

FOR OFFICIAL USE ONLY

JPRS L/10359

2 March 1982

# USSR Report

ENERGY

(FOUO 3/82)



FOREIGN BROADCAST INFORMATION SERVICE

FOR OFFICIAL USE ONLY

NOTE

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

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

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

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

COPYRIGHT LAWS AND REGULATIONS GOVERNING OWNERSHIP OF MATERIALS REPRODUCED HEREIN REQUIRE THAT DISSEMINATION OF THIS PUBLICATION BE RESTRICTED FOR OFFICIAL USE ONLY.

FOR OFFICIAL USE ONLY

JPRS L/10359

2 March 1982

USSR REPORT

ENERGY

(FOUO 3/82)

CONTENTS

FUELS

Oil Exploration in Central, Western Azerbaijan To Be Stressed  
(A. N. Guseynov, Sh. S. Kocharli; GEOLOGIYA NEFTI  
I GAZA, Oct 81) ..... 1

Safety Regulations in the Gas Service  
(N. S. Bersenev, et al.; PRAVILA BEZOPASNOSTI V  
GAZOVOM KHOZYAYSTVE, 1980) ..... 12

GENERAL

CEMA Fuel, Energy Problems  
(Anatoliy Ivanovich Zubkov; VOPROSY EKONOMIKI, Oct 81) ..... 15

FOR OFFICIAL USE ONLY

FUELS

OIL EXPLORATION IN CENTRAL, WESTERN AZERBAIJAN TO BE STRESSED

Moscow GEOLOGIYA NEFTI I GAZA in Russian No 10, Oct 81 pp 7-15

[Article by A. N. Guseynov and Sh. S. Kocharli (Azneft' [State Association of the Azerbaijan Oil Industry]): "The Main Areas for Prospecting and Exploration by the Azneft' Association During the 11th Five-Year Plan"; passages enclosed in slant-lines printed in italics]

[Text] The total area of Azerbaijan's land area that holds promise of being oil-bearing is 47,000 km<sup>2</sup> (or 54 percent of the total area). These areas are confined to the republic's lowlands and piedmont areas, and they include the following oil and gas bearing basins or depressions, which experienced intense submergence in Mesozoic-Cenozoic time: the Tersko-Caspian depression and the Caspian-Kuba area; the South Caspian depression and the Apsheron, Gobustan and Lower Kura zones; the Yevlakh-Agdzhabedi depression and the Kirovabad and Saatly-Geokchay zones; the Iori-Adzhinour depression and the Adzhinour zone; and the Kura and Iori interfluve (figure 1).

The indicated regions and zones are not identical in degree of exploration, promise of the sediments, or development of the resources. This was considered in the Integrated Design for Geological Exploration for Oil and Gas in the Transcaucasus for 1981-1985.

At the present time the most studied region is the Apsheron Peninsula, where the extent of exploration is 2,060 meters/km<sup>2</sup> and 0.7 km<sup>2</sup>/well.

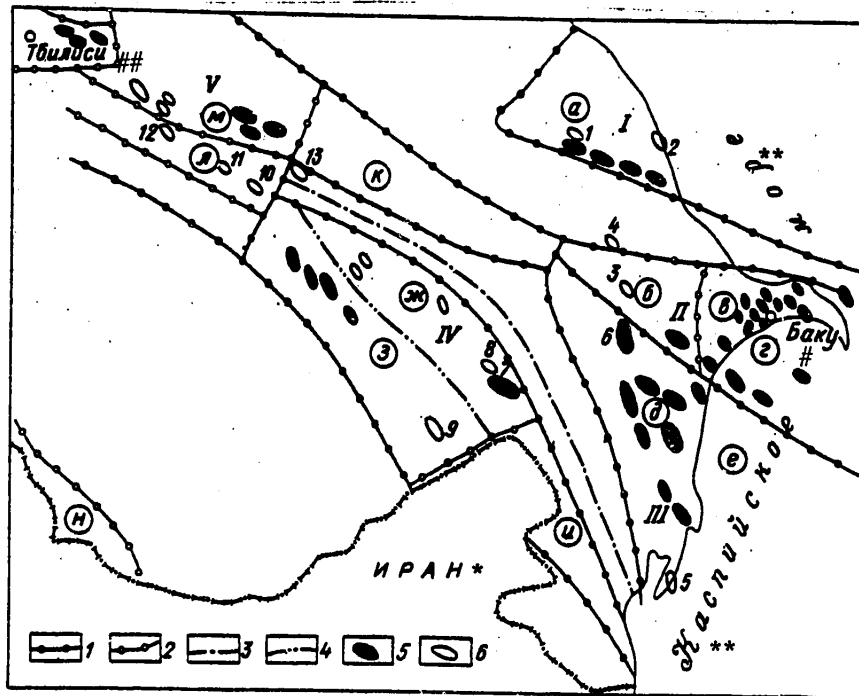
In the Lower Kura lowland and the Caspian-Kuba region, where the presence of oil and gas was established comparatively recently, the degrees of exploration are, respectively, 350 and 260 meters/km<sup>2</sup> and 8 and 7.6 km<sup>2</sup>/well.

As for the central and western regions of the republic, particularly the Kura and Iori interfluve and the Adzhinour district, their depths have practically not been studied at all with deep drilling. The degrees of exploration there are, respectively, 7 and 3 meters/km<sup>2</sup>.

Neither have the logs of individual oil and gas bearing regions been studied uniformly: thus, on the Apsheron Peninsula, about 99 percent of all drilling is at depths of less than 5 km, where Middle Pliocene (PT) deposits primarily have been developed.

FOR OFFICIAL USE ONLY

Figure 1. Scheme of the Oil and Gas Bearing Regions



Key:

\*Iran.  
 \*\*Caspian Sea.  
 #Baku.  
 ##Tbilisi.

1. NGO's [oil and gas bearing areas].
  - I. Northern Apsheron.
  - II. Gobustan-Apsheron.
  - III. Lower Kura.
  - IV. Yelakh-Agdzhabedi.
  - V. Iori-Adzhinour.
2. NGR's [oil and gas bearing regions].
  - a. Kusary-Divichi.
  - b. Shemakha-Gobustan.
  - B. Apsheron.
  2. Apsheron Archipelago.
  3. Lower Kura.
  - e. Baku Archipelago.
  - Ж. Muradkhanly, Saatly-Geokchay zone.
  3. Kirovabad.
  - u. Lenkoran'.
  - K. Adzhinour.
  - А. Kura and Iori interfluve.
  - M. Mirzaani.
  - H. Nakhichevan' (possibly oil and gas bearing).

Axial lines:

3. Mingechaur-Saatly-Talysh interbasin uplift.
4. Yevlakh-Agdzhabedi depression.
5. Oil and gas fields.
6. Local uplifts.
  1. Talabi.
  2. Agzybirchala.
  3. Leninabad.
  4. Astrakhanovka.
  5. Kyzylagach.
  6. Kalamadyn.
  7. Muradkhanly.
  8. Zardob.
  9. Sovetlyar.
  10. Tarsdallyar.
  11. Gyurzundag.
  12. Sazhdag.
  13. Adzhinour.

FOR OFFICIAL USE ONLY

## FOR OFFICIAL USE ONLY

In other oil and gas bearing regions, the share of penetration to the more ancient sediments is somewhat higher, although in the total balance it is still very low. The degree of development of oil resources in Azerbaijan's land area is 65.6 percent. However, this has been achieved thanks mainly to the degree of exploration of the resources of older regions, particularly the Apsheron Peninsula (96.7 percent). In the Lower Kura lowland the resources have been developed by 53.7 percent, in the Caspian-Kuba region by 45.6 percent, in the Saatly-Geokchay zone by 28.7 percent, and in Gobustan by 6 percent. In the Kura and Iori interfluvium and in Adzhinour the resources still have not been explored despite a positive evaluation of what is underground.

Recently the Azneft' Association executed a redeployment of exploratory drilling from the eastern regions to the less studied central and western regions. In so doing, the results of an analysis of the geologico-geophysical data and of an evaluation of the degree of promise of individual lithologico-stratigraphic complexes in the new oil-geology regionalization of promising ground were considered.

The preliminary results of exploration have confirmed the correctness of the chosen areas. Detailed exploration and introduction into development of the Muradkhanly field has created a new oil region in central Azerbaijan, the Zardob, Duzdag-Gedakboz and Kalamadyn fields have been discovered, and high promise for the presence of oil and gas in various areas of western Azerbaijan has been proved.

In accordance with the "Integrated Design," during the 11th Five-Year Plan prospecting and exploration will be accomplished in three main directions: the Mesozoic, the Paleozoic-Miocene and the Middle Pliocene.

During 1981-1985, 700,000 meters of exploratory hole are to be drilled.

Apparently the most effective direction of geological exploration during the 11th Five-Year Plan will be the Middle Pliocene. This proposition is associated with the fact that the exploratory drilling at discovered fields of the Lower Kura depression occupy the main place in the amount of penetration in the indicated direction, while in the other two directions, prospecting and appraisal drilling occupy the main spot because of the low degree of study of the new areas of the republic's central and western regions.

/In the Lower Kura lowland/ the oil and gas fields of Kyurovdag, Karabagly, Khilly, Neftechala, Mishovdag, Kyursangya, Kyursangya-South, Kalmas, Pirsagat and Kalamadyn were discovered in recent years in sediments of the Middle and partially of the Upper Pliocene, and they were introduced into development. Small deposits of oil and gas were found in various tectonic blocks in the Pirsagat, Byandovan, Bol'shoy and Maly Kharami, and Babazanan-Durovdag areas, and in other areas.

The log of the PT correlates well with the logs of the Apsheron Peninsula and the Dzheyrankechmesskaya depression. In the lowermost strata of the PT such sandy benchmark horizons as the XII, XV, XVII and XX (the suite of "discontinuity") horizons, as well as analogs of the NKP and PK suites of the Apsheron Peninsula, are being singled out.

Because of the multiple-formation nature of the PT, and also its great capacity and depth, these sediments are being explored individually in three stages: the first stage covers horizons I-VII, the second stage horizons VIII-XVII, and the third stage horizon XVII and below.

FOR OFFICIAL USE ONLY

The first stage exploration has now been basically completed, and deposits were found and are being developed. There remained the tracing of the deposits detected in the southwestern wing and the crest zone of the Karabagly and Kyurovdag areas and the crest portion of the Mishovdag field. The borders of the previously discovered deposits were greatly expanded in the southeastern direction during the later drilling of development wells in 1978-1980.

In 1978 the Kalamadyn oil and gas field was discovered in the northwestern side portion of the Lower Kura lowland during first-stage exploration of the PT. Four deposits that were established for the area at shallow depths (900-1,450 meters) must be promptly mapped and turned over for development.

Deposits of oil and gas previously discovered still have not been mapped for the second stage of exploration of the PT in the Kyurovdag, Karabagly and Kyursyanga areas. Yet this task is one of the basic ones to be fulfilled in order to carry out tasks concerning the preparation of oil reserves. However, because of the considerable lag in drilling work, it is being resolved extremely slowly.

The obtaining of an industrial flow of oil and gas from analogs of the suite of "discontinuity" (horizon XX) at the Pirsagat area has been the foundation for expanding prospecting and exploration in other areas of the Lower Kura lowland. It was established that in the areas of Mishovdag, Kyurovdag and Karabagly, horizon XX was represented by coarsely broken facies and by clayey sand in areas more to the southeast.

Oil gushers from horizons XX and XIX of the PT in the Neftechala area (holes 705 and 733) confirmed the industrial petroliferousness of the lower part of the PT log. Because of this, the 11th Five-Year Plan calls for a concentration of drilling here in order to prepare reserves and involve them most rapidly in development.

Geophysico-geological data also indicate that during the third stage of exploration prospects are high that oil and gas are present in the Kyursyanga and Kyursyanga-South areas, which are associated with deposits of oil and gas-condensate in adjacent areas of the Baku Archipelago. However, the practical execution of this task is possible where holes 6,000-6,500 meters deep are drilled.

The Kyzylagach area, which is the extreme southeastern element of the Kyurovdag-Neftechala zone, is also considered no less promising in the lower horizons of the PT. The drilling of prospecting hole No 10 at lower horizons continues in the area.

/The Saatly-Geokchay zone/ of uplifts embraces the northeastern side of the Yevlakh-Agdzhabedi depression.

During the Eighth and Ninth Five-Year Plans, a number of submerged Mesozoic structures that were grouped in the Saatly-Dzharly-Sorsor-Karadzhally and Mil'skaya-Muradkhanly-Zardob-Amirarkh folded belts were prepared here and introduced into seismic exploration.

In the Saatly-Karadzhal zone, which has proved to have few prospects for oil and gas because of the presence of a large discontinuity in sedimentation, from the Upper Cretaceous to the Sarmat inclusive, exploration for oil and gas has ceased.

FOR OFFICIAL USE ONLY

## FOR OFFICIAL USE ONLY

During 1974-1980 exploration was concentrated in the Mil'sko-Muradkhanly-Zardob-Amirarkh uplift zone. At the Muradkhanly field the petroliferousness of effusive formations that had previously been established in the crest zone was significantly expanded in the western and northeastern directions. According to drilling data and the operating and geological characteristics of the holes, it was established that the oil saturation of the effusive rocks changes sharply with area and cross-section; this change is apparently associated with the block structure of the area.

During the 11th Five-Year Plan the main tasks for prospecting and exploration drilling at the Muradkhanly field will be those of mapping the deposits of the Upper Cretaceous effusive Paleogenic formations that were found and of prospecting for new ones in carbonaceous rocks of the Upper Cretaceous, within the southwestern wing of the fold. The petroliferousness of the Maykop and Chokrak sediments will be assessed coincidentally.

In April 1981, the Zardob field, which is located to the northwest of the Muradkhanly area and has a geological structure similar to it, was discovered. The discoverer of the field was hole No 3, from which an industrial flow of oil was obtained by a formation tester from the 4175-4225 meter interval (the Middle Eocene member above the marl?).

The Zardob area was prepared for drilling by seismic exploration in 1968 and was introduced to drilling in 1971. However, an assessment of the area's petroliferousness has been hampered greatly because of the elimination of holes Nos 1 and 2 for technical reasons. In 1974 additional seismic work was performed here which refined the area's structure. Aside from an anticlinal trap in the southwestern wing, which faces the Yevlakh-Agdzhabedi depression, formations that lens out stratigraphically also are singled out in the log of Eocene sediments. Holes Nos 4 and 7, in which oil is being obtained from Eocene and Upper Cretaceous sediments, are now being completed.

An intensification of prospecting and exploration for the purpose of mapping discovered deposits, an assessment of the presence of oil and gas in the Lower Eocene and Upper Cretaceous formation, and the conduct of additional seismic exploration for purposes of refining the tectonics of the area, especially within the right bank of the Kura River, are called for.

It should be noted that a number of volcanogenic benches throughout Mesozoic sediments, which are of great prospecting interest, were discovered by highly precise gravimetric studies of the southwestern plunge of the Zardob-Muradkhanly zone that were conducted by the Southern Division of VNIPIgeofizika [All-Union Scientific-Research and Development Institute for Geophysical Operations]. These will be introduced to drilling as their structure is refined and the collectors in effusive and carbonaceous rocks of the Upper Cretaceous are developed.

To the northwest of the Zardob area is the Amirarkh structure, which has been prepared for drilling by seismic exploration for Upper Cretaceous carbonaceous formations. A fold has been superimposed on the monoclinally uplifted northeastern side of the Yevlakh-Agdzhabedi depression. The prime portion of the latter in the section that is being examined is represented by the huge Lyaki-Agdash Mesozoic uplift.

Eocene and Upper Cretaceous carbonaceous sediments have been discovered at hole No 2, which is situated in the crest portion of the structure. On sampling the



## FOR OFFICIAL USE ONLY

Middle Eocene marl member with a formation tester, oil with a flow rate of 20 m<sup>3</sup> per second was obtained. However, the engineering state of the hole did not permit this cross-section to be assessed.

The Integrated Design for Geological Exploration During the 11th Five-Year Plan calls for the institution here of a number of prospecting holes that will enable the question of the area's petroliferousness to be resolved unambiguously.

In the northwestern part of the Saatly-Geokchay uplift zone, aside from the Amir-arkh area, several submerged uplifts and benches (the Mursal'skaya, Garkhunlinskaya, Gedakkobi, Shakhsuinskaya and others) have been discovered by seismic exploration and are being prepared for drilling. They face the Yevlakh-Agdzhabedi oil and gas bearing basin and occupy a position that is suitable for oil and gas accumulation. The latter will be involved in drilling as new geological and geophysical data are obtained.

The West Garasuinskoye uplift was prepared by seismic exploration and introduced into deep drilling at the junction of the Saatly-Geokchay zone and the Lower Kura depression. Middle Pliocene and spreading Miocene-Paleogenic sediments have a finished structural shape here, at a time when the Upper Cretaceous (according to the seismic P horizon) sediments are marked by a monoclinial plunge in the direction of the Padarskiy fold.

/The Kirovabad Zone/ occupies the southwestern side portion of the Yevlakh-Agdzhabedi depression. The development of the small oilfields--the Kazanbulag, Mirbashir, Adzhidere, Naftalan and others--that were discovered in the northwestern part of the zone, in Maykop and Eocene rocks, has been suspended because of the wells' low productivity, and they have been mothballed.

During the 1970's the Eocene and upper Cretaceous sediments here were explored in the Shirinkum, Sovetlyar and Duzdag-Gedakboz areas. An oilfield (Eocene) with the same name as the latter was discovered in 1979.

During the 11th Five-Year Plan, in addition to the mapping of a deposit in the Duzdag-Gedakboz area, the Eocene-Upper Cretaceous sediments at the Sovetlyar, Shirvanly, Lemberan and South Agdzhabedi areas will be prospected and explored for petroliferousness.

/The Kura and Iori interfluve/ occupies the southwestern side of the Iori-Adzhinour depression, and it is characterized by a low degree of study underground. Previous geological-survey work and structural drilling found Oligocene-Miocene structures here. However, because of complicated seismo-geological conditions and the lack of deep-drilling data, the structure of the Eocene-Mesozoic sediments that held promise that oil and gas were present was not studied.

The promise of the Eocene-Upper Cretaceous sediments in the Kura and Iori interfluve is substantiated by the establishment of their petroliferousness in adjacent regions of the Middle Kura lowland (the Muradkhanly and Zardob areas on the east and the Samgori area to the west). An analysis of the actual data indicates that in the southern side portion of the Iori depression--the Kura and Iori interfluve and the Tbilisi region (the Samgori)--Middle Eocene rocks are represented primarily by the redeposition of coarsely fragmented formations (a horizon of "intricate stratification") and, in the Yevlakh-Agdzhabedi depression, by terrigenous carbonates (figure 2).

FOR OFFICIAL USE ONLY

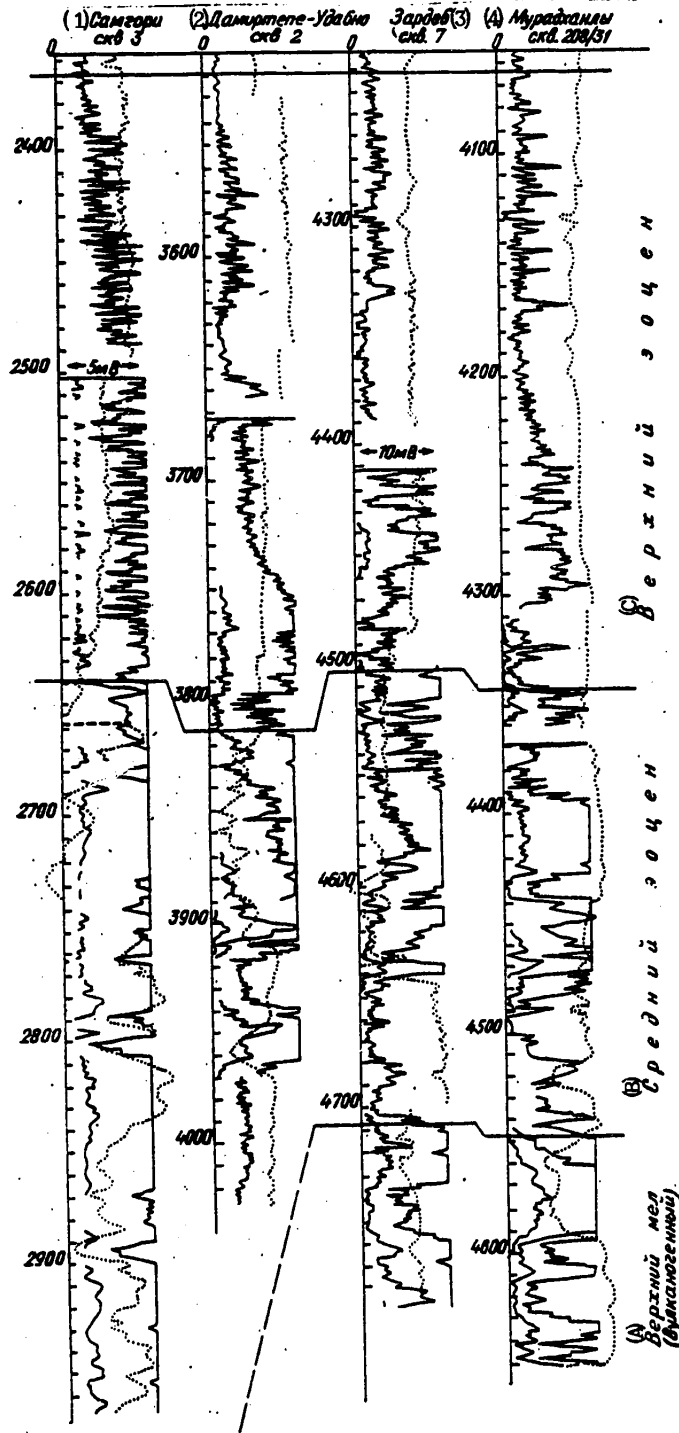


Figure 2. Correlation Diagram of the Upper and Middle Miocene Sediments.

Key:

- 1. Samgori hole No 3.
- 2. Damirtepe-Udabno hole No 2.
- 3. Zardob hole No 7.
- 4. Muradkhanly holes 208/31.

- A. Upper Cretaceous (volcanogenic).
- B. Middle Eocene.
- C. Upper Eocene.

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

During the 10th Five-Year Plan, in accordance with the program that is specified, geophysical research will be integrated with the drilling of a profile of appraisal holes and with the subsequent concentration of drilling in the promising areas. In particular, the profile of the Mamedtepe-Damirtepe-Udabno-Sazhdag-Armudlu holes was drilled over.

In the submerged portions of the depression, in the Sazhdag area (the Miocene-Oligocene complex) and the Armudlu area, where hole faces were 4,000-5,000 meters deep, the holes did not leave the Oligocene-Miocene sediments, after having established their great thickness, the presence of overthrusts and blankets and diapiric introductions of rock, and so on.

In the side portion of the depression an abbreviated thickness of Oligocene-Miocene and Paleogenic sediments and a comparatively shallow deposition of a surface of Upper Cretaceous rocks (2,547 meters) were recorded in hole No 1 in the Mamedtepe area. During testing of the hole, a nonindustrial flow of gas and oil from Upper Eocene formations was obtained.

Conditions are more favorable for the presence of oil and gas in the intermediate belt, in the Damirtepe-Udabno and Sazhdag (Mesozoic complex) areas. In the Damirtepe-Udabno area, Middle Eocene sediments--the horizon of intricate stratification, which is represented here by an alternation of terrigenous, carbonaceous and redeposited volcanogenic facies--were discovered in holes Nos 1 and 2. With discovery of the horizon, an intense absorption of the flushing fluid and oil and gas shows were observed, and the oil-bearing soils were uplifted. Oil with a flow rate of 5 m<sup>3</sup> per second was obtained in hole No 1 at the 4,095-4,011 meter interval. A log that was similar but 450-500 meters higher was discovered in holes 3 and 4 in the Sazhdag area, which had been prepared for drilling by seismic exploration. A concentration of prospecting drilling is called for, taking into account the new data from seismic exploration and drilling in the Sazhdag and Damirtepe-Udabno areas.

In the eastern part of the Kura and Iori interfluve, the Gyurzundag, Palantekyan and Molladag structures have been prepared for drilling by seismic exploration, and the Tarsdallyar, Western Gyurzundag and other areas were found and have been prepared. In the southern side portion of this region prospecting structural drilling is also being conducted with a view to preparing structures and solving regional tasks.

/In the Adzhinour Zone,/ where the log and deep structure for promising sedimental complexes remain completely unstudied, the drilling of appraisal hole No 1 was started, based upon Mesozoic sediments, in 1979.

Because of a thick buildup of pebble formations (1.5-2 km), geophysical methods of exploration, particularly seismic, proved not to be very informative here. Therefore, structural drilling into the complex, with geophysical methods of exploration, will be increased in the eastern part of the zone in order to resolve regional problems.

/The Dzhahalilabad region/ also is included in the poorly studied lands of Azerbaijan, although the prospects that it bears oil and gas have been confirmed by structural-prospecting holes previously drilled here. In order to study the log and the

**FOR OFFICIAL USE ONLY**

possibility of the presence of oil and gas in the Mesozoic and Cenozoic sediments, it is planned to lay down appraisal holes in the Shirinsu, Turmarkhanly and Agdash areas, and also to conduct geophysical operations of a regional nature, during the 11th Five-Year Plan.

/In the Gobustan-Shemakha region/ it has been established that oil and gas are present in the rocks of the Lower and Middle Miocene, in the central part thereof (Umbaki and Adzhiveli) and the Middle Pliocene to the southeast of the Dzheyran-kechmesskaya depression (the Duvanny, Dashgil', Kyanizadag and others).

Work was done here in southeastern Gobustan during the 10th Five-Year Plan for purposes of prospecting for deposits of oil and gas in the Oligocene and Miocene sediments and in central Gobustan, in order to study the log and the possible presence of oil and gas of the Mesozoic sediments.

After discovery of the productivity of the Chokrak sediments in the Duvanny area, and in consideration of the regional presence of oil and gas of Oligocene and Miocene deposits in the western Apsheron and in the Baku Archipelago (the Sangachaly-Offshore field), areas of Duvanny-West, Dashgil' and Solakhay were introduced to exploratory drilling. Despite the discovery of Miocene sediments through holes (hole No 60, Dashgil') that were characterized positively by cores and by electrical logging, industrial flows of oil and gas were not established. This was caused by the high degree of disturbance of the Miocene sediments (coals with a dip that sometimes approaches 80-90 degrees), by the erosion of their summits, and by partial destruction of the deposits. Because of this, during the 11th Five-Year Plan exploration work will be conducted at those areas where there are no sharp structural discontinuities and the sequence of the log is retained (the Duvanny and Eastern Cheilakhtarma).

In central Gobustan, holes that had been drilled in Mesozoic sediments in the Umbaki, Adzhiveli, Kelany and Nardaran-Suleyman areas, where the depths were 4,500-5,500 meters, did not emerge from the Oligocene-Miocene or Eocene rocks, after confirming the deep submergence of the surface of the Cretaceous formations. Therefore, it is planned that drilling in Gobustan will be conducted at the Sheytanud, Leninabad, Karadzhyuzly and Astrakhanka and other areas.

The poor informativeness of geophysical methods, particularly seismic exploration, tells negatively on the results of exploratory operations.

Exploration work on the Apsheron Peninsula, where PT resources are being fully explored, has been performed in limited amounts in the Miocene and Mesozoic sediments.

On the northern wing of the Karadag area (the southwestern part of the Apsheron) the borders of a previously discovered oil deposit in Miocene rocks was greatly expanded. A prospecting hole is now being drilled in the Bibi-Eybat area, and it is planned to sink new wells in the Kala, Puta and other areas.

Appraisal hole No 1 at Kyurdakhany in the northwestern Apsheron was drilled into Mesozoic sediments.

In this hole, the Upper Cretaceous rocks, which were represented by an alternation of clay and marl, primarily of flysh habit, without signs of oil or gas, were found

FOR OFFICIAL USE ONLY

at the 2,414-4,210 meter interval. The dip of the coal formations increased sharply with depth, from 30-40 to 70-90 degrees.

The sinking of new wells here depends upon the conduct of additional geological and geophysical studies.

/In the Caspian-Kuba region/ exploration went on during the 10th Five-Year Plan in the Tengino-Beshbarmak anticlinorium, the Siazan' Paleogenic monocline, and the low-lying part of the region.

The main work volume was concentrated in the Siazan' monocline, in order to trace discovered deposits in the northwestern direction. The borders of the deposits of Paleogenic sediments were expanded in area and depth when an industrial flow of oil was obtained in holes 1105, 1264, 1390 and others.

However, as a result of the strongly broken-up and forested terrain and the complexity of the geological conditions, exploration is going on slowly here because of the lag in the buildup of field facilities. Unsolved problems include the absence of a standard procedure for interpreting oilfield-geophysical data and substantiating the estimated parameters of the deposits for the steeply dipping collectors.

In the Tengino-Beshbarmak anticlinorium, drilling was conducted in the Chirakh-Kala and Chinarlar areas, where Cretaceous and Upper Jurassic sediments were discovered in carbonaceous-terrigenous facies. Since negative results were obtained, the sinking of new wells here is not planned.

In the foothills part of the region, in the Talabi-Kaynardzha area, work was performed at Paleogene-Miocene and Mesozoic sediments. The positively described log of Eocene rocks with signs of oil and gas discovered at Talabi's hole No 26 deserves attention and requires further study.

Appraisal hole No 1 of Agzybirchala, 3,558 meters deep, emerged from the PT into dense sandstones, aleurolites and argillites that hypothetically were of Jurassic age, and, from a depth of 4,700 meters to the hole face at 5,142 meters, dense magmatic rocks of the Triassic were found (217 millions years in absolute geochronology).

Aside from tracing the Siazan' monocline's deposits, exploratory work will be continued during the 11th Five-Year Plan in the Caspian-Kuba district in the Khudat, Sitalchay, Talabi and Agzybirchala areas (in the submerged sections). The conduct of exploratory work here will depend upon the results obtained in mastering the technology of drilling holes to great depths.

Thus, during the 11th Five-Year Plan, the main direction for prospecting and exploration for Azneft' Association will be the Paleogenic-Mesozoic in the republic's central and western regions.

With a view to raising the effectiveness of geological exploration in solving the geological tasks that have been set and of providing for the planned amount of growth of reserves, for purposes of stabilizing the Azneft' Association's level of oil recovery, the following are necessary:

FOR OFFICIAL USE ONLY

**FOR OFFICIAL USE ONLY**

1. To improve the quality and effectiveness of drilling work by improving the design of holes and the choice of optimal parameters of the flushing fluid, and to provide for high-quality discovery and testing of productive intervals.
2. To raise sharply the annual amount of exploratory drilling, bringing it up to 150,000-160,000 meters.
3. To develop a standard procedure for the preparation of structures in accordance with the data of field geophysical research in the Gobustan-Shemakha region, the Adzhinour region, and the Kura and Iori interfluve.
4. To develop a standard procedure for interpreting oilfield geophysical data on effusive, carbonaceous and finely alternating and steeply dipping reservoirs.
5. To redeploy drilling enterprises into regions of operation, and to provide for the full buildup of facilities in new areas that have been introduced into exploration.
6. To provide the Azneft' Association with equipment for drilling holes 6,000-6,500 meters deep.

COPYRIGHT: Izdatel'stvo Nedra GEOLOGIYA NEFTI I GAZA 1981

11409  
CSO: 1822/66

**FOR OFFICIAL USE ONLY**

FUELS

**SAFETY REGULATIONS IN THE GAS SERVICE**

Moscow PRAVILA BEZOPASNOSTI V GAZOVOM KHOZYAYSTVE in Russian 1980 (signed to press 20 Nov 79) pp 1-2, 166-168

[Annotation and table of contents from book "Safety Regulations in the Gas Service," edited by N. S. Bersenev et al., State Scientific and Technical Inspection of Mining of the USSR, Izdatel'stvo "Nedra," 475,000 copies, 167 pages]

[Text] The regulations provide for safe working methods in the construction and operation of gas pipelines, gas regulation points, and units and gas equipment in cities and other populated areas when gas is used by industrial and agricultural consumers, as well as public enterprises and enterprises of public utilities and social services. Safety regulations for the operation of liquefied gas-filling stations are presented.

The review of the regulations took into consideration the requirements of newly issued standards documents for the designing, construction and operation of gas supply systems and facilities, as well as the accumulated experience of operational and construction-installation organizations, and the suggestions obtained from the scientific research and planning organizations.

These regulations are not retroactive and cannot be applied in a control order to structures for previously active regulations and standards for gas pipelines and gas supply structures to evaluate their construction, manufacture of structural components, rated working pressure and testing.

With the publication of these "Safety Regulations in the Gas Service," the "Safety Regulations in the Gas Service" approved by the USSR Gosgortekhnadzor [State Scientific and Technical Inspection of Mining] on 28 October 1969 become ineffective.

The regulations have been approved by the USSR Gosgortekhnadzor and are mandatory for all ministries, departments and organizations that operate gas lines and gas equipment.

Developed by the State Scientific Research and Planning Institute "Gipronigaz," of the RSFSR Ministry of Residential and Communal Services.

Agreed upon with the AUCCTU on 16 November 1978, with the USSR Gosstroy on 16 February 1979.

**FOR OFFICIAL USE ONLY**

Approved by the USSR Gosgortekhnadzor on 26 June 1979.

Contents	Page
1. General Conditions	3
2. External Gas Pipelines	9
Special Requirements for Installation of Gas Pipelines Made of Nonmetal Pipes	17
3. Internal Gas Equipment	20
Industrial, Communal and Agricultural Enterprises	20
Public Enterprises and Enterprises of Public Utilities and Social Services (Communal-General Facilities)	27
Residential Buildings	33
4. Gas Regulation Points and Gas Regulation Units	38
5. Construction of Gas Pipelines	40
Pipes and Materials	40
Welding Operations and Quality Control	40
Insulation Operations and Quality Control	45
Electrochemical Protection from Corrosion	47
Gas Pipeline Testing	48
6. Gas-Filling Stations, Gas-Filling Points, Automobile Gas-Filling Stations	50
Gas-Filling Stations of Liquefied Gases	50
Evaporation and Mixing Units	57
Gas-Filling Points	57
Automobile Gas-Filling Stations	58
7. Cylinder and Reservoir Units of Liquefied Gases	59
Individual Cylinder Units	59
Group Cylinder Units	60
Reservoir Units	61
8. Gas-Dangerous Operations and Emergency-Dispatcher Service	63
9. Operation of the Gas Service	73
Acceptance for Operation of Facilities of Gas Supply Systems	73
Connection of Newly Built Gas Pipelines to Active and Turning On of Gas	74
Operation of Gas Pipelines	77
Special Requirements for Operation of Gas Pipelines Made of Nonmetal Pipes	82
Operation of Gas Regulation Points	84
Operation of Gas-Filling Stations, Gas-Filling Points and Automobile Gas-Filling Stations of Liquefied Gases	85
Firing	94
Special Requirements for Operation of Automobile Gas-Filling Stations	95



**FOR OFFICIAL USE ONLY**

Operation of Group Cylinder and Reservoir Units	96
Operation of Gas Equipment of Industrial, Agricultural and Communal Enterprises	98
Operation of Gas Equipment of Public Enterprises and Enterprises of Public Utilities and Social Services and Residential Houses	102
Operation of Devices of Automated Control Systems for Technological Processes (ASU TP)	106
10. Additional Requirements for Construction and Operation of Gas Supply System under Special Natural and Climate Conditions	108
Territories To Be Worked Over	108
Seismic Regions with Heaving and Sagging Ground	110
Appendices	111

COPYRIGHT: Izdatel'stvo "Nedra" 1980

9035

CSO: 1822/67

FOR OFFICIAL USE ONLY

GENERAL

CEMA FUEL, ENERGY PROBLEMS

Moscow VOPROSY EKONOMIKI in Russian No 10, Oct 81 pp 93-99

/Article by Doctor of Economic Sciences Professor Anatoliy Ivanovich Zubkov, chief of a department of the Institute of Economics of the World Socialist System of the USSR Academy of Sciences: "The Fuel and Energy Problem in the CEMA Countries"17

/Text One of the central places in the documents of the past congresses of the Communist and Workers Parties of the socialist countries and in the plans of social and economic development for 1981-1985 and the distant future is assigned to the solution of the fuel and energy problem. Much attention is devoted to the questions of the energy supply of the CEMA countries in the fuel and raw material long-range goal program of cooperation, which is intended to continue until 1990, as well as in the process of coordinating the national economic plans for 1981-1985. At the 35th meeting of the session of CEMA (1981) it was emphasized that the integration ties of the CEMA countries are playing an important role in supplying the national economy with fuel and raw materials.

The supply of the CEMA countries with fuel and energy is taking place under domestic and foreign economic conditions which are becoming more complicated. In practically all these countries the increase of fuel production and the development of power engineering require increasing investments, which are connected with the worsening of the conditions of the working of deposits, the increasing use of low-calorie fuel, the increase of the expenditures on environmental protection and so on. For the countries, which import fuel and power, the expenditures on their purchase have risen considerably as a result of the increase of the foreign trade prices and the need to participate in investment construction projects on the territory of the states which are suppliers of fuel and energy resources. The importance of the economical and efficient use of energy resources and the assurance of further economic development with the systematic decrease of the power-output ratio of production is increasing in this situation.

National programs or decrees of directorial organs, which orient the national economy toward the highly efficient use of fuel, energy and other material resources, have been adopted in the CEMA countries.<sup>1</sup> The set of measures on the saving of energy is a component of the national economic plans of these countries for 1981-1985. The measures in this area are aimed at the elimination of the unproductive and wasteful consumption of energy resources within the framework of the production technology already being used in the national economy. Along with this the retooling of a number of sectors and the introduction in them of an energy- and fuel-saving technology are planned. A considerable set of measures is also being

planned in the area of structural rearrangements and the updating of the products list in the directions of the limitation of the growth of some power- and fuel-consuming works and the preferential development of less power-consuming sectors.

Considerable allocations are being earmarked for the assurance of the economical and efficient consumption of fuel and power. The effectiveness of such investments is much greater as compared with the expenditures on the increase of the amount of additional energy resources. For example, in the GDR the assets being allocated for the efficient use of energy are from one-third to one-half of the expenditures connected with the increase of the consumption of energy resources.

The economical consumption of fuel and energy in the CEMA countries is being ensured by the introduction of revised standards, the limitation of the consumption of resources, the increase of economic sanctions, the raising of wholesale prices and the use of other levers. Thus, in Hungary the motor transport managements are obligated to pay from the profit a large fine for the deadhead run of heavy-duty trucks. In case of the evasion of this the fine is collected in 10 times the amount. In the GDR hundreds of new norms of the consumption of energy have been drawn up, which have gone into force as new standards. A decrease of the consumption of energy by evaporators by 14-35 percent, by equipment in ceramics production and baking by 15-17 percent and so on, for example, is called for by them. State limits of the consumption of energy and penalties, in conformity with which the users pay 10 times the amount for its excessive consumption, have been introduced here.

Measures of an organizational order, which ensure the efficient use of energy resources, have acquired primary importance. They include the setting of a differentiated temperature in buildings, regulate the consumption of electric power in the lighting of streets, roads and buildings, stimulate the consumption of power at the works and in housing and municipal services during the periods of the minimum load of the power supply network and so on. In transport the operation of worn out trucks is being reduced and the multishift operation of economical vehicles is being introduced, the fleet of official passenger cars is being reduced, norms of their total kilometers logged and operating time are being established, the maximum traffic speed on roads is being restricted. The retail prices for gasoline and the charge of fuel and power have been increased in a number of countries. The revision of the wholesale prices for fuel and energy is stimulating economic organizations to use them efficiently, and since in this case the prices for imported energy carriers are increasing more rapidly than the prices for domestic fuel, the stimuli for its preferential use are being increased.

Such a direction of the increase of the efficiency of the use of fuel and energy began to be used extensively in the late 1970's and is continuing in the 1980's. It does not require large investment outlays and yields significant results. At the same time the redistribution of energy resources among the sectors of the national economy yields the greatest results at the initial stage. Then these reserves can be reduced and their importance can be decreased, since the technical and technological bases are little affected when implementing these measures.

The introduction of new technology and equipment, which ensure the economical and efficient use of fuel and energy, is more capital-intensive than the above-examined measures. The development and introduction of energy-saving technology also require a long time. In the CEMA countries this direction has been developed

## FOR OFFICIAL USE ONLY

on a limited scale, but may become one of the basic directions in the 1980's and the more distant future.

During 1981-1985 the CEMA countries plan to continue the retooling of sectors on an increased scale, which will promote the further increase of the efficiency of energy consumption. The renovation of obsolete thermal electric power stations and the reequipment of industrial furnaces, boiler houses and other installations for the purpose of the most complete utilization of domestic solid fuel are envisaged here. A policy of decreasing the power-output ratio of products on the basis of the improvement of the design of items, the introduction of new materials and their substitutes and new technology, the use of secondary energy resources and so on has been adopted.

Technological modernization will become one of the factors of the saving of fuel and energy. In Hungary the annual saving of all types of energy resources by the end of 1981-1985 will be equivalent to the cost of 1.5-1.7 million tons of petroleum.<sup>2</sup> In the GDR during the current five-year plan it is planned to save 65-70 million tons of lignite.<sup>3</sup> In the CSSR by the end of this five-year plan the saving of energy resources in the national economy should come to not less than 12 million tons of conventional fuel.<sup>4</sup> In Romania the task is being set to save annually by the end of the current five-year plan more than 3 million tons of conventional fuel just by the increase of the cogeneration of thermal energy and electric power and the development of the central heating network.<sup>5</sup>

Whereas the organizational measures on the efficient use of fuel and energy to a considerable extent can be implemented by means of national efforts, in the case of the retooling of production, the development and introduction of energy-saving technology the greatest impact is achieved in the direction of the mutual cooperation of the CEMA countries. In this area definite achievements exist in a number of directions. For example, the use of the results of joint research on the development of highly efficient means of using gas and the creation of gas-using equipment, according to a preliminary estimate, is providing a saving of natural gas in all the CEMA countries, on the basis of the level of its consumption in 1980, in the amount of up to 10 billion m<sup>3</sup>, while up to 15.5 billion m<sup>3</sup> of gas are fed annually through the Soyuz gas pipeline from the USSR to the European CEMA countries.

Various forms of joint activity, which are oriented toward the elimination of losses of fuel and energy both during their production and during their consumption, can be mutually advantageous in a number of instances. For example, as a result of the operation of the joint society of Hungary and Poland, Haldex, it was possible to eliminate the coal-containing dumps in Silesia, which had accumulated over a century, and to obtain many millions of tons of high quality coal, as well as construction materials from the accompanying rock.<sup>6</sup>

An extensive set of measures on the development and production of the latest mining machinery and energy-saving equipment is outlined in the fuel and raw material long-range goal program of cooperation. Their implementation is opening new prospects of the intensification of socialist production by means of the further rationalization of the use of fuel and energy resources. At the same time the gradual and thorough retooling of sectors is a constant process. Having undergone considerable development, it will also be continued in the distant future. This process can be developed most successfully on the basis of a comprehensively coordinated technical strategy of the socialist countries.

In the future the structural rearrangement of the economy of the CEMA countries, first of all of the importers of fuel and energy, will act as one of the more and more significant factors of the efficient use of energy resources. The national economic complexes of these countries during the decades of their formation were built up as multisectorial complexes, having also included power-consuming works (chemical, metallurgical and others). During the period when fuel and raw materials were inexpensive, in most instances this justified itself. Now such a means of development burdens the economy, decreases its efficiency and leads to an increase of foreign indebtedness. A number of countries are faced with the objective need to set limits to the development of fuel- and energy-consuming works and to begin structural rearrangements in the economy, taking into account the new world situation in energy supply. This rearrangement can be accomplished during the further intensification of the international socialist division of labor and the development of the joint planning activity of the CEMA countries. Such an approach guarantees the supply of the markets of the socialist countries with the necessary products, including fuel- and power-intensive products.

The socialist countries have gained considerable experience in the coordinated and interconnected development of the structures of production, which can also be used successfully in the changed economic situation. For example, the cooperation of the USSR and Hungary in the development of the aluminum industry, which was expanded extensively in the 1970's, made it possible to increase the mining of bauxites and the production of alumina in Hungary and to increase in the USSR on the basis of Hungarian deliveries of alumina the production of aluminum and its export to Hungary. As a result in Hungary, which is experiencing a shortage of domestic energy resources, by means of such cooperation up to 2.4 billion kWh of electric power are being saved annually, which corresponds approximately to its expenditures for household needs.<sup>7</sup> The measures of the fuel and raw material long-range goal program of cooperation, which provide for the location of the production of high power-intensive products in the USSR and low power-intensive products in other socialist countries for their mutual exchange and the meeting of increasing needs, are promising.

The structural rearrangements in the national economy and first of all in industry are connected mainly with the change of the intrasectorial proportions, but subsequently they may also affect the intersectorial proportions. In 1981-1985 a number of CEMA countries in conformity with the new energy situation will begin to adapt their economic structures to the changing conditions of the supply of fuel and energy.

In Bulgaria the progressive structural changes in the economy are recognized as one of the primary economic problems of the current five-year plan, and in this connection the output of small-tonnage chemical products, electronic equipment and other relatively nonpower-intensive types of goods is undergoing leading development. Intraworks structural changes, which ensure the saving of fuel and energy, are envisaged in Hungary. In the GDR the investments to a considerable extent are being concentrated in a highly efficient industrial structure (microelectronics, the production of robots, electronic machine building and so on). In Romania the growth rate of fuel- and power-consuming works in metallurgy, the chemical industry and other sectors is being limited. A long-range orientation toward the decrease of the growth rate or even the volumes of the output of power-consuming products is planned in the CSSR.

## FOR OFFICIAL USE ONLY

The process of improving economic structures, particularly by the limitation of the development of power-consuming works, of course, does not eliminate the increase of the needs for the corresponding products. For example, the need for high quality steel, including electric steel, as well as for light-weight nonferrous metals, especially aluminum, will increase. Therefore the restriction of the development of such works in some countries, apparently, should be accompanied by their increase in others, owing to which the importance of the coordination of the national economic plans of the CEMA countries is increasing.

In the socialist countries economic growth depends to a greater and greater extent on the efficiency of the use of fuel and energy, and not only on the amounts of the commitment of their natural resources to the economic turnover. In the European CEMA countries (excluding the USSR) during the 1970's the average annual rate of decrease of the specific power-output ratio of the national income, according to our rough estimates, was 1.2-1.3 percent, while the average annual rate of increase of energy consumption was about 4 percent. Approximately 25 percent of the economic growth was provided by the decrease of the power-output ratio of the national income and 75 percent was provided by the increase of the consumption of fuel and energy.

Nevertheless during this period the reserves in the area of the efficient use of energy resources remained very significant. According to rough estimates, in the late 1970's the power-output ratio of a unit of national income of the European CEMA countries on the average exceeded by 30-40 percent the corresponding indicator of the leading EEC countries (the FRG, England, France and Italy taken together). Thus, in the CSSR 20-50 percent more energy resources were consumed per unit of national income than in other developed countries.<sup>8</sup> In comparison with the indicated four West European countries the specific power-output ratio of the national income was substantially higher in Bulgaria, the GDR and Poland, at approximately the level of these countries in Romania and slightly lower than this level in Hungary.

The analysis of the basic indicators of the development of the national economy of the European CEMA countries for 1981-1985 attests that approximately 30-40 percent of the increase of the national income will be provided by the decrease of the power-output ratio of a unit of national income and 60-70 percent will be accompanied by an increase of the consumption of energy resources. During the current decade the average annual rate of the decrease of the specific power-output ratio of the national income will be, apparently, not less than 1.5 percent, while in the GDR and the CSSR this decrease will be even more significant.

The economic development of the socialist countries, which is being ensured to an increasing extent by the economical and efficient use of energy resources, also presumes the further increase of the consumption of fuel and energy. However, whereas in the 1970's the average annual increase of the national income by 1 percent was due to the average annual increase of the consumption of primary energy resources by about 0.8 percent, during the 1980's the latter indicator may decrease to approximately 0.7 percent. According to the most reliable estimates, the consumption of primary energy resources in the European group of CEMA countries in 1978 came to 560-580 million tons of conventional fuel.<sup>9</sup>

During 1981-1985 the average annual increase of the national income in Bulgaria is planned at the level of approximately 4-4.5 percent, in the GDR--5-5.4 percent, in the CSSR--2.7-3 percent, in Hungary--2.7-3.2 percent and in Romania--6.7-7.4 percent. As a whole for the European CEMA countries during the 5-year period this

FOR OFFICIAL USE ONLY

indicator will thus be approximately 4 percent. If in the listed countries in the future to 1990 the 4-percent average annual growth rate of the national income is taken into account, an average annual increase of the consumption of energy resources by 2.8 percent should correspond to it. In this case their total consumption in 1990 may increase to approximately 800 million tons of conventional fuel. A higher rate of economic growth will cause a further increase of the consumption of fuel and energy and, on the contrary, a slowing of the rate of economic growth may decrease the need for energy resources. Other things being equal, economic growth will depend on the amount of energy resources which the countries have available.

The interrelationship of economic growth and energy consumption in Cuba, Vietnam and Mongolia is distinguished by a special feature. In this group of socialist countries in the 1980's the proportion of industry and especially of its base sectors--the mining, fuel and power sectors, some metallurgical works, the construction materials industry--will increase, modern types of transport will undergo development, the mechanization of agriculture will be intensified. During such development the increase of energy consumption usually leads the increase of the national income. The trends being revealed for the 1980's in the development of the national economy of Cuba, Mongolia and Vietnam make it possible to expect that in them for every 1-percent increase of the national income the increase of the consumption of primary energy resources may be not less than 1.2-1.5 percent, that is, the average growth rate of the consumption of fuel and energy here may be several fold greater than in the European CEMA countries.

The further increase of the use of fuel and energy at a faster rate in Vietnam, Cuba and Mongolia and at a slower rate in the European group of CEMA countries is causing the need for the involvement in the economic turnover of large additional energy resources.

In the future nuclear power engineering will become the most important direction of the development of the fuel and power management of the CEMA countries. By 1990 nuclear electric power stations with a total installed capacity of up to 37 million kW, which is equivalent to the consumption of up to 70 million tons of conventional fuel a year, will be built on the territory of the European CEMA countries. The production of the equipment for them and the building of these projects are being carried out on the basis of mutual cooperation. As a result, the role of nuclear electric power stations in the total generation of electric power is increasing considerably. Thus, in 1985 in the CSSR nuclear electric power stations will account for approximately 20 percent of the generation of electric power in this country and in Bulgaria--about 26 percent of the generation of electric power in this country.

The CEMA countries are cooperating in development in the case of the building of thermal reactors with a unit capacity of 1 million kW, which should replace the 440,000-kW reactors now being produced. However, as Academician A. Aleksandrov notes, thermal reactors cannot ensure the development of nuclear power engineering for the distant future, and science proposes a radical means--the development of fast breeder reactors, since only in this case is it possible to approach nuclear power engineering which is self-sufficient in fuel for an unlimited time.<sup>10</sup> The first reactors of this type have been built in the USSR. The pooling of the efforts of the CEMA countries is making it possible to expedite the work on the assimilation of these reactors and to turn to the development of nuclear power engineering in the new direction.

## FOR OFFICIAL USE ONLY

The construction of the Khmel'nitskaya and Konstantinovskaya AES's with a total capacity of 8 million kW is planned by joint efforts on the territory of the USSR. The amount of deliveries of electric power from them to the European CEMA countries by 1990 may be increased to 20-22 billion kWh a year, which is equivalent to the annual use at thermal power stations of 7-8 million tons of conventional fuel. The idea of creating large nuclear power complexes, which was advanced by Soviet scientists, is of interest for the more distant future.

During the present decade the generation of electric power in the CEMA countries along with the development of nuclear power engineering will be based to a significant extent on thermal electric power stations. Here at the electric power stations liquid fuel is being replaced by domestic solid fuel (brown coals, lignites, shale). Thus, in Romania the proportion of coal-powered electric power stations will be increased in the generation of electric power from 35 percent in 1980 to 55 percent in 1985. The mining of brown coals in the GDR and the CSSR and of lignites in Bulgaria is increasing.

The increase of the production of raw materials in the majority of CEMA countries is being accomplished under mine working and economic conditions which are becoming more complicated. Thus, in the GDR the specific capital outlays per unit of increase of the production of raw materials in the 1970's increased by 50 percent, while in the 1980's they will increase by more than twofold as compared with the 1960's.<sup>12</sup> With the development of the mining of coals and lignites their ash and moisture content increase, the calorific value decreases. This leads to a substantial decrease of the service life of power boilers, unplanned shutdowns and repairs of equipment and a considerable excessive consumption of fuel. The purification of fuel at the site of its production provides a large economic impact in transportation and power engineering, which exceeds the expenditures on cleaning. Cooperation in the development and production of equipment for the preparation of solid types of fuel for use in power management makes it possible to decrease the effect of this unfavorable natural factor on the indicators of the development of power engineering of the CEMA countries.

In the 1980's it is planned to expand the use of water resources, including by joint efforts. Thus, several powerful hydroelectric and pumped-storage power stations will be built by mutual cooperation on the territory of the European CEMA countries. Along with this the use in some countries of the water power potential of small rivers, especially in mountainous regions, is possible.

The rising costs in obtaining petroleum and its increasing value as a chemical raw material and motor fuel are leading to the more and more limited consumption as boiler fuel of the residues of petroleum refining (fuel oil). The degree of the refining of petroleum in many CEMA countries is 45-50 percent. As estimates show, an increase of the degree of refining to 65-70 percent makes it possible to additionally obtain in these countries up to 15 million tons of light petroleum products and lubricating oils and to decrease accordingly the yield of fuel oil.<sup>13</sup> In conformity with the agreement on the specialization and cooperation of the production of advanced types of sets of equipment for the heavy refining of petroleum in the CEMA countries, including the USSR, in 1981-1990 it is planned to produce various units with a total refining capacity of about 190 million tons of petroleum a year. Cooperation in the production of units which ensure the refining of petroleum according to the most advanced technologies (catalytic cracking, hydrocracking and others) is of particular importance.



In the 1980's the CEMA countries intend to expand the geological prospecting operations and cooperation in this area. Thus, the joint Petrobaltic organization, which was created by the GDR, Poland and the USSR, is carrying out exploratory drilling for petroleum and gas on the shelf of the Baltic Sea within the territorial waters of these states. Cooperation in the performance of geological prospecting and the recovery of petroleum and gas on the continental shelf of Vietnam is envisaged in accordance with the 1980 agreement between the USSR and Vietnam.

The use of new methods of recovering petroleum may be of great importance for the CEMA countries. Thus, in Romania the treatment of petroleum in the beds with bacteria was successfully tested, which made it possible to increase substantially its extraction in a number of depleted fields. Here it is planned to increase the coefficient of the petroleum yield of the beds from 31.5 percent in the late 1970's to 37 percent in 1985 and 40 percent in 1990.<sup>14</sup> In the USSR the experimental and pilot industrial use of polymers and other reagents, intrabed burning and high-pressure steam in recovering petroleum has begun. Experience attests that the new methods will make it possible to increase the coefficient of the petroleum yield to 55-60 percent.

The cooperation of the CEMA countries in the intensification of the use of petroleum resources can be developed in several directions. For example, the coordinated development of the production of the chemical reagents necessary for this, their reciprocal deliveries, the sharing of experience in the working of reserves and so on will be of mutual interest.

The large reserves of coals, lignites and shale in the European CEMA countries make it possible to direct attention to their versatile use, including as raw materials for obtaining liquid fuel. This problem is especially urgent for the USSR and Poland, on the territory of which the largest coal fields are located. These two countries have concluded an agreement on cooperation in the development of methods of obtaining liquid fuel from coal.

The production of natural gas in the USSR will be developed in the future. As was reported in the Accountability Report of the CPSU Central Committee to the 26th party congress, for the socialist countries their participation in the increase of the recovery and transportation of Western Siberian natural gas may be of substantial importance. The large reserves of gas in this region of the USSR and the experience of the construction by the socialist states of the Soyuz gas pipeline are making it possible to aim at the joint working of these reserves and the increase of the deliveries of Soviet gas to the European CEMA countries.

In the CEMA countries the losses of accompanying liquids, which are a valuable raw material for the chemical industry and a high calorie fuel, are considerable in the recovery of natural gas. The losses mainly at small- and intermediate-capacity fields, as world experience attests, can be reduced by several times by the means of modern technology. Equipment of the unitized type, which is tailored for moving from some relatively small fields to others as the production of gas increases or decreases, is required for this. The production of such equipment, which is based on international specialization and cooperation, and its efficient use are making it possible to commit additional reserves of raw materials to the economic turnover of the CEMA countries.

## FOR OFFICIAL USE ONLY

The further development of the domestic energy base of the CEMA countries, including Mongolia, Vietnam and Cuba, will be combined with the importing of fuel and energy, including from developing countries. The USSR remains the main exporter of these products to the CEMA countries. However, the increase of deliveries of fuel and energy from the USSR is undergoing substantial change. Whereas in 1976-1980 the exports of energy from the USSR to the CEMA countries increased as compared with the preceding 5-year period by 43 percent, in 1981-1985 it will increase as compared with 1976-1980 by 20 percent. Thus, the energy resources, which the CEMA countries have during the current 5-year period, are limited and require their very efficient use for the assurance of the necessary rate of economic growth.

Thus, in the 1980's an overall strategy of the solution of the fuel and energy problem by the CEMA countries is being formed. It is based on the economical and efficient consumption of energy resources, the adoption of energy-saving technology and structural changes in the economy, which ensure the systematic decrease of the power-output ratio of production; the structural rearrangement of the balance of primary energy resources, in which the proportion of atomic energy and solid types of fuel is increasing; the slower increase of production and the consumption of primary energy resources as compared with the preceding decade; mutual cooperation, which is oriented toward the decrease of the power-output ratio of production and the efficient consumption of energy resources, which encompasses the field of the study of new resources and sources of energy, and also includes the continuation of deliveries of energy resources from the USSR to the other CEMA countries.

The rate of economic growth of the CEMA countries in the 1980's along with other conditions will be determined by the progress of the implementation of this strategy and its individual components and by the intensity of cooperation in the main directions of the solution of the fuel and energy problem.

## FOOTNOTES

1. See, for example, "Decree No 28 of the Council of Ministers of the People's Republic of Bulgaria of 28 June 1979" (D"RZHAVEN VESTNIK, 13 July 1979); "Decree of the GDR Council of Ministers on the Efficient and Economical Use of Electric Power, Thermal Energy, as Well as Solid and Liquid Fuel" (NEUES DEUTSCHLAND, 21 September 1979); "Decree of the State Council of the Socialist Republic of Romania on the Taking of Steps on the Proper Management and the Reduction of the Consumption of Electric Power, Thermal Energy and Natural Gas" (SCIENTEIA, 31 July 1979); "Decree of the CPSU Central Committee and the USSR Council of Ministers 'On the Intensification of the Work on the Economy and Efficient Use of Raw Material, Fuel, Energy and Other Material Resources'" (PRAVDA, 4 July 1981).
2. NEPSZABADSAG, 20 January 1981.
3. NEUES DEUTSCHLAND, 15 April 1981.
4. RUDE PRAVO, 7 April 1981.
5. "Romania. Documents--Events," Bucharest, AGERPRES, No 37, 1979, pp 16, 19.

FOR OFFICIAL USE ONLY

6. RUDE PRAVO, 23 January 1980.
7. See "Toplivno-syr'yevaya problema v usloviyakh sotsialisticheskoy ekonomicheskoy integratsii" /The Fuel and Raw Material Problem Under the Conditions of Socialist Economic Integration/, Izdatel'stvo "Nauka", 1979, pp 37-38.
8. RUDE PRAVO, 8 April 1981.
9. SPRAWY MIEDZYNARODOWE, No 9, 1980, p 24; "Energy Problems and Cooperation in the ECE Region." Statistical annex. Economic Commission for Europe. Energy (R 10), add. 1, 16 December 1980.
10. See KOMMUNIST, No 4, 1981, pp 89-90.
11. See EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV, No 1, 1977, p 72.
12. WIRTSCHAFTSWISSENSCHAFT, No 10, 1980, p 1176.
13. See VNESHNYAYA TORGOVLYA, No 10, 1980, p 17.
14. See PRAVDA, 12 January 1981.

COPYRIGHT: Izdatel'stvo "Pravda", "Voprosy ekonomiki", 1981

7807

CSO: 1825/28

END