in 1983, introduction of apartment houses-- 1.2-fold and of objects for production purposes--1.5-fold. Efforts and resources must be concentrated at construction projects underway, for the purpose of unconditional ensurance of their being put into operation. Particular attention should be paid to fulfilling the plans for constructing and putting into operation apartment houses and social-everyday living purpose projects. The responsibility of operations directors and trade union organizations for the state of affairs in construction must be increased.

Last year the commercial service for geologists and members of their families was improved. Some 38.2 million rubles worth of goods more than in 1982 were sold. An agrarian sector was formed in the sector that has already sufficient resources and potentials for a further increase in the production of basic types of agricultural products. The level achieved for production of agricultural goods, however, still cannot be acknowledged as satisfactory.

The CPSU Central Committee and the USSR Council of Ministers regard an increase in the production of goods for national consumption and expanding the sphere of services as a unit with the Food Program as a central part of the social program, confirmed by the 26th CPSU Congress. The volume of output of commodities for national consumption in the sector's organizations in 1983 reached 43 million rubles. It remains to carry out work in shortened periods of time for compiling a Comprehensive Program for the Development of Production of Commodities for National Consumption and Service Systems for the Population.

Despite the measures adopted, the accident situation still remains intolerable. A number of organizations of the RSFSR Ministry of Geology, Ukrainian SSR Ministry of Geology, Soyuzgeotekhnika and Gidrospetsgeologiya have deteriorated in their work, have permitted an increase in accidents with serious consequences and have not reorganized work in the light of the CPSU Central Committee requirements. I wish to emphasize that the situation with respect to the state of labor safety practices in the sector is complex and requires specific actions, thoroughly thought out.

Fulfilling the resolutions of the 26th CPSU Congress on developing foreign economic relations, the USSR Ministry of Geology is implementing cooperation with foreign countries. In 1983, technical assistance in the field of geology was rendered to 30 foreign countries. Expanding the mineral-raw material base in the Mongolian People's Republic, the Republic of Cuba, Vietnam and other countries was the result of multilateral cooperation.

The CPSU Central Committee and the Soviet Government recently adopted a series of extremely important decrees, directed toward reinforcing State, planning and labor discipline, developing the brigade form of labor organization and improving socialist competition. The Law on Labor Collectives was approved. Practical realization of these resolutions in the sector's organizations and enterprises is already yielding positive results. On the whole for the USSR Ministry of Geology in 1983 the number of work absences was reduced by 12 percent and personnel turnover was reduced by 4 percent. At the same time, despite the measures adopted, in a number of geological organizations of the RSFSR, Uzbekistan, Azerbaijan and Moldavia, the state of labor discipline did not improve. Of great importance in the matter of strengthening discipline and raising the productivity and economy of labor resources are the introduction of the brigade form of labor organization, further improvement in its norm-setting and reduction of the labor-intensiveness of the work and attesting the work places to correspond with the rules of scientific organization of labor. The resolutions of the December (1983) CPSU Central Committee Plenum direct us toward this.

Many collectives completed 1983 with good results and fulfilled the socialist commitments. Among them were collectives of the Yuzhukrgeologiya, Uzbekneftegazgeologiya and Volkovgeologiya associations, the Sarydzhazskaya Expedition, etc. In the three years of the five-year plan, 162 drilling and mine-drifting brigades fulfilled the assignments for four years of the five-year plan, and 5 brigades for deep drilling and 13 for core drilling--five-year assignments. Permit me on behalf of the Board and Presidium of the Central Committee of the Trade Union to express gratitude to the collectives of the brigades for outstanding work achievements and to wish them new labor success in socialist competition and achievement of high milestones. It is also necessary henceforth to improve the organization of socialist competition from bottom to top, as is required by the decree of the CPSU Central Committee and the resolutions of the December (1983) Plenum.

In accordance with the resolutions of the December (1983) CPSU Central Committee Plenum, the USSR Ministry of Geology drew up basic measures directed toward ensuring fulfillment of the 1984 plan. The measures stipulated: concentration of geological exploration work on the most important directions and regions of the country; fulfillment and overfulfillment of the plan to increase and confirm mineral reserves; rise in the efficiency and quality of geological exploration work and its intensification; increase in labor productivity; reduction of the production cost of the work and fuller utilization of the production and scientific-technical potential; economical and efficient use of the fuel-energy and other material-technical resources. Important sections of the measures are development of capital construction, improving the administrative system, improving planning, increasing the effectiveness of economic levers and stimulus of the operative mechanism, etc. We envisage taking on the role and significance of geological supervision.

Work on improving the management of the economic system and a further rise in the work collectives' initiative is to be considerably activated. The system of planning and evaluating the indicators must be rearranged in such a way as to create the conditions for motivating the labor collectives to achieve high end results, increase labor productivity and a saving of all types of resources and reduce the cost of the work. A system of indicators should be developed to measure labor productivity of the main types of geological exploration work and the methodology of planning it. A clear-cut system must be formed for the administration of the geological prospecting work at all levels on the basis of information-dispatching service.

As was said at the December (1983) CPSU Central Committee Plenum, the most important factor is careful selection of personnel according to business and political qualities, training true production organizers and enterprising, talented workers. The benevolent attitude confirmed must be even more combined with high exactingness and adherence to principles. The ministry has implemented a number of measures to eliminate high turnover of supervisors, form a reserve and improve work with it, carry out comprehensive checking of the union republic ministries and administrations of geology, intensify monitoring of the supervisory workers' adherence to state and labor discipline and norms of socialist code of morals and improve the skills of the supervisory personnel. The management of a number of the sector's institutes has been strengthened. Many examples can be given of good work done by young supervisors, promoted to major independent work. Among them should be noted general directors of associations V.F. Dubinin, N.P. Tereshchenko and B.A. Nikitin--in the RSFSR Ministry of Geology, E.P. Malyarov--in the Ukrainian SSR Ministry of Geology, T.A. Akishev--in the Kazakh SSR Ministry of Geology and T.L. Babadzhanov--in the Uzbek SSR Ministry of Geology. The Board of the USSR Ministry of Geology is obliged to make the highest demands of supervisors of all ranks for strict adherence to State, plan and production discipline, for the results of the activity of organizations and enterprises and for the state of training work in the collectives. Carrying out the plans for 1984 and the five-year plan requires more deeply thought-out political and organizational work from the Board and central staff of the USSR Ministry of Geology, the boards of the geology ministries and administrations of the union republics and the sector's organization and enterprise staffs.

This August the 27th Session of the International Geological Congress will be held in the Soviet Union. The ministry has been entrusted with a large part of the organizational problems on carrying out the plan of measures to prepare for and conduct the congress. One of the complex and vital sections of the work is organizing scientific trips. The impression of the congress as a whole will depend to a great extent on how the trips are conducted. Therefore our task is to carry out their preparation at the highest level and think out everything, down to small details.

The present international situation is exceptionally tense and complex. A sharp aggravation, unprecedented in the entire postwar period, is taking place in the struggle of two social systems. The arms race unleashed by the United States is taking on an unprecedented scale and military expenditures are growing uncontrollably. The USSR Supreme Soviet, in the resolution adopted



"On the International Situation and the Foreign Policy of the Soviet State" gave a deep and thorough evaluation of the reasons bringing forth the present complication in the international situation and confirmed the immutable line of the USSR toward preserving and consolidating peace, repressing the arms race and expanding and deepening cooperation between states. This foreign policy act of the highest organ of state authority in our country confirms that henceforth the Soviet Union will follow the well-defined markers of Lenin's peace-loving course. All this creates the conditions for constructive peaceful labor and for realization of our plans.

Permit me on behalf of the Board and Presidium of the Central Committee of the Trade Union to express certainty that all the sector's work collectives will ensure fulfillment and overfulfillment of the planned assignments established for 1984, and will considerably strengthen the mineral raw material base of our native land.

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MINISTRY OF GEOLOGY SOCIALIST COMMITMENTS FOR 1984 REVIEWED

Moscow RAZVEDKA I OKHRANA NEDR in Russian No 3, Mar 84 pp 10-13

[Article: Socialist Commitments of the Collectives of Organizations and Enterprises of the USSR Ministry of Geology for 1984"]

[Text] By carrying out the historic resolutions of the 26th CPSU Congress and the November (1982) and June (1983) CPSU Central Committee plenums, the geological prospectors of the sector fulfilled the plan for 1983 for an increase in the reserves of most minerals and also the socialist commitments adopted. The five-year assignment for an increase in reserves of natural gas and apatites was fulfilled. The results of 1983 in many ways determine the work flow of the following years, and the collectives of the organizations and enterprises are filled with resolution to secure the successes achieved, to respond with practical work to the Party's call to work with high efficiency, reinforce work discipline and organization and to make efficient use of labor, fuel-energy and other material resources.

A new work upsurge was brought about among the geological prospectors by the decisions of the December (1983) CPSU Central Committee Plenum and the Ninth Session of the USSR Supreme Soviet, which confirmed the State Plan for Economic and Social Development of the USSR in 1984. Inspired by the resolutions of the plenum, the sector's workers developed organizational work directed not only toward unconditional fulfillment of the planned assignments, but also toward seeking and utilizing all potentials to overfulfill them.

The sector's work collectives gave broad support to the initiative of the geological prospectors of the Ukhtaneftegazgeologiya Association and other leading collectives in the country, and were actively included in socialist competition for above-plan increase in labor productivity, reduction of the production cost of the work, more efficient use of equipment and transport means, increase in their shift coefficient, introduction of scientific organization of labor at each work place, utilization of the existing production and scientific-technical potential with a high yield, reduction of labor input on the basis of improving its norm-setting, elimination of bottlenecks in the process of carrying out geological exploration work and reducing all types of waste. On this basis, having determined their potentials, the workers, engineering-technical personnel and office workers of the organizations and enterprises of the USSR Ministry of Geology adopted the following socialist commitments for 1984.

## Further Develop the Country's Mineral Raw Material Base

Overfulfill, having adopted a counter plan, without additional allocations, the five-year assignment for an increase in gas reserves by 28.5 percent and for affirmation in the USSR GKZ [State Commission for Mineral Reserves] by 17 percent, and also the plan for 1984 for a 4 percent increase in oil and gas condensate reserves and affirmation in the USSR GKZ by 1 percent.

Ahead of schedule, in 1984, fulfill the five-year plan for growth and confirmation of molybdenum reserves and the plan for confirming lead and zinc reserves.

Overfulfill the yearly plan for an increase in reserves--for iron ores by 5.7 percent, manganese--by 4 percent, chromic--by 2 percent, copper--by 2.5 percent, native sulfur by 4 percent, rock crystal--by 2 percent, and also capacities of coal sections by 2.5 percent.

Ahead of schedule, by the 67th anniversary of the Great October Socialist Revolution:

Complete the plan for four years of the five-year plan for increase in the prospected reserves of iron ores for the USSR Ministry of Geology;

Fulfill the five-year plan for increase in reserves of tin and molybdenum; for confirmation in the USSR GKZ of coal reserves for the RSFSR Ministry of Geology; for increase in the native sulfur reserves for the Ukrainian SSR Ministry of Geology;

Complete the planned assignment for four years of the five-year plan with respect to increase in prospected reserves of fluorspar and in capacities for coal sections for the RSFSR Ministry of Geology; for increase in natural gas reserves for the Uzbek SSR Ministry of Geology;

Fulfill the yearly plan for increase in tungsten reserves for the RSFSR Ministry of Geology; of copper, zinc and natural gas for the Kazakh SSR Ministry of Geology;

Confirm in the USSR GKZ above the yearly plan, prospected reserves of gas in the amount of 17 percent; 60 million tons of coal for the Ukrainian SSR Ministry of Geology and 32 million tons of coal for the RSFSR Ministry of Geology;

Turn over for industrial development three coal sections with a capacity of 5.7 million tons a year and 20 productive oil and gas wells for the Ukrainian SSR Ministry of Geology.

### Increase Labor Productivity, Improve Use of Material-Technical Resources and Overfulfill Work Volumes

Increase labor productivity above the established assignment by at least 1 percent and reduce the production cost of geological prospecting work in addition by at least 0.5 percent.

Obtain the entire increase in volumes of geological exploratory drilling and tunneling of underground mine exploration workings through increasing labor productivity.

Achieve above-plan increase in the rate of deep drilling for oil and gas by 3 percent, core-drilling by 1 percent and drifting underground mine workings by 1.5 percent.

Increase, as opposed to the level achieved in 1983, the average penetration per deep drilling brigade for oil and gas by 5 percent.

Overfulfill the assignment for increasing labor productivity at seismic prospecting works by at least 1 percent, and at the basic type of prospecting work in the World Ocean--deep-water sampling--by 4 percent.

Overfulfill the yearly plan for oil and gas drilling volume, having worked out one day for the material-technical resources saved in the course of the year.

Improve utilization of motor vehicle transport, increase the productivity of one average-listed vehicle-ton by 1 percent and through this, transport an additional 960,000 tons of freight.

**Accelerate Scientific-Technical Progress, Raise the Quality  
and Efficiency of Geological Exploration Work**

Analyze the reserve of structures for the main oil and gas-bearing territories (Western and Eastern Siberia) and make recommendations for the order of putting them under exploration (VNIGNI [All-Union Petroleum Scientific Research Institute of Geological Exploration]).

Prepare and turn over to Glavtyumengeologiya and the Tomskneftegazgeologiya and Novosibirskgeologiya associations before 1 June 1984 substantiation for prospecting oil deposits in the rocks of the Bazhenovskaya formation (SNIIGGIMS [Siberian Scientific Research Institute of Geology, Geophysics and Mineral Raw Materials]).

Draw up and introduce the "Manual for Controlling and Combating Manifestations of Hydrogen Sulfide When Drilling Out and Uncovering Gas-Bearing Beds," using the example of the Astrakhanskoye gas condensate deposit (VNIGRI [All-Union Geological Scientific Research Institute of Geological Exploration] and NVNIIGG [Lower Volga Scientific Research Institute of Geology and Geophysics]).

Study the qualitative characteristics of coking coals of the Ulughemskiy basin in the Tuva ASSR for their efficient use in the national economy (VNIGRIugol' [All-Union Petroleum Scientific Research Institute of Geological Exploration for Coal]).

Develop waste-free techniques for processing synnyrites with chlorine-free potassium fertilizers obtained as a by-product (VIMS [All-Union Scientific Research Institute of Mineral Raw Materials]).

Compile, two months ahead of schedule, a comprehensive research program to substantiate the state system of observation, prediction and monitoring changes in the hydrogeological and engineering-geological conditions due to tectogenic dislocations (VSEGINGEO [All-Union Scientific Research Institute of Hydrogeology and Engineering Geology]).

Submit, three months ahead of schedule, a geological-economic map of building material deposits in the Baykal-Amur Mainline region (ZabNII [Transbaykal Scientific Research Institute]).

Complete, a year ahead of schedule, construction of the first section of a hydrogeological model of the Crimea (VSEGINGEO and Krymgeologiya Association).

Increase the efficiency of prospecting-exploration work for oil and gas in Western Siberia, the Caspian basin and Western Kazakhstan, having ensured obtaining an economic effect amounting to 6 million rubles on the basis of using the newest versions of nuclear-physical, geoacoustical and geochemical methods of research (VNIIYaGG [All-Union Scientific Research Institute of Nuclear Geophysics and Geochemistry]).

Continue development and introduce into production a year ahead of schedule methodology for deep-water continuous photoprofiling—a new type of research in the oceans of the world.

Overfulfill the assignments established for 1984 to introduce new technical devices and advanced technology, including the use of nonexplosive sources of oscillations in seismic prospecting by 5 percent, digital recording and automatic processing of entries on an electronic computer by 2 percent, nuclear-geophysical methods of determining the elemental composition of rock and ore in natural occurrence by at least 3 percent, drilling deep exploratory wells for oil and gas using rolling cutter drilling bits with a sealed bearing by 3 percent, with synthetic diamond crown bits by 3.5 percent and with diamond instruments using high-frequency hydraulic hammers by 4 percent.

Introduce 130 inventions and 31,000 efficiency innovation proposals and obtain from them introduction of an economic effect amounting to 60 million rubles.

Develop, a year ahead of schedule, output of the new highly productive KGK-300 combination units to drill wells to a depth of 300 meters with hydrotransport of the core.

Ensure carrying out work of extreme importance for the sector, adopted by the collective of VITR [All-Union Scientific Research Institute of Methods and Techniques of Exploration] on the basis of a counter plan, to replace, in diamond rock-breaking instruments, cutting diamonds with synthetic ones and to introduce this instrument into production.

Turn over, three months before the established deadline, to the USSR Ministry of the Machine Tool and Tool Building Industry technical documentation drawn up at VNIISIMS [All-Union Scientific Research Institute of [not further identified]] for manufacturing synthetic monocrystal diamonds with increased durability for rock-breaking drilling instruments.

## Improve Production Organization and Economy of Labor and Material Resources

Ensure conditional release of 4650 workers through putting into practice the sectorial target Comprehensive Program To Reduce Manual Labor.

Increase the number of brigades working according to the brigade contracting method, for deep exploratory drilling up to 80 percent, for derrick construction up to 75 percent, testing wells up to 55 percent, core drilling up to 72 percent, mine exploration work up to 48 percent, for construction and installation work up to 8 percent of the total number of corresponding brigades and also the number of geophysical detachments and parties by at least 30 percent as compared with 1983.

Bring the number of brigades working at the level of sectorial milestones up to to 30 percent for deep exploratory drilling, to 35 percent for core drilling and for mine exploration work--to 35 percent of their total number.

Raise the shift coefficient of metal working equipment at the plants of the Soyuzgeotekhnika Association by 10 percent and in the central machinery and repair shops of the associations--by 5 percent.

Save additionally, as against the assignments specified by the plan for 1984 to reduce input of material and fuel-energy resources: 1200 tons of rolled ferrous metals, 10,000 tons of steel pipes, 7500 tons of cement, 10,000 cubic meters of timber materials, 25,500 tons of standard fuel and 28 million kilowatt-hours of electric power.

Drill, through material-technical resources saved, 50,000 meters of deep wells for oil and gas and 300,000 meters of core-drilling wells, and drift 500 meters of underground mining-exploration workings.

Produce 650,000 rubles above the plan of industrial goods at the sector's plants.

### Put into Effect the USSR Food Program

Overfulfill the plans for an increase in the reserves explored: phosphorites by 6.5 percent, apatites by 7 percent; including for the Kazakh SSR Ministry of Geology--phosphorites by 10 percent, for the RSFSR Ministry of Geology--apatites by 8 percent and for the Ukrainian SSR Ministry of Geology--apatites by 5 percent.

Ensure the carrying out, above the established plan, of comprehensive hydro-geological and engineering geological surveying for land reclamation over an area of 1000 square kilometers; confirm in the USSR GKZ and TKZ [Territorial Commission for Reserves] the deposits of subsurface waters, explored in four years of the five-year plan, to irrigate lands amounting to 6 million cubic meters/day, with the five-year assignment 7 million cubic meters/day; turn over to agriculture for operation 600 wells drilled in the process of geological exploration, and subsurface waters revealed that are suitable for use; complete

the compilation, above the established five-year assignment, of the correlating work, "Hydrogeological Substantiation of Agricultural Water Supply and Land Irrigation With Subsurface Waters".

Increase in subsidiary agricultural organizations and enterprises in the sector, as compared with 1983, meat production by 46 percent, milk by 87.1 percent, potatoes by 71.3 percent, vegetables by 54.4 percent and grain by 27 percent.

#### Improve Social-Everyday Living Conditions for the Workers

Put into practice labor conditions in accordance with the requirements and norms for labor safety, for at least 12,000 workers through mechanization of difficult, manual labor and through other measures.

Overfulfill the yearly plan for putting into operation total area of apartment houses constructed by virtue of all the financing sources by 1.4 percent, and places in children's preschool institutions by 1.9 percent.

Ensure additional production of goods for national consumption in all the republic geological organizations, and by means of this, at least double their output as compared with 1983.

Expand by 20 percent the assortment of goods for cultural-everyday and household purposes made from colored stone.

The labor collectives of the organizations and enterprises of the USSR Ministry of Geology assure the CPSU Central Committee that socialist competition will be developed even more widely for ahead-of-schedule fulfillment of the plan for 1984 and the 11th Five-Year Plan as a whole and that they will devote all their efforts, experience and energy to putting into practice successfully the resolutions of the 26th CPSU Congress and the following CPSU Central Committee plenums.

The socialist commitments were discussed and adopted in the work collectives of the sector's organizations and enterprises and were approved by the Board of the USSR Ministry of Geology and the Presidium of the Central Committee of the Trade Union of Geological Exploration Workers.

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GENERAL

BRIEFS

HOUSING CONSTRUCTION FOR KATEK--Sharypovo (Krasnoyarskiy Kray)--The first large-panel house building plant at KATEK [Kansk-Achinsk Fuel-Energy Complex] built in the center of the complex in Sharypovo has begun production. The product of the new enterprise--reinforced concrete panels and ceiling slabs--has been awaited by the KATEK construction workers with particular impatience. The largest fuel-power complex in the world is growing at rapid rates. Dozens of apartment houses are turned over for operation here every year. Formerly, the parts for them were brought in from a long way off. The experience of the best housebuilding combines in the sector has been taken into consideration at the new enterprise. For example, all the transport of fittings and insertion pieces from shop to shop is done on self-propelled trolleys moving along a rail track. This made it possible to release workers and considerably simplify the operation and repair of equipment. From the beginning of next year the plant will start manufacture of standard structures for five-story houses to build up new cities and workers' settlements at KATEK. [By Yu. Yudin] [Text] [Moscow TRUD in Russian 25 Dec 83 p 1] 12151

NEW ESTONIAN GASIFICATION CHIEF--The Estonian SSR Council of Ministers has named Vladimir Timofeyevich Busel Chief of the Main Administration for Gasification for the Estonian SSR Council of Ministers. The Estonian SSR Council of Ministers released Vsevolod Ampliyevich Generalov from his duties as Chief of the Main Administration for Gasification for the Estonian SSR Council of Ministers because of his retirement. [Text] [Tallinn SOVETSKAYA ESTONIYA in Russian 5 Jan 84 p 1] 12151

HOUSING FOR AES WORKERS--(Nikolayev Oblast)--Over 350 families of construction workers, power engineers and installation workers--the developers of the Southern Ukrainian AES--moved into new, well-appointed apartments in the first weeks of the new year. Here in the small city of power engineering workers in Yuzhnyy Bug, the new homes these days are also being procured in two dormitories for small families. A kindergarten for 320 places (the fifth by count), polyclinic and bathing-swimming pool combine received their first visitors. The new settlers have good words to say about the collectives and their shock-work to construct the social-cultural-everyday living objects--House Building Combine No 4, the Donbassenergostroy Mekhanizatsiya administrations and others. [By A. Nen'ko] [Text] [Moscow - SOTSIALISTICHESKAYA INDUSTRIYA in Russian 22 Jan 84 p 1] 12151



SHAMKHORSKAYA GES HOUSING CONSTRUCTION--Shamkhor--A new five-story apartment house has been turned over for operation of the urban type settlement of Kyur, where the power engineers of the Shamkhorskaya GES live. In it are 60 apartments with improved planning. In the time that has passed since the last elections in the USSR Supreme Soviet, a vast program for housing construction has been implemented in the rayon. A large microrayon has grown up next to Shamkhor. New housing for about a thousand families was acquired in the apartment houses constructed by using state funds. [Text] [Baku VYSHKA in Russian 12 Feb 84 p 3] 12151

MICRORAYON FOR MINE WORKERS--Chervonograd (L'vov Oblast)--A new microrayon has been designated for young people in the northeastern part of the miners' city, where the first hundred mining families of the Ukrzapadugol' Association have acquired new housing. The housing was granted out of turn to young miners who had achieved the best work indicators. Since the beginning of the year, over 300 miners, who started their work career recently, have obtained keys to well-appointed apartments. [Text] Moscow TRUD in Russian 27 Dec 83 p 1] 12151

OIL WORKERS' MOBILE POLYCLINIC--Nizhnevartovsk (Tyumen Oblast)--A mobile polyclinic has been organized in a young city of oil workers. Its first patients were drillers, geologists and construction workers of the fields at the Samotlorskoye deposit. The offices of the unusual polyclinic--dental, therapeutic--and the clinical laboratories were equipped on the base of a standard series bus. Similar services are being developed in many cities of the Ob oil region. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 14 Mar 84 p 1] 12151

UZBEK MICRORAYON HOUSING COMFORTS--(Uzbek SSR) (TASS)--A kindergarten was the next object in order of priority put under construction at the Shurtanskiy Gas Complex. It was built far from the fields, in the oblast center of Karshi, because all the service personnel of the complex are gradually resettling here. It was decided to extract Shurtanskiy gas by the special collective method. At the field they assembled dormitories from light insulating structures, installed air conditioners and drilled wells to supply water. In the city of Karshi a microrayon is being constructed, where all the conditions for normal living are provided for. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Feb 84 p 3] 12151

URENGOY DEPOSIT OUTPUT ACCELERATED--The Urengoy deposit today is the main supplier of gas in the country. At the beginning of January the Urengoy workers took on the commitment to give 850 million cubic meters above the plan during the year. Then, having weighed their potentials, they outlined a new milestone: to fulfill the year's commitments for above-plan extraction by election day for the USSR Supreme Soviet. A few days ago in the control room of the Tyumen'gazprom All-Union Industrial Association, this record was entered in the log: "500 million cubic meters of gas above schedule have been sent to the consumers." [By V. Demenev] [Text] [Moscow KOMSOMOL'SKAYA PRAVDA in Russian 24 Feb 84 p 1] 12151

KIRGIZ GAS SERVICE INCREASING--Natural gas has come to one more city in Kirgiziya--Kara-Balta. The workers of the republic's Ministry of Gas Industry constructed a gas branch pipe, a distributor station and other communications. The first gas consumer in the city was the Kara-Balta Carpet Combine, put into operation on the eve of the New Year. Today all the enterprises located south of the Frunze-Lugovaya railroad are obtaining gas. Next year municipal-everyday services are outlined for hook-up to the gas pipeline. [By B. Murzabekov] [Text] [Frunze SOVETSKAYA KIRGIZIYA in Russian 26 Jan 84 p 4] 12151

AUTOMATED CONTROL HELPS TURKMENIYA--Turkmen SSR--Specialists of the Turkmenneftegazstroy Association are developing an automated control system for construction of oil and gas fields. The mini-computer, with which the construction trusts are equipped, will gather daily extensive information on the state of affairs at the numerous construction areas scattered throughout Kara-kum. Data processed by the computers will enter the Central control studio by means of transmitting apparatus. Electronics will make possible prediction of the situation and adoption of efficient decisions. [By V. Gavrichkin] [Text] [Moscow IZVESTIYA in Russian 19 Feb 84 p 1] 12151

GEOLOGY DAY CELEBRATED--(TASS)--A ceremonial meeting, held on 30 March in Moscow, was dedicated to Geology Day. In the presidium were Candidate-Member of the CPSU Central Committee Politburo, Secretary of the CPSU Central Committee V.I. Dolgikh, First Deputy Chairman of the USSR Council of Ministers I.V. Arkhipov, Deputy Chairman of the USSR Council of Ministers B.Ye. Shcherbin, First Deputy Head of the CPSU Central Committee Department I.P. Yastrebov, directors of a number of ministries and departments, scientists, winners of socialist competition, exemplary workers in production and representatives of the community of the Capital. USSR Ministry of Geology Ye.A. Kozlovskiy gave a report. Participants in the meeting gave assurance that the sector's workers apply all their efforts, knowledge and experience for further improvement in work and successful fulfillment of the assignments of the five-year plan. [Text] [Moscow PRAVDA in Russian 31 Mar 84 p 2] 12151

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