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USSR Report

ENERGY

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13 February 1986

USSR REPORT
ENERGY

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OIL AND GAS

CHANGES IN GAS ALLOCATION SYSTEM DESCRIBED BY DEPUTY MINISTER

Moscow EKONOMICHESKAYA GAZETA in Russian No 43, Oct 85 p 7

[Article by S. Kashirov, deputy minister of the gas industry, under the rubric "Going Back to What Was Printed Earlier": "Gas Delivery by the Month"]

[Text] The share of natural gas in the country's fuel balance is constantly growing, and increased attention is being paid to its conservation. Until recently, however, this type of fuel was distributed on a quarterly basis. As a result gas consumption quotas for some months did not conform to actual conditions. Air temperature in April, for instance, is different from June.

In studies of the use of fuel energy resources, regularly published in EKONOMICHESKAYA GAZETA, the question of the need for a monthly allocation of the quarterly allotment of gas was repeatedly brought up. This problem acquires a special urgency during the fall and winter period. The earlier order of doing things, I report, has been changed. Mingazprom has been charged, along with the union and autonomous republic councils of ministers and oblast (kray) executive committees, with developing and submitting to the appropriate territorial organs plans for monthly gas delivery.

At the same time earlier adopted resolutions remain in force. Thus Mingazprom is obligated to satisfy the domestic economy's uneven demand for gas (dependent upon climatic factors) including boiler houses whose output is less than twenty gigacalories per hour.

Concerning industrial enterprises, electric power stations, and boiler houses with a capacity over twenty gigacalories per hour, they must have at their disposal 2 or 3 types of fuel in order to compensate for fluctuations in gas consumption stemming from weather conditions.

As a result of the increased capacity of underground storage in regions of high gas usage, Mingazprom is yearly increasing the transportability of the supply. However, not all the problems have been solved. Therefore a procedure has been adopted whereby electric power stations and industrial enterprises in each oblast and republic work out schedules for switching to reserve fuel sources on extremely cold days so that significant auxiliary gas supplies can be allotted for public use.

OIL AND GAS

CREATING AN INFRASTRUCTURE TO SUPPORT YAMBURG GAS REGION

Moscow GAZOVAYA PROMYSHLENNOST in Russian No 6, Jun 85 pp 5-7

[Article by V. D. Batozskiy and N. G. Portyanko, engineers, with the Ministry of the Gas Industry and the YuzhNIIGiprogez (Southern Gas Design Scientific Research Institute)]

[Text] The introduction of new technical solutions for developing the Yamburg condensed gas field will allow a reduction in the volume of capital investment of approximately 1.5 billion rubles in comparison to the solutions used in other Siberian fields.

In order to boost the commercial development of fields, the preliminary period needed to construct the basic regional facilities as well as the industrial and social elements of the infrastructure must be eliminated.

The Yamburg condensed gas field is the fundamental raw material base needed to assure the growth of condensate and gas extraction in Western Siberia during the 12th Five-Year Plan.

A severe climate, a solid covering of permafrost, remoteness, the complete lack of facilities in the region and the absence of underground fresh water and mineral soils suitable for the establishment of yards and access roads are the reasons for the need to adopt a number of new technical solutions. These solutions have been found by analyzing and correlating the experience gained from developing other northern oil and gas fields and by multiple-variant optimization of estimates, beginning with the transportation plan for the delivery of cargo and ending with plans for the processing and transport of gas.

The successful development of new gas-bearing regions is based on the creation of reliable engineering support services, primarily the transportation network. For this reason the general plan for developing the region provides for initial construction of regional transport facilities including a river port, an airfield with associated structures, a railroad and road from Urengoy and a road from the Medved field.

The development of the Yamburg field requires a significant volume of construction work. Naturally, even with a high degree of industrialization in construction work and the use of components and facilities from a highly developed manufacturing base, this volume of work is not possible without a solid construction industry establishment. Therefore, this is a high-priority item in the list of work to be done.

In view of the short preparatory period, the need for accelerated construction of manufacturing facilities and the unacceptability of resource wastage and time loss in the construction of temporary facilities, the Ministry of the Gas Industry, as the overall authority, has undertaken the construction of permanent water, heat and electrical power supply facilities to provide support for the engineering services. Of course, this decision was not easy to make, but it does pay off in terms of time and resources.

The logging-expedition method of carrying out drilling work is also helping to reduce the time required to develop the field.

The technical solutions which directly affect field development and which reduce capital investment, operational costs, the number of service personnel and the development period are of interest.

The absorption-drying method was adopted in preparing gas for shipment. Operational experience with field facilities and gas transport systems has shown the advantages of this method over the adsorption-drying technique in terms of economy and efficiency. High-efficiency, automated pyrorecovery facilities are used to reduce concentrations of hydrate inhibitor and absorbent solutions.

To increase gas processing facility reliability and decrease the use of water as the heat carrier in the heating and ventilation system, low-freezing point antifreeze solutions heated in the primary furnaces are used instead of steam.

The number of gas processing facilities and their optimal productivity is defined by comparing technical and economic variables. This process considered factors such as gas recovery at the field during the period of complete development, the level of gas processing facility productivity achieved by those developing the the fields, optimum hydraulic and thermal conditions, as well as operational characteristics for the gas recovery network, the need for assuring reliable gas deliveries to consumers and the practicality of concentrating capacity at one site. The estimates considered expenditures for the gas recovery network, roads, gas feeder and main lines for in-field handling, gas processing facilities and compressor stations.

The total capital investment savings achieved by optimizing the number and productivity of gas processing facilities is nearly 250 million rubles.

Clustered borehole arrangements (with up to 6-8 in the cluster) were chosen for the Yamburg field. This decision was based on the project by Natural Gas Scientific Research Institute and the Tyumen NIIGiprogez [State Institute for the Design of Gas Pipelines and Gas Industry Facilities] which considered detailed gas dynamics calculations on slant-drilled exploratory boreholes.

This method results in a capital investment savings of nearly 240 million rubles.

Optimal diameters for gas pipeline circuits and the value of hydraulic losses in the gas recovery system were defined on the basis of technical and economic comparisons of networks with pipe diameters of 300, 400 and 500 mm against various hydraulic loss values at the end of the estimated continuous gas recovery period. Here the calculations considered specific outlays for gas compression by compressor stations in order to compensate for pressure losses. The optimum gas network design selected consists of 500-mm nominal diameter pipe, which is characterized by a 12-17 percent hydraulic loss value.

For the field, the capital expenditure reduction due to the selection of optimal pressure loss values is nearly 110 million rubles. The network's specific metal consumption is reduced 1.7-fold, nearly half of the amount needed for the Urengoy field gas processing facilities.

The most accepted and economical means of laying underground pipe is not suitable for the Yamburg field's larger territory since, even with the use of thermal insulation, over a long period of operation a ring of thawed material forms around pipelines. This thawed area leads to a lessening of the soil's weight bearing capacity and to uneven settling of the pipe. This is dangerous from the point of view of strength and reliability and moreover leads to the development of irreversible cryogenic processes in the surrounding soil. Thus, a pipelaying method involving the use of low-profile metal pillars on thermally isolated circuits was adopted.

Gas at the gas processing facilities output is cooled year-round to a temperature below 0 degrees C in air-cooling units and in pipe-expansion units in order to assure the soil's load-bearing capacity as well as the reliability and resistance of gas field pipelines.

The economic effect of this type of gas cooling is on the order of 30 million rubles annually in comparison to vapor compression cooling units. The selection of gas cooling at the processing facility outlet was implemented in conjunction with in-field and mainline gas transport flow diagrams and parameters at the gasline head section.

Technical solutions for the automation of production facilities provide optimal manufacturing process conditions and safe, reliable operation with a minimum number of service personnel, as well as a subsequent change to unsupervised servicing of gas processing facilities.

Special attention has been directed to increasing the level of construction facility industrialization. On the basis of joint decisions by the Ministry of the Gas Industry and the Ministry of Construction of Petroleum and Gas Industry Enterprises, a method has been adopted to construct gas processing facilities using factory-assembled pontoon units weighing up to 300 tons. These consist of a floating base on which equipment with interconnection supply lines, a casing and protective building structures are mounted. At the

construction site the pontoon units are assembled to piling bases, they are connected and inter-unit piping connections are made.

This method allows 75 percent of the construction and assembly work required for the gas processing facilities to be accomplished under factory conditions, thus increasing construction quality and reducing the number of highly qualified personnel required at the site.

To further increase the degree of construction industrialization, the Ministry of the Gas Industry and the Ministry of Construction of Petroleum and Gas Industry Enterprises are working on the development of units to be functionally completed under factory conditions and on pontoon unit assemblies weighing up to 1000-1200 tons. The technical solutions adopted for developing the Yamburg field, primarily those listed in this article, are reducing the amount of capital investment by nearly 1.5 billion rubles and are providing a 2-fold increase in the productivity of gas processing and transport personnel.

The experience gained in the development of northern fields in the Tyumen area shows that for rapid industrial progress the preliminary period needed for the construction of transportation and engineering support facilities, client and construction personnel bases, housing and fill areas must be eliminated. When necessary, the design and construction of preliminary period facilities should be accomplished in individual projects on the basis of the general plan for regional development.

In this connection it is appropriate to prepare general methods for the combined creation of a regional production and social infrastructure, which according to calculations by the Siberian Department of the Academy of Sciences USSR will allow a significant reduction in capital investment and, while eliminating the preliminary period, will provide appropriately comfortable conditions for construction and operational personnel, as well as reduce the overall time required for the development of fields.

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OIL AND GAS

DESIGN AND DEVELOPMENT OF LOW-PERMEABILITY JURASSIC OIL FIELDS OF WESTERN SIBERIA

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 8, Aug 85 pp 3-10

[Article by A.K. Bagautdinov, Siberian Scientific-Research Institute of the Oil Industry, and I.F. Yefremov, Tomskneft]

[Abstract] This article discusses approaches to developing the Vakhs koye, Katylginskoye, West-Katylginskoye, Olenye, Upper-Tarskoye, Strezhevskoye and Pervomayskoye Oil Fields in southeast West Siberia. The fields' geological features and reservoir properties are discussed. The productive horizons are divided into several sand strata which are not aeri ally uniform, resulting in pools of about the same size as the well grid spacing. The oil-bearing thickness of the Yu₁ bed is not uniform within the oil fields; it does not have morphological or reservoir properties favorable for development. The Vakhs koye and Katylginskoye Fields each have two potential reservoirs, while the other fields have one each. Due to the localized nature of certain sand strata, additional localized areas should be singled out for development by reserve-fund wells. Seven- or nine-spot well arrays, with a rectangular grid, should be used for Jurassic reservoirs. A three-row system is feasible for the most homogeneous, high-production sites. Depending on the structural complexity, well densities in these fields range from 20 to 36 hec/well, with 25 hec/well used in most fields. Due to the small elastic reserves of the pools, pressure-maintenance systems must be used from the very start of production, with ratios of injection:production wells of 1:3 and greater. The Vakhs koye, Olenye and Strezhevskoye Fields are in the initial stages of development, and their production characteristics have not yet been fully determined. Special efforts must be made to maintain even water advance in the reservoirs. Figures 1, tables 2.

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OIL AND GAS

DEVELOPING LOW-PERMIABILITY RESERVOIRS OF UKRAINE

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 8, Aug 85 pp 12-15

[Article by Ye.M. Dovzhok, I.I. Muzychko and V.S. Ivanishin, Ukrneft, and V.P. Onopriyenko and I.T. Mikitko, Ukgiproniineft (Ukrainian State Project Institute of Petroleum Scientific Research)]

[Abstract] This article discusses the greatly varied Ukrainian oil fields and the secondary recovery methods used in them. These methods include flooding, gas injection surfactant treatment and reservoir depletion with complete cessation of flooding. While the fields in the Carpathian Foothills have favorable conditions for depletion-drive production, flooding is used in most of these fields, surfactant-injection is used in two fields and gas/gas-water repression is used in the Bitkovskoye Field. Of the various methods used over the last 10-15 years in the Ukraine to boost oil recovery, many have lower-than-average technico-economic indicators, due to low reservoir permeability. Closer well spacing (7-9 hec/well) has proved an effective solution to this problem. Experience at a number of fields has shown the effectiveness of gas injection in low-permeability reservoirs, and its use is to be expanded. For fields with multiple reservoir beds and high reservoir inhomogeneity, higher oil recovery during final depletion can be achieved by complete cessation of water injection. References: 3 Russian.

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OIL AND GAS

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OIL AND GAS PROSPECTING IN DNEPR-DONETS BASIN

Kiev GEOLOGICHESKIY ZHURNAL in Russian Vol 45, No 5, Sep-Oct 85 pp 103-115

[Article by V.A. Raznitsyn, A.A. Bilyk, V.A. Ivanishin and A.S. Vladimirov, in section "Oil and Gas": "Directions of Regional Exploration and Prospecting for Oil and Gas in the Dnepr-Donets Basin"]

[Abstract] Prospective directions for oil and gas exploration are discussed for four of the five known oil- and gas-bearing series in the Dnepr-Donets Basin. Maps were developed showing oil, oil-gas/oil-gas-condensate and gas/gas-condensate occurrences. Promising Devonian structures are found in the north and south slopes of the basin. The Tournaisian/Lower-Visean Series has the most promising oil-gas content. The best area to prospect for oil and gas in this series is along the basin's central axis. The other series discussed are the Upper-Visean/Serpukhovian and Middle-Carboniferous. The geology of each series is described, and regions of high, average, little or no promise for exploration are delineated. The distribution of oil-gas occurrences in these series are discussed. This work provides a basis for planning oil-gas exploration and prospecting in the region. The authors feel that the basin is promising for oil-gas exploration because of its unexplored areas and depths. They feel that the basin will be the subject of regional exploratory work for a long time. References: 2 Russian.

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NUCLEAR POWER

USE OF RECYCLING DISCUSSED AT VOLGODONSK ROSTOVSKAYA AES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Sep 85 p 1

[Article by SOTSIALISTICHESKAYA INDUSTRIYA correspondent L. Shamardina, Volgodonsk, under rubric "Our Correspondent Point at the Construction Site: Rostovskaya AES": "For a Report, Without Account"]

[Text] At first, brigade leader Valeriy Ivanovich Dolgopolov was unable to give a direct answer to a direct question. Instead, a pert answer was given by sector chief Yu. Aleynikov: "It will economize! Everything will be done to a T, just the way it was written down -- 3,250 cubic [meters] of rubblestone..."

"Where did you get that saving from?" the brigade leader asked in a surprised tone. "This is the first time I have heard about computations like that and I don't know what they are based on. If you want to take a look at how much net saving we have had since the beginning of the year, you will get about 400 cubic [tons]," Dolgopolov continued. "Converted to money, that a little bit more than 4000 rubles. Isn't that right? By the end of the year we'll finish cleaning up the site, and we will take away as much as a thousand cubic [meters] Where do you get the rest of it?"

"Well, aren't the waste products a reserve?" Aleynikov says aggressively. "The remaining 25 meters of the dam will require 44,000 cubic meters of mass. A fourth of it can be made up of broken reinforced concrete."

Yes, there are computations like that. There is also a document that was signed by the customer, by the contractor, and by the designers, which describes in detail how and where to use waste products. There is no shortage of waste products. At Atomenergostroy alone, according to data provided by the production department, 1,200 cubic meters of broken and defective reinforced concrete had accumulated. Other subdivisions of the Volgodonskenergostroy Trust were ready to provide four times more than that. But the waste products are not being used. Why not?

"Well, you realize," deputy administration chief I. Shirayev explains, "it is still necessary to prepare a PPR (draft plan for carrying out the operations), and to collect the machinery..."

Those explanations are needlessly contrived. For a completely uncomplicated technological process there is absolutely no need of a design institute. The

true reason is that the task and idea of economizing are far removed from the immediate executed. And they themselves failed to interpret correctly either the method or the benefit. There was no administration-wide order concerning the implementation of a technical decision that promises a saving, and no one was personally responsible for its execution.

Incidentally, as has been pointed out by practical life, an order also does not have much force. In the middle of May 1985 the manager of the Volgodonskenergostroy Trust, V. Talanov issued an order to create in the subdivisions an economy fund for operating with saved materials. Subsequently the question of checking the execution arose.

The person carrying out that check, whom I met at that time, in May at the Atomenergostroy party committee, was furious.

"Why haven't we yet had the appeal to work two days with saved materials? A three-day period..."

Soon an attractive poster-appeal appeared at the site of the nuclear power station. The person carrying out the check -- he was from the party committee of the lead organization -- was satisfied. But as for what was behind that poster, he wasn't interested...

A. Kosogov, the chairman of the people's control committee at the trust, was also satisfied. "The people at Atomenergostroy were even the first in the trust to order special blank forms for their personal accounts at the print shop. And their reasoning was the very best... Everything would be strictly in order!"

He is talking about that very document the figures of which were so surprising and so perplexing to the first brigade leader and which, it turned out, proved to be so little reinforced by any practical work.

Is it possible that this situation pertains only to rubblestone? Is the expenditure of lumber, metal, or brick any better? I referred to those exemplary personal accounts that had been printed at the print shop. But I couldn't make head or tails of them.

For rolled metal in the January column there was an entry of an overexpenditure of 250 kilograms; in February also there was an overexpenditure -- 4.5 tons. In May, two tons were economized. For the remaining months, just a dash. But, based on the results for the half-year, an unexpected saving -- 25 tons! Does that mean that the result planned in the computations was already achieved? The same kinds of miracles with lumber, except that here the computed limit was even surpassed: it had been necessary to save 50 cubic meters of lumber, but the actual amount given was 55. Where did they come from?

In the personal accounts of the sectors and in the accounts in the name of the brigades there is almost nothing but dashes. But that did not surprise me. The amount of economized lumber that was entered in the account of A. Gorbachev's brigade in June was 0.94 cubic meters -- a saving of 56 rubles.

P. Tokaruchek's account shows 2 cubic meters. Both brigades work side by side, and compete with one another. But, when summing up the weekly results of the "workers' relay race," they regularly write in the "Saving" column, "No accounting." If there is no accounting, where did these figures come from? And, in the absence of any component figures, where did that nicely rounded off total saving come from?

To get explanations I go to the production department, inasmuch as the statement at the bottom of every personal account clearly reads "Authenticity of the data in the personal account confirmed -- A. Malkov."

Anatoliy Anatolyevich -- the chief of the production department -- was also embarrassed by the discrepancy in the accounts.

"Well, this is apparently supposed to be charged to technical measures...", he attempts to explain. "They organized production on the basis of cutting out measured armature sheet metal -- and saved 8.6 tons of rolled metal; they also centralized the manufacture of sheathing and saved 6 cubic meters of lumber..."

Malkov was citing not the actual figures for the economizing, but the computed ones.

"But what does all this have to do with what is being done in the brigade?"

"Nothing at all," Malkov admitted honestly. "It's simply playing with figures..."

How, then, in this instance does one include and take into account the contribution made by every collective and worker? How does one determine the appropriate share of merits and incentive benefits?

"We didn't do any thinking about that..."

The official accounting for the creation of an economy fund includes only four types of materials: metal, lumber, brick, and stone. And yet there are many other things that are used at the construction site, and that require people to take a thrifty attitude to them: mortar and crushed stone, sand and asphalt, paint, glass, concrete, etc. "Petty details" like this are not entered in the personal account. People even think, for example, that you cannot economize with concrete mortar.

"It's difficult, but possible," brigade leader V. Dolgopolov explained during the conversation. "The expenditure norms, of course, are severe: for a cubic meter we are only given 15-20 hundredths extra. But in a day about two dozen trucks arrive at the site and, thanks to very careful pouring and good cleaning, in a day we can collect as much as 3 saved cubic meters."

"Anything can be economized if everyone takes a serious approach to it," he concluded.

It would seem that the brigade leader is correct. That is what the movement

with the motto "Let's work two days with economized raw and other materials and electric energy" is aimed at: teaching and forcing everyone at his work station to take an economical attitude toward the country's wealth, and to take into complete consideration and accounting. Only then can that movement provide a real result. And from that point of view, the three cubic [meters] achieved by the personal effort of everyone are richer and more important than the inexplicable "figures game."

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NUCLEAR POWER

RECENT DEVELOPMENTS AT VOLGODONSK ATOMMASH PLANT

Delivery Problems

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Sep 85 p 2

[Item under rubric "SOTSIALISTICHEKSYA INDUSTRIYA At Atommash": "On the Initiative of the Workers"]

[Text] On the initiative of B. Vasilyev's brigade of machine-tool operators at Atommash, there has been a re-examination of the individual-output norms for boring operations for the steam-generator housing. The labor-intensity of the manufacture of that housing has been considerably reduced. The norms have been re-examined in the brigades of machine-tool operators which are headed by V. Sadovskiy and V. Khorkov, and in other collectives. The role in the re-examination of the norms that is played by the social norm-establish bureaus is discussed by T. Makarov in her report "Norms Are Established by the Workers," which was published in "SOTSIALISTICHESKAYA INDUSTRIYA At Atommash," No 38 (350).

The Donetsk and Kommunar metallurgical plants regularly fail to deliver sheet metal to Atommash. The people at Volgodonsk, in their turn, delay the shipment of output to the factories manufacturing components for them. "When will USSR Minchermet [Ministry of Ferrous Metallurgy] establish proper order?" is the question asked by A. Zornin in his report "Behind the Wall of Silence."

Atommash spent approximately a half-million rubles when it gave the production order to Atomkotlomash NPO [scientific-production association] to design and manufacture an automated complex for testing the SUZ [control and safety rods] drives. The plant planned to receive a three-fold return on the use of this technology. However, the complex is just not operating. The reason why that happened is discussed by Z. Devtyatkova in her report "The Desired and the Actual."

Kuzma Volgodonskiy has written a satirical article item entitled "Communal Crossword."

Idle Workers

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Sep 85 p 2

[Item under rubric "SOTSIALISTICHESKAYA INDUSTRIYA At Atommash": "Speeding Up the Rates"]

[Text] In August the Atommash construction and installation workers executed construction-and-installation operations valued at a total of 10 million rubles. Those are stable rates, but they are insufficient to assure the coping with the planned assignment. Judged simply on the basis of the results of the work in August, the construction workers are more than 2 million rubles "in debt." What must be done to eliminate that indebtedness by the end of the year? That is the topic of the editorial "Speeding Up the Rates," which was published in "SOTSIALISTICHESKAYA INDUSTRIYA At Atommash," No 39 (351).

This is the second year that the collective at Kuybyshevgidrostroy has been helping the Volgodonsk construction workers to install the networks. Whereas last year the emissaries from the city of Togliatti coped successfully with the assignment, at the present time the bosses at the construction site are in no hurry to offer their guests a work front. "What sense does it make to travel a thousand kilometers just to sit around with nothing to do?" is the completely reasonable question asked by A. Amirov, Kuybyshevgidrostroy sector chief, in his report "We're Sitting Around, Doing Nothing."

The newspaper continues to print replies to the questionnaire concerning problems of accelerating scientific-technical progress at Atommash. In the issue that was published, the questions in the questionnaire are answered by A. Shanygin, chief designer of a separate design bureau in the association.

Many items in this issue of the newspaper are devoted to the approaching holiday -- Machine-Builder's Day. They include Z. Bibikov's report "The Entire Wages on the Basis of KTU [coefficient of labor participation]," and other items.

The issue also contains various kinds of information and offers the works of a creative association of Volgodonsk amateur photographers.

Shop 131

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Oct 85 p 2

[Item under rubric "SOTSIALISTICHESKAYA INDUSTRIYA At Atommash": "Working Like a Stakhanovite"]

[Text] Most of the drivers in D. Dorofeyev's brigade, which is in Motor Column 2070, are communist-labor shock workers. The collective constantly overfulfills the planned assignments for the shipment of freight for Atommash. The drivers have taken increased pledges for the worthy meeting of the 27th

CPSU Congress. This is discussed in "SOTSIALISTICHESKAYA INDUSTRIYA At Atomash," No 40 (352) by the motor column's party buro secretary, Yu. Savin.

The newspaper continues to discuss the rate of the socialist competition on principles of the "workers' relay race," which has become widespread at one of the Atomash complexes that is scheduled for activation in the next report period. At the present time the electrical-installation workers have joined the competition. The ways in which they plan to reduce the time required to install the equipment are discussed in the report "Amendment to the Schedule," by V. Mochalov, brigade leader in Sector 2 of Kavelektromontazh.

The newspaper's special correspondent, A. Zornin, visited certain metallurgical enterprises in the Ukraine which are in debt to the Volgodonsk Energy Complex. Since the beginning of the year the metallurgists have undershipped to the construction site thousands of tons of rolled metal. Why have the suppliers been failing to fulfill the contractual obligations? That is the subject of the first report from Krivorozhstal, which was published under the title "Links in the Same Chain."

Both in the report and in the statements made at the party conference that was held at Production Area 1 of Atomash to hear reports and hold elections, frequent criticism was leveled at Shop 131. The discipline there is limping along, labor productivity is increasing slowly, there are large losses from defective work, the socialist competition has been poorly coordinated... When the floor was offered to a brigade leader in that shop, Yu. Radchenko, the Communists expected that the causes of that situation would be revealed. Unfortunately, that did not occur. "Coefficient of Participation" is the name that was given by party conference correspondent V. Navozov to his report, in which he writes about the reasons for the drop in the combativeness of the shop's party organization.

The issue also published other items.

500-Megawatt Reactor

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Oct 85 p 2

[Item under rubric "SOTSIALISTICHESKAYA INDUSTRIYA At Atomash": "Analyzing Ways to Economize"]

[Text] All the workers in Kh. Khalikov's combined brigade at Shop 152 of Atomash are students at the communist labor school that is headed by propaganda specialist, senior shop foreman S. Strashevskiy. At one of the first classes last year the workers analyzed the brigade's possibilities and decided to work two days in 1985 with economized materials. At subsequent classes they discussed ways to economize and, with the shop economists, made the necessary computations. Shortly before the beginning of the current school year, in the Marxist-Leninist education system, the workers summed up the results: the brigade will be able to work three days on the materials that have already been saved. "A Concrete Saving" is the name of O. Kuzminev's article that was published in "SOTSIALISTICHESKAYA INDUSTRY At Atomash," No

41 (353).

The first domestically produced nuclear reactor, with a capacity of 500 megawatts, for the Gorkiy Heat-Supply Nuclear Power Station, was manufactured at Atom mash. Its hydraulic tests will be carried out in a few days. The latest operations at AST-500 are described in the report "The First Heat Unit At the Finish Line," by deputy chief of the housing equipment shop A. Peresadko.

The newspaper is concluding the publication of notes by its special correspondent A. Zornin from the metallurgical enterprises of the Ukraine.

Kuzma Volgodonskiy has written a satirical article entitled "Rushing After the Operations List."

Using Economized Materials

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Oct 85 p 2

[Item under rubric "SOTSIALISTICHESKAYA INDUSTRIYA At Atom mash": "Words Backed Up By Deeds"]

[Text] For the final year of the five-year plan the plant builders have taken on intensive socialist pledges. It has been decided, in particular, to work two days using economized materials. The people at Atom mash are reinforcing their word by their deed.

An important lever for instilling thrift in the labor collectives has been the introduction of personal accounts, according to the report given by deputy chief of Zavodstroy, A. Revnivitsev, in his article "Words Backed Up By Deeds," which was published in "SOTSIALISTICHESKAYA INDUSTRIYA At Atom mash," No 42 (354). The progressive form of organization of labor is being successfully introduced in the advanced collectives that have changed over to the brigade contract system. It is necessary to propagandize on a broader scale the experience of the best brigades, which have already actually worked several days each by using economized resources, the author emphasizes.

Continuing the series under the rubric "Reports and Elections at Party Organizations," the newspaper has published, under the title "Reserves Are Close By," an article by electrician-fitter at the administration for the construction of mechanized operations, V. Butsenko. The author shares his ideas after a meeting that was recently held in the collective to hear reports and hold elections.

Housing is being built at Volgodonsk according to standard plans, from parts that are produced at a local plant. However, every building is accompanied by numerous pieces of documentation, the significance of which is sometimes difficult to establish. The author of the article "Choir Leader Needed," chief of the contract-estimate department of the Volgodonskenergostroy Trust, Ye. Mimonov, asks the question concerning the necessity of a considerable reduction and simplification of this kind of documentation.

The issue has published articles by T. Komandirova, "Right to an Autograph"; G. Kolenkina, "Procedure In All Regards"; S. Izgutdinov, "Indivisible by Three"; and Ye. Khizhnyakova, "So That There Won't Be Anyone Defeated."

Kuzma Volgodonskiy acquaints the readers with a satirical article entitled "...And the Batteries Did Not Hold Out." The newspaper publishes news of culture and sports, and sport information.

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CSO: 1822/64

NUCLEAR POWER

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PROBLEMS OF AES AUTOMATION DISCUSSED

Moscow TEPLOENERGETIKA in Russian No 10, Oct 85 pp 6-8

[Article by S.D. Malkin, doctor of technical sciences: "Certain Problems in the Automation of Nuclear Power Plants"]

[Abstract] The advantages of plant technical management automation systems [ASUTP] in AES are discussed. The author also discusses the conflicting and competing trends in ASUTP design and the need to reduce the number of operating and service personnel at AES's. Integrated management systems have the following advantages: greater safety, simpler control (especially under irregular operation conditions) and minimization of operator mistakes, improved economic operating indicators, standardization of hardware and software and the need for fewer operating and repair personnel. ASUTP's should be designed as integrated man-machine systems to utilize the inherent advantages of both. Of particular importance is resistance to failure; i.e., ability to perform functions despite failure of individual parts of the system. Development of failure-resistant systems is a compromise between conflicting, competing requirements: simplicity vs. complexity, dispersity vs. centralization, standardization vs. variation, asynchronousness vs. rigid synchronization of system operation, different relative frequencies vs. a single relative frequency of sensor sampling, system self-monitoring vs. operator monitoring and universality vs. specialization of operating systems. With regard to this last point, universal operating systems are not advantageous for AES application because: 1) in real-time operation, they require unjustified expenditures of machine time and in working storage and 2) many service functions are not needed for basic ASUTP operation. To solve this problem, two-mode operating systems must be developed which use universal operating systems during program debugging and use so-called technological operating systems during real-time ASUTP operation. The main goal in using microprocessor technology is to reduce specific expenditures (especially those of human labor) per kilowatt of generated electricity, particularly since AES's are usually far from large cities, necessitating greater infrastructure construction. Since more and more AES's are being built, large training centers should be built for RBMK-equipped and VVER-1000-equipped AES's. Also, a training simulator should be built at each AES with a capacity of 3 million kW or more.

12595/12232
CSO: 1822/48

AUTOMATED CALCULATION OF AEC INDICATORS DESCRIBED

Moscow TEPLOENERGETIKA in Russian No 10, Oct 85 pp 16-18

[Article by L.P. Zhidkova, engineer; V.N. Ruzankov, I.D. Zak, and V.I. Stepanov, candidates of technical sciences, and R.A. Tseytlin, engineer, All-Union Thermo-technical Institute imeni F.E. Dzerzhinskiy [VTI] and State All-Union Central Scientific-Research Institute of Integrated Automation [TsNIIKA]: "Standard Structure of Automated Calculation of Technico-Economic Indicators and Analysis of Economic Performance of AES Generating Units"]

[Abstract] Among of the functions of the plant technical management automation system [ASUTP] for AES generating units are calculation of technico-economic indicators [TEI] and analysis of operating efficiency. A united system structure to fulfill these tasks has been developed, based on work by VTI, TsNIIKA, Soyuztekhenergo Production Association, the Belorussian Branch of the Power Institute imeni G.M. Krzhizhanovskiy and others. This system, which can be recommended as a standard for AES generating units, performs nine tasks. The first task is gathering and primary processing of input information, using standard procedures. The second is determining the operating conditions and status of equipment units, using digital information from two-position elements. The third is monitoring the reliability of input information. The most critical information channels have backup channels for added reliability, while the reliability of the least-important information for indicator calculation is not monitored. If a faulty parameter is obtained, one of three commands is given: stop the entire analysis, stop analysis of individual indicators or replace the faulty parameter with a reliable one. Faulty information is printed out. The fourth task is making preliminary calculations for the operating interval (15 min). This includes averaging and scaling of average values, calculation of thermodynamic functions of the medium, determination of heat-carrier flow rates etc. These results go into a file which becomes the basis for all further calculations. The fifth, and most voluminous, task is calculation of TEI's and analysis of generating-unit efficiency for the operating interval. Each outputted indicator is the quotient of two integrable values, times a scale coefficient. Indicators such as generated electricity, which are already integral and do not require division, are divided by unity. The main purpose of this task is to calculate integrable values using technological formulas which cannot be stated as standard procedures. The sixth task is calculation of TEI's for various time intervals. The seventh is filling in information for periods of information loss. This is designed to make the operating-interval information mainly based on actual data and only partly based on values calculated for system downtime. The eighth task is calculating TEI's for startup and shutdown

operating conditions, since these vary considerably from steady-state operation. The ninth task is presenting the information to personnel. This provides service information for monitoring current operation and technological information for AES operators. The latter is broken into two parts: operating-interval information on a display for equipment testing and adjustment and archival information in printouts. Efficiency information is provided on two levels: for all equipment, divided into consolidated groups, and for each group, divided into smaller elements. This structure will make possible the development of a standard algorithm for automated calculation of TEI's and analysis of AES generating-unit efficiency.

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NON-NUCLEAR POWER

YENISEY GES OFFICIAL DISCUSSES DELAYS, ECOLOGY, GES TECHNOLOGY

Moscow PRAVDA in Russian 22 Oct 85 p 3

[Interview with K. Kuzmin by S. Bogatko, p. [settlement] Cheremushki-Moscow: "The Lesson of the Yenisey: Thoughts on the Paths for the Development of Hydraulic Energy Engineering"]

[Text] A very important time has come for the creators of the hydraulic engineering complex on the Yenisey. By the end of the year it is planned to activate the last units in the basic GES -- the Sayano-Shushenskaya GES -- and the auxiliary station, the Maynskaya counterregulating "satellite" station. That will be not only an important reporting stage in the construction, but also a prerequisite for the successful operation of many enterprises in Siberia in the new 12th Five-Year Plan.

Our special correspondent met Chief Engineer of the Order of Lenin Krasnoyarskgesstroy Administration, K.Kuzmin. The name of that person -- a veteran of the Great Patriotic War, honored master of sport in mountain-climbing, and eminent hydraulic technician -- is linked with the construction of such projects as the Tsimlyansk, Kuybyshev, Volgograd, Saratov, Aswan, and Toktogul hydraulic complexes. At the construction of the GES in the Sayany, for the past seven years he has headed the collective's engineer building.

[Question] Kirill Konstantinovich, how have the engineer-technical workers at Krasnoyarskgesstroy perceived the criticism that was expressed at the June conference at the CPSU Central Committee concerning the slow construction of the Sayano-Shushenskaya GES?

[Answer] The criticism is completely justified and extremely pertinent. That can be confirmed not only by engineers, but also by every cadre worker of ours. Ask anyone and he will say that we cannot continue working this way. The construction of the GES began as long ago as 1963. If there had been a normal rate of operations, the station could have been started up in 1970 and turned over for operation in 1975. Because of the prolonged construction alone, we have lost approximately 200 billion kilowatt-hours of electric energy, not even counting the losses linked with the freezing of the technology, equipment, and labor resources.

I'll say something else. During the past 20 years the construction rates for the hydraulic complexes in our country have dropped to one-fourth to one-third; the time required to construct them has increased. We have begun to yield the advanced positions that were won in worldwide hydraulic construction. Meanwhile the USSR Energy Program that was adopted in 1983 stipulates an increase in the capacities of hydraulic energy engineering.

[Question] What is the state of affairs today at the Sayanskiy Hydraulic Engineering Complex?

[Answer] During recent months the situation has been improving noticeably. There has been an improvement in the support of the construction site, and the start-up diagrams have been re-examined. The collective has been applying all its efforts to assure that the ninth hydraulic turbine will be started up by 7 November -- it has already been tested in dry runs; and the tenth and last turbine will be started up by 22 December. That will make it possible in the first year of the new five-year plan to feed into the energy system no less than 18 billion kilowatt-hours of energy. The last unit at the Mayskaya GES will also be activated. The station will be turned over for operation in 1987.

At all sectors of the construction site, the operations are currently going on at an accelerated rate. The mood of the people has improved and labor productivity has increased. Although, of course, it is impossible to restore completely that which has been lost, just as one cannot return water that has been wasted. Because, in essence, it is not water that has flowed out of the concrete channels, but fuel...

[Question] What do you consider to be the basic reason for the lag that has occurred?

[Answer] Primarily that occurred because of fundamental errors in determining the effectiveness of the hydraulic engineering projects. One cannot evaluate the expenditures for the creation of new energy capacities only within the confines of a single branch -- power engineering. That approach is fundamentally flawed. It is necessary to proceed from the interests of the national-economic complex.

For example, USSR Minenergo [Ministry of Power and Electrification] has one of the basic reporting positions -- the build-up of capacities. Where can they be built up more quickly and most inexpensively? At thermal electric power stations. But as for what will have to be spent for the construction of new mines and coal pits, for the development of the transportation system, and what masses of people will be drawn into that conveyor line, people who will have to be provided with housing, food, and social, cultural, and everyday amenities -- those concerns are now those of "other" departments: Minugleprom [Ministry of the Coal Industry], MPS [Ministry of Railroads], Minzhilkomkhoz [Ministry of Housing and Municipal Services], the local Soviets... And it turns out that, because of the lack of fuel and interruptions in the transportation system, difficulties keep occurring in energy supply.

In the course of departmental disputes, people sometimes forget that the only highly maneuverable source of electric energy at that present time is the hydroelectric power station. Hydroelectric power stations can be easily used at the peak hours in the load schedule; they create conditions for the economical operation of thermal and nuclear electric power stations.

[Question] But these advantages sometimes turn out to be shortcomings. Whereas at a GES it is necessary to work for hours to "raise the steam," at the Krasnoyarskaya GES, for example, within a minute one can build up tremendous capacities. And what happens at that time to the Yenisey, and to the people who are living on its banks? Isn't it too big a temptation, simply by pressing a button, to close the gaps in the schedules? The public is assuaged by the ecological damage that accompanies the operation of a GES.

[Answer] That is a question chiefly of production efficiency, of planning, labor, and technological discipline. Unfortunately, the violation of the rules of operating a GES occurs frequently. For example, water was allowed to be discharged from the emergency reserves at a number of reservoirs. Too many hands can reach the button. But that does not mean at all that it is impossible to impose strict procedures here.

[Question] Nevertheless, where are the ecological losses greater: at a GES or at a GRES?

[Answer] One cannot go to extremes by comparing thermal power stations with hydroelectric ones. It is necessary calmly and thoroughly to analyze everything, taking into consideration the complete expenditures that will be borne by society, by the state, in receiving the electric energy. The only thing that disturbs us is the smoke trail from the GRES. But if you visited the places where coal is mined by the open-pit, "cheap" method, you would see those lifeless lunar craters where plowland had been. We must learn how to expend electric energy economically, since it costs a lot to pay for it.

[Question] But the tremendous mass of timber that is currently crowded together in the upper water of the GES could be sold.

[Answer] When the question concerning the removal of the timber from the zone to be flooded and concerning shared participation was being resolved, the planners knocked on all the high-level doors. But they could not find a single organization that wanted to enter into a shared situation with us. Everyone refused. "We won't have anything to do with your floating trash," is the way they put it. "Logging here is complicated, expensive, and unprofitable -- you can burn it." So we burned it. Now everyone comes out to the inspection site and they are surprised and outraged. They look at us reproachfully -- we are destroyers of the environment. But, just as the situation previously, no one suggests anything concrete. This is not the first year that islands of wood have been drifting along, either on the Bratsk "sea" or on the Ust-Ilimskiy. Energy engineers currently are attempting themselves to create floating timber-collecting plants, although, of course, this requires the participation of specialists, involves the technology of shipbuilding, timber processing, etc. It would be most efficient to transfer these sectors to Minlesbumprom [Ministry of Timber, Pulp and Paper, and Wood

Processing Industry], and to reinforce its subdivisions with technology, but also simultaneously to ban logging on other tracts until the reservoir channel has been completely cleared. Funds for fishery measures should be transferred in exactly the same way to Minrybkhos [Ministry of the Fishing Industry].

[Question] Are we really to believe that the planning agencies could not foresee this or that, at least now, they cannot make an effective, comprehensive decision?

[Answer] The fact of the matter is that there is no clear prospect in the development of hydraulic-energy construction. This unnatural condition has been in existence for a long time, and it has already resulted in a chain of uncoordinated actions and errors and in the actual elimination of many previously powerful specialized organizations. Financing is being carried out in an unforeseeable and, at time, unexplainable manner from the point of view of the technological scheme and common sense. Here, at the Sayano-Shushenskaya GES, at time the impression was created that financing pursues just one goal -- the start-up of the first unit for a high-sounding report, for "victory fanfares," whereas the project's energy yield does not excite anyone.

Obviously, one invariably sees superimposed on the external, objective difficulties at the construction site various internal, subjective problems, interruptions, instances of lack of coordination, and errors in the organization of labor. It must be said that people react very sensitively to the public opinion that forms about the construction site.

[Question] Do you mean the personnel turnover rate?

[Answer] Not just that. The occupation of hydraulic construction worker is a special kind of occupation. The working conditions are difficult, and at times dangerous; the quality of operations that is required is high, and there is a large amount of responsibility. The people whom we select here are those who love their profession, who are proud of it, and who put their heart and soul into their work. But when a person sees that supply is being carried out chaotically, there are frequent interruptions and coordination problems, what kind of pride can a person have? The people nowadays are intelligent. Everyone realizes that it takes 20-25 years to build a GES. This situation could absolutely ruin the country.

[Question] But what are the tendencies in worldwide hydraulic-engineering construction?

[Answer] During the five years since the start-up of the first unit at the Sayany, that is, through 1983, the United States activated at hydroelectric power stations 20.1 million kilowatts of capacities; in Brazil, 13.4 million; but in the Soviet Union, approximately 8 million. It is also necessary to take into consideration the fact that the percentage of use of hydraulic

resources was 45 percent in the United States, 40 in Canada, 90 in Japan, 70 in Italy, 99 in Switzerland, and 18 percent in the USSR.

[Question] What can be said about the level of provision with machinery and planning decisions and about technical progress at the construction sites?

[Answer] For more than 20 years practically no one has engaged in the development of machinery intended specifically for hydraulic-engineering construction sites. Because of the lack of long-range plans, fundamental research in the form of dissertations shows up after the construction has already been started or, as it sometimes happens, even after it has been completed. The new technology created by the design institutes with orientation toward definite types of structures frequently becomes unnecessary because of the fact that certain projects are replaced by other ones. But when major construction starts up, the construction workers themselves have to create the new technology to meet their specific situation. That technology, as a rule, abounds in interesting, unique decisions; but the cost, labor expenditures, and level of its manufacture often are remote from what could be obtained if series production in industry existed.

The design institutes are becoming more and more divorced from construction practice, and the real-life production conditions are being taken into consideration less and less. There have also been many shortcomings in originator control. Often the rights of decision-making are bestowed not upon those specialists who bear the actual responsibility for the quality and reliability of the structures, but upon those who, while having the right of control, do not bear any clear-cut responsibility. This gives rise to irresponsibility on the part of the executors and it stifles the initiative that has been aimed at the creation of designs that are technologically more sound and more economical.

[Question] That is, both organizational and economic measures are needed?

[Answer] What is needed, as M. S. Gorbachev has said, is a thoroughgoing, fundamental reorganization in the activity of everyone -- from the common laborer to the minister. An urgent reorganization, beginning with long-range planning and ending with questions of small-scale mechanization. And the first condition is to assure that the scientists and production specialists, the designers and the construction workers work in closer contact. This requires a modern organizational structure of the type of advanced scientific-production associations. This matter, undoubtedly, is a very difficult and complicated one. However, encouraging symptoms are already manifesting themselves. And they were expressed not only in a change of the attitude toward the Sayano-Shushenskaya GES. In this regard, in the final analysis, the subjective factors could also play their role. No, one senses that the time has come for changes in social awareness. And that is the most important thing.

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ENERGY CONSERVATION

RATIONAL USE OF WASTE PETROLEUM PRODUCTS

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 9, Sep 85 pp 62-69

[Article by candidate of economic sciences A. Vlasov, docent, Ufa Petroleum Institute]

[Abstract] This article discusses the present state of petroleum-product recycling, as well as organizational problems and ways to resolve them. A number of measures were taken to improve recycling: 1) institution of obligatory petroleum-product collection by consuming enterprises, regardless of their total consumption; 2) organization of ministry- and department-wide collection efforts and 3) allocation of new oil on the basis of waste-petroleum-product collection. After good petroleum-product recycling results in 1983, republic-level indicators fell in 1984 (only Armenia, Lithuania and Estonia met their 1984 collection tasks). The positive conservation steps taken by the Ministries of Ferrous Metallurgy, Power Machine Building and others are discussed. The following ministries are doing poorly in collecting waste petroleum products: Procurement; Communications Equipment industry; Petroleum Enterprise Construction in Eastern Regions; Geology; Instrument Making, Automation Equipment and Control Systems; Machine Tool and Tool Building Industry; Construction of Heavy Industry Enterprises; Agricultural Construction and nearly all agricultural ministries. The present directions of petroleum-product recycling need to be changed. Far too much waste oil is being sent to refineries to be mixed with crude oil, an uneconomic use. Rather, the most efficient practice is for consuming enterprises to regenerate petroleum products for their own use; this should be promoted. The main reasons for the uneconomic use of waste products are: 1) lack of regeneration capacity, 2) low wholesale prices for waste products and 3) lack of established consumption norms. To resolve the first problem, more capacity should be built (the maximum feasible recycling-plant capacity is 60,000 tons per year, rather than 150,000-200,000 tons per year, as some are suggesting; transport problems will make large facilities uneconomical). The second problem results from basing price calculations on zero cost for waste oil; rather, the true worth should be used. The third problem, lack of norms, is due to insufficient experimental research. Ministry scientific-research institutes should be directed to do more of this research. In addition, USSR Gosplan and its planning and norms institute should take the initiative. The setting of norms, however, should be a bottom-up, rather than a top-down process--starting with data from individual enterprises. The enterprises are presently doing a poor job of bookkeeping: they frequently revise their recycling report data after receiving the more reliable operating data from oil storage depots. Mobile recycling stations should be further developed. Waste-petroleum-product shipping requires better planning, involving specialized research.

ENERGY CONSERVATION

GOSPLAN CHAIRMAN CALLS TECHNOLOGY KEY TO ENERGY CONSERVATION

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 9, Sep 85 pp 125-126

[Article by V. Chebotarev under rubric "Scientific Life": "Problems of Reducing the Energy-Intensity of Social Production"]

[Text] Moscow was the site of the All-Union Scientific-Technical Conference "Problems of Reducing the Energy-Intensity of Social Production," which was organized by the All-Union Scientific-Research Institute of Comprehensive Fuel and Energy Problems, under USSR Gosplan (VNIKTEP). The participants in its work included Deputy Chairman of USSR Council of Ministers, Chairman of USSR Gosplan N. K. Baybakov; Deputy Chairman of USSR Council of Ministers B. Ye. Shcherbina; and more than 50 specialists from 102 union-level and republic-level organizations. The conference was opened by Deputy Chairman of USSR Gosplan A. M. Lalayants.

The report given by Chairman of USSR Gosplan N. K. Baybakov, "The Decisive Role of Scientific-Technical Progress in Reducing the Energy-Intensity of Social Production, contained a profound analysis of the basis ways to implement the USSR Energy Program. In that report it was noted that one of the most important directions in the economic development of our country in the present-day energy situation is the reduction of the relative consumption of energy resources and the carrying out of a fundamental transformation of the structure of energy resources in the national economy and the structure of energy consumption.

With the entire diversity of the measures that are being carried out to achieve the complete economizing of fuel and energy, it is desirable to isolate two groups that are closely interrelated. The first group can include the measure that do not require any major national-economic expenditures or the reorganization of the economy; in order to carry them out, it is sufficient to carry out organizational measures to eliminate unjustified losses of energy resources. The other group of measures is linked with considerable with considerable capital investments and, in a number of instances, the fundamental reorganization of energy production and energy consumption on the basis of the mass introduction of energy-saving technological schemes, as well as being linked with a substantial change in the structure of the economy for purposes of reducing its specific energy-intensity and with the improvement of the structure of the country's energy

balance sheet. A decisive role in carrying out the measures in this group belongs to scientific-technical progress. This principle in the report was given a thorough theoretical substantiation and was illustrated by concrete examples. A special place was occupied by the consideration of the question concerning the role of scientific-technical progress in resolving the tasks linked with the replacement of liquid fuel and the expansion of the use of untraditional sources of energy.

A great amount of importance in developing the country's energy management is attached to nuclear energy engineering, which has been called upon to play a decisive role in the economizing of organic fuel in the long run. On the basis of the acceleration of NTP [scientific-technical progress], other energy-saving technological processes are improving, and effective machinery, equipment, and apparatus are being created and introduced both in energy engineering itself and in other energy-consuming branches of the national economy. In many branches our economy has achieved major successes in improving energy-saving technological schemes. But there are areas where the rates of development have been lessened and one has noted a lag behind a number of the industrially developed countries of the world. Moreover, this pertains not to the scientific-technical developments, but chiefly to their introduction into production. It is necessary to change that situation radically in the 12th Five-Year Plan.

The report by the director VNIKTEP, under USSR Gosplan, Doctor of Technical Sciences, Professor S. N. Yatrov, "Problems and Prospects for Reducing the Energy-Intensity of Social Production," provided definitions of very important national-economic energy-saving indicators --the indicator of the energy-intensity of the national income, and the indicator of gross social product -- and pointed out their difference from the energy-intensity of social production as an indicator that characterizes the material-production sphere. Considering the question of the reduction of the energy-intensity of social production, the speaker reported that, on instructions issued by USSR Gosplan, the institute had developed a comprehensive target program for economizing and increasing the effectiveness of the use of fuel and energy resources in the national economy for 1981-1985 and for the period until 1990. As a result of the intensification of the work of economizing energy resources, in the current five-year plan better results were achieved than in the previous five-year plan. However, the rates of reduction of the energy-intensity of social production are lower than in a number of the developed capitalist countries. Researching the peculiarities of the structure of energy consumption in the United States, S. N. Yatrov concludes that it is not completely correct, without any special methodology, to compare the rates of reduction of the energy-consumption of social production in the USSR and the United States, since the structure of the national economic complexes in those two countries, the rate of provision with energy, and the energy consumption are different, not even mentioning the differences in economic policy.

In the report by Deputy Chairman of USSR Gosstroy I. I. Ishchenko, "Ways to Economize Fuel and Energy Resources in Construction," the speaker pointed out the basic directions in the work of carrying out the efficient designing and construction of buildings and structures in the country. USSR Gosstroy devotes a large amount of attention to assuring that the construction plans

include progressive technological resolutions that guarantee a saving of energy resources. The construction-planning documentation contains materials for using secondary energy sources, which are taken into consideration in the construction norms pertaining to heating and ventilation. Provision is made for the broad introduction of effective protective designs and coatings, the reduction of the degree of building fenestration, and the automation of the system of heating, ventilation, hot water supply, and the operation of heat networks.

In the report by V. V. Shildin and P. P. Bezrukikh (Gosstandart), "The Role of Standards in Reducing the Energy-Consumption of Social Production," it was noted that, in most of the state standards, quotas have been established for the expenditure of fuel and energy. However, the introduction of energy indicators into the standard is only the first stage of the work. It is necessary subsequently to exert an active influence upon the level of energy consumption with the aid of checking the observance of the standards and the making of more rigid requirements with respect to the energy consumption of the machinery and equipment being designed and produced. At the present time the country still lacks a single state entity to inspect the implementation of the decrees of the party and government in the area of economizing fuel and energy resources and the carrying out of a single technical policy with respect to energy conservation. This problem must be resolved within the near future.

In the report by Chairman of USSR Goskomnefteprodukt [State Committee for the Supply of Petroleum Products] T. Z. Khuramshin, "The Economizing and Increasing of the Effectiveness of the Use of Petroleum Products in the National Economy," the speakers noted the important role of petroleum products in our country's economy. However, at a number of enterprises, ministries, and departments, insufficient attention is still being devoted to the work of economizing fuels and lubricants. Everything has not been done to eliminate the opportunities for figure-padding, the theft of petroleum products, or their use for other than their intended purposes.

In the course of creating new machines and machinery, it is often the case that attention is not paid to reducing the expenditure of motor oil and lubricating oils during operation. The increase in the consumption of fuel in agriculture is considerably outstripping the increase in the volume of production in that branch. The efficient use of petroleum production can be guaranteed only if there is an improvement in the system of establishing norms for them and in the system of control.

The report by USSR Gosplan department chief A. A. Troitskiy, "Cooperation Among the CEMA Member Countries in Resolving the Problem of Reducing the Energy-Intensity of Social Production," was devoted to the problem of reducing the energy-intensity of social production under conditions of the worsening energy situation and the improvement of the energy management of the CEMA member countries. With respect to its significance, scope, and methods of resolution, that problem is going farther and farther beyond the confines of individual countries and is taking on an international nature. The resolution of this problem requires the intensification of the efforts of all the CEMA member countries, including those in the area of their cooperation in the

following directions: the intensification of the energy-saving policy; the further modernization and improvement of the structure of the national fuel and energy balance sheets, with the efficient replacement of petroleum fuel by alternative types of fuel; the expansion of their own energy base, including expansion by means of the accelerated development of nuclear energy engineering and the more complete use of the water-power potential; and the improvement of the structure of the national economy, with the deepening of the international socialist division of labor.

The discussion of the national-economic problems which were considered at the plenary session and which dealt with the reduction of the energy-intensity of social production continued in the course of the work performed by the following sections: "Methodological Problems of Reducing the Energy-Intensity of the National Economy and Branches"; "Reserves for Economizing Fuel and Energy Resources in Branches of the National Economy"; and "The Role of Scientific-Technical Progress in Reducing the Energy-Intensity of Social Production."

The conference adopted detailed recommendations dealing with the questions being discussed.

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ENERGY CONSERVATION

PARTY SECRETARIES REPLY TO FUEL USAGE CRITICISMS

Moscow EKONOMICHESKAYA GAZETA in Russian No 43, Oct 85 p 7

[Statements, signed as indicated below, under rubric: "After the Newspaper Has Made Its Statement": "How the Fuel and Energy Resources Are Used"]

[Text] As was noted in the survey (issue No 34), at individual enterprises in the oblast there was a lack of reserve fuel that could be used to replace gas during the period of the largest winter cold spells. I am reporting that those enterprises have been taken under special supervision, and effective assistance has been rendered to them.

Additional steps were taken, which were aimed at the fastest completion of the construction and activation of heat and energy structures, as well as the preparation of the electric power stations and industrial enterprises for the transition to reserve types of fuel. Supervision has been established over the prompt preparation of the enterprises and organizations for the acceptance and unloading of railroad freight cars and tank cars containing shipments of fuel and other types of freight under conditions of low temperatures.

All this has made it possible during the past two months to intensify the accumulation of fuel by the enterprises in the oblast and to increase the reserves of fuel oil by 1 October to 87.5, and coal to 81.1 percent. The work in this direction is continuing. -- A. Gerasimov, secretary of the Leningrad Oblast Committee of the CPSU.

In the survey (No 34) it was correctly pointed out that in July, in Latvian SSR, there had been an exceeding of the established limit for the consumption of electrical energy. The reason for this was the lack of discipline on the part of individual managers of the housing and communal-services management, as well as the insufficient supervision and demandingness on the part of the local Soviets.

As a result of the over-expenditure of electrical energy, penalty sanctions for a total amount of 736,000 rubles were levied against 319 violators of electrical-consumption discipline.

In the course of the preparation for the work in the autumn and winter period of 1985-1986, the republic has increased the supervision of the observance of

electrical-consumption limits. -- E. Aushkap, secretary of the Central Committee of the Communist Party of Latvia.

The Central Committee of the Communist Party of Kirghizia [KiCP] considered the facts cited in the surveys (No 8, 34, 37) concerning the use of fuel and energy resources. Actually, in February, July, and August the enterprises in our republic failed to stay within the established limits of electrical-energy consumption. The violators were subjected to sharp criticism at a session of the buro and at a conference at the KiCP Central Committee. The managers of ministries, departments, and enterprises that violated the limit discipline have been given a strict warning. In addition, at sessions of the execution committees of the Soviets of People's Deputies, oral reports have been given by managers of 76 consumer enterprises and organizations that had had an over-expenditure.

As a result of the steps that were taken, more than 15 million kilowatt-hours of electrical energy were saved in September. The KiCP Central Committee is intensifying its supervision over the rate of fulfillment of the decisions dealing with the economizing of fuel and energy resources. -- V. Makarenko, secretary of the KiCP Central Committee.

The shortcomings that were mentioned in the survey (No 34) have actually been occurring. Questions of the use of fuel and energy resources were discussed at the Buro of the Central Committee of the Communist Party of Turkmenistan [TuCP] and a session of the TuSSR Council of Ministers. The decree that was adopted contains a definition of a series of measures for preparing for the winter. Schedules have been developed and approved for converting electric power stations and industrial enterprises from natural gas to reserve types of fuel on days of a considerable cold snap.

For the republic as a whole, during the nine-month period a saving of electric energy was achieved; its consumption limit was used by 98 percent. The plan for accumulation of reserve fuel at electric power stations was overfulfilled. More than 15 percent of it has been laid in, as compared with last year. -- V. Zhulenev, secretary of the TuCP Central Committee.

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ENERGY CONSERVATION

GOSSNAB OFFICIAL ON TECHNOLOGICAL DIFFICULTIES OF CONSERVATION

[Editorial Report] The careful and rational use of resources is the basis for a program of "renewal" which will lead to economic intensification, writes D. Ovchinnikov, director of the Gosnab USSR Fuel Division, in a 2000 word article for Moscow's MATERIALNO-TEKHNICHESKOYE SNABZHENIYE in Russian No 4, Apr 85, pp9-13. This can be achieved by implementing "a single technical policy, further electrification of the economy, and a transition to massive use of highly efficient machines and technological processes which insure complex mechanization and production automatization."

The author cites several ministries for positive action in this regard. The Ministry of the Electrical Equipment Industry has over the past five years produced over 10,000 units of energy conservation equipment, such as electronic regulators and heat exchangers which utilize low potential heat of ventilation by-products. The Ministry of the Petroleum Refining and Petrochemical Industry has saved 2.2 million tons of standard fuel since the current five-year plan began through its modernization and reconstruction program, its new large-scale combined oil processing production, new technological processes in divinyl and isoprene production, use of effective catalyzers and rubber production techniques. The Ministry of Mineral Fertilizer Production has saved up to five million tons of fuel annually by introducing new equipment and by increasing output of ammonia and other products on older equipment. Five other ministries are praised, including the ministries of the Gas Industry and Power Machine Building.

Individual enterprises of several ministries in the construction, agriculture and consumer goods areas are criticised for lack of planning and organization. The author faults the low level of capital investment in power conservation in several sectors and in the national economy as a whole, where investment constitutes "only a half-percentage of the general volume of waste." He also criticises the slow implementation of such technological processes as dry coke quenching, the uninterrupted steel-casting method and oxygen-converter steel production, steam cooling of blast furnaces in ferrous metallurgy, autogenous processes, electrolyzers with glazed anodes, and hydro-metallurgical processes in non-ferrous metallurgy. The author further calls for widespread industrial development of new methanol, ammonia and carbamide production installations, gas phase polyethylene production, fuller use of thermal furnace waste gases and secondary fuel and thermal power resources. The inhibited development of these technologies and the lack of automated systems of fuel and power control and measurement have caused great harm to the economy, he states.

GENERAL

ACADEMICIAN DESCRIBES INEFFICIENCIES IN KAZAKH POWER SYSTEM

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 9, Sep 85 pp 49-51

[Article by A. Alimbayev, chief of the Karaganda Branch of the Economics Institute of the Kazakh SSR Academy of Sciences: "At the Service of the Energy Program"]

[Text] Implementation of the party's Energy Program requires the involvement in production of a vast amount of raw material and fuel and power resources (TER). Provision for the requirements of the national economy for fuel and power and an increase in capital and operational expenditures for extraction and transport of fuel and power resources should be combined with measures to reduce the consumption of energy resources and increase the efficiency of their utilization. This direction is becoming most important.

The role of energy conservation policy was defined particularly clearly with the adoption in 1981 of the CPSU Central Committee and USSR Council of Ministers decree "On intensification of work for the economy and efficient use of raw materials, fuel and power, and other physical resources." The document, of a long-range programmed nature, outlines a combination of economic and organizational measures and stresses the necessity of "...radically improving all work for the economy and efficient use of raw material, materials, fuel and power in all parts of the national economy. Scientific and technical and structural policy, capital investment policy, the system of administration, planning and incentive, and the initiative of labor collectives must be aimed at this."

Major problems which require expeditious scientific and practical solution are emerging in the course of implementing the Energy Program. The problems of more complete utilization of the fuel available in mineral resources and an increase in the oil yield of strata are acquiring particular importance. The proportion of recoverable deposits of fuel for the republic amounts to 30-33 percent of the fuel resources balance. So that the losses in mineral resources as a result of imperfectly utilized methods of extracting fuel at times are immense. For this reason, even an insignificant increase in the oil extraction coefficient makes it possible to obtain additional large amounts of hydrocarbon raw material.

Petroleum losses in the process of extraction also are taking place during desalinization and dehydration, storage and transport.

By improving the technical equipment of oil field facilities, by replacing worn out pipes and obsolete machinery, and by making use of efficient demulsifiers, we can sharply reduce the losses of the valuable fuel.

Casing head gas has become a significant resource for increasing fuel and power resources in the republic. In recent years, 80 percent of the casing head gas has been utilized in industrial production and for everyday purposes. Nevertheless, a significant amount of this valuable raw material is still being burned in flares or released into the atmosphere, which brings down enterprises' indexes of economic activity and has a harmful effect on the environment. While 97.2 percent of the casing head gas is now being recovered in extractive enterprises of the Mangyshlakneft Production Association, only 83.7 percent is being recovered in the Embaneft Production Association. About 1.8 billion cubic meters of casing head gas has been burned off in flares or released into the atmosphere in the Emba oil field in just the past 6 years. For this reason, it is now necessary to plan the construction of installations to provide for maximum volume in the accumulation, scrubbing and transport of gas. This is especially important as new oil and gas deposits will soon be put into operation in the region.

If oil workers are unable to recover casing head gas from these formations, the national economy will lose billions of cubic meters of valuable fuel.

The problem of complete utilization of the natural resources of coal requires solution. Losses of it are still high.

The inadequacy of equipment and technology in coal mining, losses in the ore untouched beneath buildings and structures located on the surface of major underground workings, and losses in areas with complex mining and geological conditions are among the detrimental factors which have to be emphasized.

Advanced technology to utilize untouched ore has begun to be introduced at a number of Karaganda mines in recent years. In this connection, operational losses of coal in mineral resources have begun decreasing. While they amounted to 72.6 percent in 1975, they were reduced to 55.2 percent in 1984. The economic gain also has been calculated at 114,000 rubles annually.

In addition, it also should be noted that losses for some mines in the basin amount to 30-35 percent of the balance stocks of coal. The volume of fuel left in mineral resources in the form of protective pillars at operating mines is approaching 500 million tons. The need no longer exists in many of them, and finishing off these pillars will yield a significant economic gain.

The increasing losses of solid fuel in its transportation and storage are intolerably high. Thus, over the years of the 11th Five-Year Plan they more than doubled for the Karagandaugol Production Association, and increased by a factor of 1.5 for the Ekibastuzugol association. According to our calculations, losses in coal shipments over 4 years of the five-year plan amounted to about 5.249 million tons, that is, essentially one large mine in

the Karaganda Basin was operating to no purpose. The reasons are an increase in the yield of the fine grades of coal, increased speed by trains, and the unsatisfactory condition of railroad cars.

All this should force production workers in a particularly pointed manner to resolve the problem of reducing coal losses, then eliminating them. In recent years, certain steps have begun to be made in this direction. For example, at the Karaganda TETs No 3 and GRES No 2, the fuel received is put into piles and rolled out in layers with the aid of roller-compactors. To prevent losses when coal blows away during rail shipments, as well as from oxidation and disintegration during storage in piles, the surface of the coal is compacted with rollers and protective film coverings [plenochnyye pokrytiya] are applied at the Karaganda Central Concentration Works. Nevertheless, this positive experience has not been widely disseminated.

One of the possible sources for replenishing fuel and power resources is the methane which is separated in the faces when coal is mined underground. Compared with other forms of fuel, mine methane does not contain products of condensation and may be used without dehydration and scrubbing.

More than 170 million cubic meters of methane are being recovered annually in the mines of the Karaganda Basin at present. Its industrial use was begun in 1975 in Karaganda. The boiler room of the Mine imeni 50th Anniversary of the October Revolution is being switched to gas. More than 22 million cubic meters of methane already have been recovered here, as a result of which coal consumption has been reduced and 466,000 rubles have been saved.

Work was concluded 2 years ago to shift the boiler at the Karagandinskaya Mine to methane, and this year similar fuel will be utilized for preheating the boiler at the Mine imeni Kostenko. This will make it possible to benefit from the use of about an additional 7 million cubic meters annually, reducing coal consumption for their own needs by 15,000 tons. The expected economic gain is 153,600 rubles. In this way, about 10 million cubic meters of methane will be consumed efficiently at three mines in 1985.

However, utilization of such an amount of methane sometimes depends to a substantial degree on the distance between the source and the consumer, as well as on how continuously this fuel is used and in full volume.

During the summer the workload at boiler rooms drops to 10 percent of the winter workload. In addition, the KPD [efficiency] of mine boiler rooms does not exceed 60-70 percent. All this does not make it possible to efficiently and uniformly utilize gas throughout the year. So that a significant amount of methane is released into the atmosphere during the summer. Utilization of it at the Karaganda TETs No 3 appears more promising. This will make it possible to economize up to 200,000 tons of coal annually. The capital expenditure to implement the method of utilizing methane being proposed by scientists is estimated at 4.178 million rubles and operating expenses at 650,000 to 718,000 rubles. In the process, economic gain will reach 1.2 to 1.5 million rubles annually, with an investment recovery period of 2.3 years.

In the system of measures to economize and utilize fuel and power resources efficiently, the role assigned to scientific and technical progress is paramount. First of all, this involves accelerating the realization of discoveries and advanced research efforts, with the technical re-equipment of production aimed at increasing the rates of economic growth.

At present, more than 70 percent of industry's fuel and power resources are consumed for technological needs; for this reason, improvement of energy conservation processes and the machines in use and the development of new ones are of great importance. Thus, the introduction of autogenous smelting at the Balkhash Mining and Metallurgical Combine will make it possible to increase the output of metals, sulfuric acid, and other components. At the same time, the fuel economized will amount to more than 40,000 tons of standard fuel. In addition, working conditions will be improved significantly and pollution and the spreading of dust will be decreased not only in the metallurgical shop, but in the entire production area of the combine as well.

At the same time, it must be admitted that construction of a heavy-duty unit for smelting in a liquid bath (PZhV) at the combine's copper smelting plant is being inadmissibly delayed. Periods set for introducing a number of projects in this important production complex for the enterprise have been repeatedly disrupted through the fault of the construction workers.

Further improvement in central heating is an important direction for fuel economy. More than 25,000 hot-water boilers are operating in the republic. There are more than 840 in Karaganda Oblast alone. The technical level of operation for this equipment is low, and the relative fuel consumption per unit of heat exceeds the level achieved at a TETs by several times as much. By eliminating these boiler rooms and connecting up industrial facilities to a central heating system, no less than 1.5 million tons of coal can be saved every year.

A considerable part of the equipment in operation and a number of the industrial processes at enterprises in the republic are obsolete and do not meet requirements for the current level of fuel use. Electric power stations built during the years of the first five-year plans and at the beginning of the postwar plans are still in operation in central Kazakhstan. The level of depreciation for their power equipment is 46 percent for Karagandaenergo and more than 75 percent at the Karaganda GRES's.

Since the beginning of the five-year plan in the Kazakh SSR Ministry of Power and Electrification system, only 10 turbines and five physically obsolete boilers have been disassembled, and equipment has been rebuilt and modernized on 61 boilers and seven turbines. They explain the reason for this as strain

in the energy resources balance. But such rates of reconstruction and modernization cannot ensure fulfillment of plans for the economic growth of power engineering for the sector, as well as the targets for the economy and efficient use of fuel and power resources.

Utilization of secondary energy resources is acquiring great importance for economy and an increase in production efficiency. In recent years many energy-intensive enterprises have achieved significant successes. They include the Ust-Kamenogorsk lead and zinc and titanium and magnesium combines and the Karaganda Metallurgical Combine.

At the same time, it must be admitted that the use of secondary energy resources at individual enterprises has not become one of the main directions in the struggle for economy. Analysis has shown that secondary thermal resources are being inadequately utilized at the Balkhash Mining and Metallurgical Combine (only by 6.2 percent). And at the Dzhezkazgan Mining and Metallurgical Combine this resource is not used at all. The point concerning renovation of metallurgical facilities for efficient utilization of thermal energy is continually included in plans for the combines' organizational and technical measures. However, in practice everything remains as before.

A considerable amount of the coal--up to 43 percent--is being consumed by thermal electric power stations. The efficiency of their operation, as a rule, is determined by the proportionate consumption of fuel per unit of energy released. This indicator is decreasing from year to year, although the relative consumption in Kazakhstan, on the average, is still 20 percent higher than in the heat and power stations of the USSR Ministry of Power and Electrification.¹

One of the factors holding back efficiency in the operation of thermal electric power stations is the quality of solid fuel, which is deteriorating every year. Thus, the ash content of coals mined in the Karaganda Basin in the 1970-1984 period increased by 2.7 percent. The basic reason for this is the proportion of the yield at mines which are working strata high in ash content and those that are substandard in ash content, as well as the contamination and disintegration of coal in the extraction process by narrow-capacity [uzkozakhatnyye] combines and during transport.

A further increase in the ash content of Ekibastuz coals is accounted for by the fact that the strata of the field have a complex structure and are made up of individual blocks of coal and rock layers which have an ash content ranging from 15 to 80 percent.

The quality of Ekibastuz coal, which is the basic raw material for the energy-producing industry, has a direct effect on the production activity of energy-consuming enterprises. The decrease in it is one of the reasons for the increase in proportionate consumption of fuel. Thus, an increase in the ash content of coal burned from 20 to 50 percent, other things being equal, increases annual fuel consumption by 80.5 percent.²

So an increase in the ash content of coal coming to the electric power stations of Kazakhstan causes considerable harm. In order to reduce it, it is necessary to conduct operations to prevent the coal from being further worked out and for its enrichment. An immense economic gain may be obtained from reconstruction of operating thermal electric power stations to shift them to the burning of unplanned high-ash fuel.

It is also important to intensify the search for industrial and economically beneficial means of obtaining synthetic liquid fuels from coals which are free of mineral impurities. A large group of scientists of the Central Kazakhstan Branch of the Kazakh SSR Academy of Sciences is now engaged in this, in particular, and rather successfully.

The activity and ultimate national economic effectiveness of organizational and technical measures depend to a significant degree on the status of accounting and control of the use of energy resources. However, the accounting of fuel and power in certain sectors of heavy industry, particularly at a number of mines and nonferrous and ferrous metallurgy enterprises, is unsatisfactorily organized at present.

Experience indicates that under current conditions the energy conservation policy cannot be maintained at the necessary level without an accounting of regional peculiarities. For this reason, it is necessary to determine the most important scientific and technical problems for each region; their solution would ensure identification of reserves and provide for an evaluation and correlation of measures to economize energy resources in industry.

Systematic economy and an increase in the efficient use of fuel and power resources is a complex task requiring many plans, and its solution cannot be reached solely as a result of implementing individual measures, even extremely important ones. Only the development in our republic of a unified plan which embodies a combination of closely interrelated organizational, technical and economic measures in all the stages of fuel extraction and processing and the production, conversion and utilization of energy will ensure success and will provide the opportunity not only to bring about a fundamental change in development of the fuel and power complex and sectors related to it, but to provide for success in all sectors of the national economy.

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1. "Izyskaniye rezervov ekonomii i povysheniya effektivnosti ispolzovaniya toplivno-energeticheskikh resursov v narodnom khozyaystve. Materialy Vsesoyuznoy nauchno-tekhnicheskoy konferentsii" [The Search for Reserves in the Economy and Increased Efficiency of Use of Fuel and Power Resources in the National Economy. Materials of the All-Union Scientific and Technical Conference], Moscow, 1981, p 209.
 2. V. N. Ivashenko, "Tsena i kachestvo energeticheskikh ugley" [The Cost and Quality of Energy-Producing Coals], Moscow, Nedra, 1977, p 31.

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