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USSR Report

ENERGY

No. 166

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DINKOV REVIEWS PROGRESS, PROBLEMS OF SOVIET GAS INDUSTRY

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 9, Sep 83 pp 3-12

[Article by V. Dinkov, USSR minister of gas industry: "The Sector's Five-Year Plan"]

[Text] Like all the Soviet people, people working in the gas industry received the decisions of the June 1983 Plenum of the CPSU Central Committee enthusiastically. This Plenum thoroughly analyzed pressing problems in the sphere of communist indoctrination in the current phase and clearly and precisely defined ways to further increase its efficiency. The results of the Plenum and the challenges that follow from its resolutions and the speech of General Secretary of the CPSU Central Committee Yu. V. Andropov have been adopted for strict guidance and fulfillment.

Thanks to the constant attention and enormous concern of the CPSU Central Committee and USSR Council of Ministers, the gas industry, which is the youngest sector in the fuel-energy complex, continues to develop rapidly. In the time since 1956 when the gas industry was established as an independent sector, gas extraction has risen more than 40 times. The Soviet Union is second in the world for volume of gas extraction and has passed all countries for level of annual growth in extraction. The USSR has built and is developing the largest unified gas supply system in the world in terms of productivity and energy availability. The objective of this system is to reliably supply natural gas for national economic and domestic needs and for export. The total length of trunk gas pipelines in this system could circle the earth at the equator three times. A system of underground gas storage facilities has been built.

Natural gas is an important part of the country's fuel-energy balance. Daily gas consumption has passed 1.6 billion cubic meters. In the USSR gas is used in production of 92.4 percent of the steel, 93.3 percent of the pig iron, 39.3 percent of the rolled metal products, 60 percent of the cement, and about one-quarter of the nonferrous metals. The production of all nitrogen fertilizers is based on natural gas. The municipal-domestic sector is a priority user of natural gas in the USSR: more than 203 million Soviet citizens use gas. Gas is being given a large role in the development of agriculture and carrying out the Food Program. The volume of gas use in agriculture increases each year. During the 10th Five-Year Plan the total

volume of consumption of gas from the system increased 1.4 times while use of liquefied gas rose 1.5 times; for the population the corresponding figures were 1.2 and 1.6 times. At the present time 154,000 populated points in rural areas have been connected for gas.

Alongside the factors that favor development of the gas industry, complexities have developed in the last decade in connection with the shift of the principal raw material base to remote areas of the northern part of Western Siberia while growth in gas consumption continues to be primarily in the European part of the country. Whereas about 40 percent of the gas in 1975 was extracted from deposits in the Ukraine, Northern Caucasus, and Komi ASSR, in 1980 it was 19 percent and in 1985 it will be just 10 percent. With the natural depletion of gas in deposits and certain regions now being exploited the share of the new capacities coming to replace them increases. About half of capital investment in the gas extraction subsector is being used to maintain the level of gas extraction achieved at deposits which are becoming depleted. The volume of capital investment for gas transportation is steadily rising, above all because of the need to build extremely long trunk gas pipelines from Western Siberia to the central and western regions of the country.

These characteristics of development of the sector were taken into account in working out plans for the 11th Five-Year plan, and this made it possible to insure that they were realistic and balanced. Thus, in the first 2.5 years of the present five-year plan the sector fulfilled its assignments for gas extraction ahead of schedule. The national economy received about 21 billion cubic meters of gas beyond the plan. Assignments for volume of industrial production, labor productivity, and other technical-economic indicators were overfulfilled. Stable gas supply to the national economy has been insured. Accelerated development of the sector is the result of the incorporation of large new gas extraction regions in Tyumen and Orenburg oblasts and the Turkmen SSR, which account for a large part of all USSR gas extraction.

The 11th Five-Year Plan envisions laying six giant gas pipelines with a total length of about 20,000 kilometers to transport Tyumen gas to the central and western parts of the country and for export. Three of them, the trunk lines Urengoy -- Ukhta -- Gryazovets -- Moscow, Urengoy -- Petvosk, and Urengoy -- Novopskov, are already in operation. The line part of the export pipeline from Urengoy through Pomary to Uzhgorod has been built; gas deliveries along this line will begin in 1984. It is envisioned that the first and second lines of the Urengoy -- Central Zone pipeline will be put in operation, as outlined in the five-year plan, in 1984 and 1985. All the pipelines are being built with 1,420-millimeter pipe and gas travels in them under a pressure of 75 atmospheres.

Despite the constantly growing complexity of the conditions for building and operating facilities, the rates of growth in gas extraction and transportation achieved became possible thanks to following a purposeful technical policy oriented to re-equipping gas extraction and transportation

enterprises with new, highly efficient equipment and to broad introduction of the latest scientific advances.

In construction at the Urengoy deposit in Western Siberia installations for comprehensive gas preparation are being built on the basis of modular equipment with greater unit productivity. The capacities of these installations are 2.5 times as great as the largest ones used in the 10th Five-Year Plan. This has made it possible to reduce the specific metal-intensity of equipment by 40 percent and cut labor expenditures and construction time in half. Large gas-chemical complexes have been built on the basis of new equipment. From the natural gas they extract components which are valuable raw materials for the chemical industry and for mineral fertilizer production. The third phase of the Mubarek gas refinery, built in 1981, reduced the amount of primary industrial equipment by four times compared to the first and second phases, the amount of pressure fittings seven times, cut specific metal consumption almost in half, and saved 21 million rubles of calculated expenditures a year.

Fundamental changes have taken place in the equipment of the compressor plants on the trunk pipelines. The GTK-10 10,000-kilowatt gas turbine pump units, which have inadequate reliability and a low level of automation, are being replaced by compact 16,000-kilowatt and 25,000-kilowatt machines with an improved automation system. Standardized plans for compressor plants using easily assembled individual buildings have been formulated on the basis of these machines. In this case the construction area is reduced by 2.5 times and the volume of construction work on the buildings and length of construction is cut in half.

Gas pumping units with aviation drive and output of up to 16,000 kilowatts are finding broad use on trunk pipelines. Their advantage is that all primary auxiliary equipment is delivered together in easily transported modules. A compressor plant with such units can be installed with one-half of the labor expenditures required for construction with GTK-10 units and construction time can be cut by three-fifths.

Practically all the new units have highly efficient full-pressure blowers. This simplifies the technological design of the compressor plant and significantly reduces the need for scarce connecting parts and pressure fittings. It should be noted that both the primary and the auxiliary equipment (dust traps, separator filters, air cooling units, and the like) at compressor plants being built in the 11th Five-Year Plan have improved technical-economic indicators.

One of the main directions of scientific-technical policy in the sector is introducing technological processes and equipment that insure conservation of raw material and fuel-energy resources. The Novo-Troitskiy gas condensate deposit in the Ukraine has successfully carried out an experiment on introduction of gas extraction technology that increases the extraction of condensate. It makes it possible to raise the coefficient of condensate recovery by 50 percent. The machine building ministries have begun manufacturing equipment for installing this technology at two other deposits.

The use of pipe expansion units that take advantage of the effect of gas expansion and do not conserve outside energy is widening in the processes of gas preparation at the field. Heat recycling units are being used widely at compressor plants with gas turbine drive. Enterprises of the Ministry of Gas Industry have developed and are manufacturing these devices.

The sector has done major work to automate technological processes and introduce automated control systems. In 1982 92 percent of the gas was extracted and 88 percent was pumped at automated enterprises. The largest gas fields and trunk pipelines now operate 35 ASU's for industrial processes. There is an operating system for transmission and processing of technological-regime and organizational-economic information. It includes the main computer center and 38 information-computing centers located at the sites of the production enterprises. The ministry has introduced the first phase of an automated control system for the gas industry. It consists of two large subsystems: dispatcher control of the Unified Gas Supply System of the USSR, and planning development of the sector.

According to calculations by economists, the introduction of new technology in the sector in the 11th Five-Year Plan is securing a 10 percent reduction in capital investment and a 23 percent rise in labor productivity. The principal result of measures toward technical progress is a significant (1.5-2 times) acceleration of the construction of gas fields and trunk pipelines, which ultimately also creates the prerequisites for getting high annual growth in gas extraction and delivering it to the national economy.

For the period until 1990 the ministry has worked out a comprehensive program of scientific-technical progress in the gas industry. Among the main tasks defined by the program are accelerated development of the deposits of Western Siberia, building large gas-chemical complexes on the basis of deposits in the Caspian Basin; accelerated growth in extraction of gas condensate; raising the operating reliability of the national Unified Gas Supply System; reducing the expenditure of fuel-energy and material resources during drilling, extraction, transportation, and processing of gas; and, full mechanization of facilities on the basis of broad use of microprocessor technology.

The enterprises and scientific research organizations of the associated ministries and departments that supply equipment, pipe, and materials must be directly involved in carrying out this program. The USSR Ministry of Nonferrous Metallurgy is to increase the production and improve the quality of corrosion-resistant casing, drilling, and pump-compressor pipe. The ministries that manufacture gas pumping units must begin work to raise the efficiency of these machines, to 32-33 percent in the first phase, and later to 40-45 percent by conversion to a steam-gas cycle. The gas industry needs modern electric-drive gas pumping units with a power output of 25,000 kilowatts. Their use would make it possible to greatly reduce the consumption of fuel gas.

There are major challenges in the field of improving automated systems for geophysical work on the continental shelf and for offshore drilling. We must

improve systems for diagnosing gas pumping units, means of monitoring the technical condition of trunk gas pipelines, and other devices.

Successful performance of production assignments by the gas industry is directly linked to refining the sectorial management system. As the resolution of the June 1983 Plenum of the CPSU Central Committee observed, questions of improving management are among the most important ones in the current phase.

Carrying out the measures of the Master Plan for Management of Gas Industry would permit a substantial simplification of the structure (elements) of administration, greater concentration and specialization of primary production, elimination of 236 enterprises and organizations, and a 5.5 reduction in the number of persons working in the sector and 5.25 percent reduction in number of persons in the management apparatus, resulting in a significant economic impact. The system of all-Union industrial, production, and science-production associations has been established and is developing successfully.

Carrying out the measures of the management master plan would promote organizational consolidation of the sector and rationalization of management links on the basis of an optimal combination of the principles of territorial and sectorial management. The plan meets the requirements of accelerated development of the sector, promotes an increase in production efficiency, corresponds to the rate of development of technical progress, and makes it possible to insure reliable gas supply to the national economy.

Planned refinement of management was a logical continuation of the measures of the General Plan. In the 10th Five-Year Plan this resulted in an economic impact of more than 310 million rubles, and almost half of the savings came from reducing the prime cost of output (work). Cutting expenditures for maintaining the management apparatus accounted for a substantial share of the savings. It became possible to achieve these results because of steps taken to straighten out the structure (number of elements), eliminate superfluous and parallel organizations, convert independent enterprises into production units and shops, and so on.

The successes of the gas industry are inseparably linked to a scientifically substantiated approach to production planning. The sector has clearly defined specific ways to improve planning work. A system of plan indicators was worked out and introduced for five-year and current planning. The indicators of volume of industrial output that existed earlier (extraction of gas, gas condensate, and petroleum, production of output by gas refineries and machine building plants in physical measurements, and their value) gave a good account of themselves in practice. But this was not enough. The role of indicators that described the quality of the work had to be bolstered. So beginning in 1978 the plan has established an assignment for prime cost of extraction and transportation of 1,000 cubic meters of gas. In recent years systems of norms and ceilings have been used extensively in planning. Using them together with stimulation is a progressive way to develop new methods of economic management and makes higher demands

for substantiation and balance of plan assignments. The new norms are reconciled with existing indicators, the sphere (level) of their application is precisely defined, and they have been made interdependent with the economic stimulation system.

Under the new conditions of economic activity it was necessary to significantly bolster the effectiveness of economic levers and stimuli and to make material incentive directly dependent on the results of production activity. For this reason the sector worked out and introduced a new system for formation of economic stimulation funds, based on the principle of providing incentive to enterprises for every 1,000 cubic meters of gas extracted, one ton of petroleum, and condensate by cubic meter rates. The amounts of the funds depend on maintaining the level attained and growth in extraction and labor productivity. Additional stimulation of enterprises is envisioned for conserving materials, fuel, and electricity, while a reduction in funds is provided if there is overexpenditure of these resources.

Improving the economic mechanism demands greater responsibility for final results and use of resources. For these purposes the ministry is working to introduce cost accounting in production elements on the following principles: planning indicators for each shop, brigade, section, and service based on their tasks and working conditions; keeping track of the work results of each cost accounting element in conformity with plan indicators; organizing cost accounting relations on the basis of mutual obligations and mutual responsibility of shops, sections, brigades, and services for fulfillment of the plan; and, stimulating low-ranking elements for cost accounting indicators. Introduction is going forward concurrently with improvement in production organization, and with reorganization of production in many cases. Comprehensive brigades with a precise delineation of their functions are being formed and rational relations between primary and subsidiary services are being established. In a number of cases it is necessary to improve record-keeping, reporting, and monitoring at the site and in all production units and shops where material, labor, and financial resources are being directly used.

Improving economic methods of management, conducting economic experiments, and introducing progressive know-how from within the sector and from other sectors of industry (the Shchekino method, the brigade contract, the experience of VAZ [possibly Volga Automotive Plant], and the like) have made a significant contribution to increasing production efficiency. The gas industry is devoting considerable attention to development of brigade forms of labor organization and introducing cost accounting in brigades. As experience shows, productive time has increased 7-10 percent in cost accounting drilling brigades and the prime cost of work has gone down 8-11 percent in derrick-installation cost accounting brigades. Furthermore, observations of the work of almost 240 cost accounting drilling and derrick installation brigades in the sector showed that personnel turnover in them is lower, discipline is better, the creative activism of workers and their wages are higher, and satisfaction with work is greater. For example, the turnover of medium-qualifications specialists dropped 10-15 percent, while

for highly qualified specialists the decrease was 40-50 percent; the number of workers who have mastered two and more occupations almost doubled.

During review of a concrete question at a meeting of the board of directors or party committee attention is given not only to the quality and quantity indicators and plan fulfillment, but also to the economic and social aspect of the matter. Concern is being shown for how to reduce expenditures for gas extraction and transportation, prevent excessive consumption of fuel-energy and material resources, create better working and living conditions for the working people of the sector, improve discipline, insure order in production, and increase the responsibility of each person for his assigned job.

The management, board of directors, and party committee of the ministry have taken a number of steps which have made it possible to increase the responsibility of working people for performance of party and government directives and our own orders and decrees and also for the overall level of performance discipline in the sector. In light of the demands of the June 1983 Plenum of the CPSU Central Committee, additional steps are being taken to raise the level of organization in fulfillment of state plans and assignments and to strengthen plan, technological, contract, labor, and performance discipline in subordinate associations, enterprises, and organizations. The final results of the economic activity of the sector and growth in labor productivity depend greatly on this.

Socialist competition is assigned an exceptionally large part in solving all these important questions. Suffice it to say that 900 collectives of associations, enterprises, and organizations of the Ministry of Gas Industry are now participating in this form of labor competition. According to the results of the All-Union socialist competition for 1982 challenge Red Banners of the CPSU Central Committee, USSR Council of Ministers, AUCCTU, and Central Committee of the All-Union Komsomol were awarded to the Tyumengazprom, Turkmengazprom, Shebelinkagazprom, Mostransgaz, Orenburggazprom, Soyuzgazenergoremont, and Gazlineftegazodobycha associations and the Kaspmorneftegazflot administration of the petroleum-gas fleet of the Kaspmorneftegazprom All-Union Production Association. The Tyumengazprom, Turkmengazprom, Shebelinkagazprom, and Mostransgaz associations have been listed on the Board of Honor at the Exhibition of the Achievements of the USSR National Economy.

Last year was a very important milestone for the gas workers of Western Siberia. On 3 November gas field workers in Tyumen extracted the 1 trillionith cubic meter of gas since exploitation of deposits in the oblast began. Following a call by the Tyumen workers, broad socialist competition for the right to participate in the Honorary International Watch unfolded throughout the country on the eve of this event. In addition to the best collectives in Western Siberia, emissaries of the gas extraction regions of the Ukraine, Uzbekistan, Turkmenistan, Azerbaijan, Yakutia, and the Komi ASSR stood this honorary watch at gas fields in Tyumen Oblast.

Responding with practical action to the party appeal to work more efficiently and strengthen discipline and order, the working people of the gas industry are laboring with great enthusiasm. The socialist obligations assumed for 1983 of extracting an additional 4 billion cubic meters of gas were already fulfilled by May. Moreover, the bulk of this amount came from the fields of the Tyumengazprom Association. From the first days of the present year socialist competition has been underway in all the collectives of this association under the slogan "From 500 million cubic meters a day of Tyumen gas for 15 years to 1 billion cubic meters a day for four years!"

Supporting the initiative of the collectives of Moscow industrial enterprises, Shebelinkagazprom and Achakgazedobycha associations came forward with an initiative to adopt additional stepped-up socialist obligations. The workers, engineering-technical personnel, and employees of the Shebelinkagazaprom Association resolved to decrease unproductive losses of work time by 22 percent through stronger labor and production discipline and improving labor organization and to produce 236,000 rubles worth of additional output in this way. These initiatives have been broadly supported at all associations, enterprises, and organizations of the sector.

Under contemporary conditions where the growing challenges of economic and cultural building make new demands for the organization of socialist competition, working people in the sector are competing to overfulfill production plans for quantitative indicators, while concentrating their primary attention on improving the quality of output and the use of production capacities, raw materials, energy, and working time. "In many cases this continues to be justified, especially in extracting industry," Yu. V. Andropov observed at the June 1983 Plenum of the CPSU Central Committee."[1]

The Ministry of Gas Industry is constantly looking for ways to raise the efficiency of use of material and fuel-energy resources and is taking a number of steps to strengthen conservation of these resources. The sector has established permanent commissions for conservation and rational use of material resources. Purposeful work is being done to establish scientifically sound norms for their use. A sectorial comprehensive target program for conservation of gas and other types of fuel and energy in the 11th Five-Year plan has been developed and is being carried out. Each year plans of organizational-technical measures that insure fulfillment of established assignments for conservation of fuel-energy resources are developed at all management levels.

The enterprises of the Ministry of Gas Industry also handled their assignment for conservation of fuel-energy resources in the first six months of the present year. The savings of fuel-energy resources was accomplished by introducing energy-conserving processes and equipment, improving norms and records, and carrying out a set of organizational-technical measures.

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[1]"Materialy Plenuma Tsentral'nogo Komiteta KPSS 14-15 iyunya 1983 goda" [Materials of the Plenum of the CPSU Central Committee on 14-15 June 1983], Moscow, Politizdat, 1983, p 12.

The most important measures are wide application of gas pumping units with greater unit capacity and wide use of efficient full-pressure blowers.

Work to reuse secondary energy resources is broadening in the sector. The work areas in compressor plants, communities, and hothouses are heated with recycled heat. Beginning in 1981 all newly built compressor plants with gas turbine drives have been equipped with units to recycle exhaust gases. At the present time more than 1,200 heat recycling units have been installed at 50 percent of the compressor plants with gas turbine units. At the same time, the volume of utilization of the heat of gas turbine exhaust gases is still low in comparison with potential opportunities. There are numerous promising ways to increase the use of this resource. Of particular interest is using the secondary heat resources of compressor plants equipped with gas turbine drive in units of the steam-gas cycle, which can produce electricity year-round or produce mechanical energy to drive additional gas blowers.

The possibilities of using secondary energy resources for production needs at compressor plants are essentially limited to this. The remaining reserve of these resources can be used by organizations and enterprises of the USSR Ministry of Fruit and Vegetable Industry and the USSR Ministry of Agriculture. With this in mind construction of a number of hothouse vegetable combines using secondary heat from compressor plants is envisioned. But the USSR Ministry of Fruit and Vegetable Industry still has not begun building these combines, which is holding back the rate of increase in use of secondary resources in the national economy.

The Ministry of Gas Industry is doing a great deal of work to raise the efficiency of gas use not only at subordinate enterprises, but also at the enterprises of other sectors. This work comprises examining enterprises of all economic sectors to determine the level of economy of the equipment and industrial processes using gas there, examining norms and record-keeping for gas use, studying the degree of utilization of the heat of exhaust gases, and producing modern highly economical gas burning devices for sectors of industry. As calculations show, it is possible to conserve about three percent of all the gas extracted each year just by modernizing gas burning devices at the enterprises of our country.

The gas industry, which extracts an enormous amount of natural gas, is itself one of the major consumers. Therefore, the question of economical use of gas is especially critical at enterprises of the sector, because this influences the efficiency of its work. To accomplish this, organizational-technical measures to fulfill established assignments for gas economy are developed and carried out each year. And we must say that the sector has had some success. For example, last year we achieved a 0.9 percent reduction in specific use for pumping gas on trunk pipelines as compared to the planned figure. Reducing gas losses during transportation through the country's pipeline systems by preventing and stopping gas leaks and emergency situations, reducing the number of purgings of pipeline segments, and technical re-equipping of the sector continues to be a reserve for gas conservation. The measures that have been adopted made it possible

to reduce specific gas consumption for pumping by 4.4 percent in the first two years of the current five-year plan and to fulfill established assignments for fuel conservation.

One of the important conditions for economical use of gas and insuring reliable operation of the national Unified Gas Supply System is strict compliance with economic discipline by all consumers. After all, even a slight increase in gas taken beyond established ceilings affects the technological regime of the trunk lines and leads to serious complications, especially on cold winter days when gas consumption for heating increases 2-2.5 times.

The sector has also made some progress in conserving material-technical resources. The average norm of metal consumption for the sector was lowered by 2.6 percent in 1982 alone, while a significant savings of rolled metal products was accomplished by introducing new, more powerful GTN-25, GTN-16, and GPA-Ts-16 units, efficient blowers, and other technological and design concepts at the compressor plants.

The ministry is devoting considerable attention to questions of lowering the estimated cost and materials-intensiveness of building gas pipelines. Sectorial planning institutes together with contracting construction organizations have done a great deal of work to formulate standardized design concepts for compressor plants. Standardized designs have gone through testing at USSR Gosstroy and are now being used widely for planning trunk pipelines. Work has been done to revise plan and estimate documentation for the purpose of lowering the estimated cost of construction. At 162 primary construction sites, the plan-estimate cost was lowered by 5.3 percent of the estimated cost of the revised plans.

The Ministry of Gas Industry is devoting a great deal of attention to the development of auxiliary agricultural production. The sector has already set up 10 sovkhozes, 12 subsidiary farms, and 159 livestock feedlots. The food products produced at them are a significant addition to the diet of people working in the gas industry. The sector's sovkhozes and subsidiary agricultural units have been given an important task: convert to meeting animal husbandry needs with their own feed by the end of the five-year plan. To do this they are significantly enlarging the area planted to grain and legume crops, above all grain corn on irrigated land.

The ministry is devoting a great deal of attention to increasing the production of consumer goods, broadening their assortment, and improving their quality. In the first two years of the 11th Five-Year Plan all machine building plants overfulfilled plans for their production. The Ministry of Gas Industry is responsible for the current state and development of production of gas equipment in the country (gas ranges, canisters for liquefied gas, water heaters, heating units, and the like), fuller satisfaction of public demand for these goods, development and introduction of new types of products, and expanding and improving their assortment. Beginning in 1981 a number of plants of the Soyuzgazmashapparat Association initiated series production of a new generation of Elekta gas ranges. Production of AOZhV-20

and AKGV-20 combined hot water and space heating units and the AOGV-6 and AOGV-10 heating units have been incorporated. By 1985 all gas equipment plants will be converted to production of a new generation of gas ranges. During the 11th Five-Year Plan production of 40 technically complex articles in 27 categories is to be incorporated.

Despite the sharply increased expenditures of incorporation and development of remote gas producing regions, the gas industry is one of the sectors that repays investment fastest. It is extremely advantageous to use gas in various industrial sectors. In open hearth production, for example, use of gas made it possible to increase the capacity and productivity of the furnaces and reduce consumption of refractory materials. The use of natural gas in rolled metal furnaces reduces specific fuel consumption 5-10 percent. In machine building most of the natural gas is used in the processes of heating metal and thermal treatment. Replacing electricity with gas in these processes cuts primary fuel consumption in half. The main area for increasing the efficiency of gas use in the building materials industry is converting to the dry method of cement production.

Natural gas has afforded automation of industrial processes, a healthier atmosphere in shops and at enterprises, and a decrease in specific expenditures of fuel and labor and the cost of repair of fuel-consuming equipment. It is also efficient to use gas to heat production buildings with air heaters that can successfully replace boilers. This kind of system (considering that there is no need to build the boiler room or lay heat piping) makes it possible to significantly reduce the cost of heating and construction time; moreover, the metal-intensiveness of structures is reduced by one-half to two-thirds.

Natural gas is being successfully used in devices that regulate a gas medium and are employed at fruit and vegetable storage facilities, in heat generators for heating hothouses, and in air heaters and infrared burners that are produced in series at enterprises of our country for heating interior areas. Gas is also used in cylinder dryers during the production of vitamin meal, to dry agricultural products, and in generators for top dressing plants with carbon dioxide.

The use of gas in the most diverse spheres of our life promotes environmental preservation. Its great advantages over other forms of fuel are the purity of the products of combustion and their lack of dust and sulfur anhydride. Thus, the dust content in the air basins of Moscow, Leningrad, Donetsk, Sverdlovosk, Tbilisi, and various other cities dropped several times after they converted to gas. Moscow now has the cleanest air of any industrial capital in the world, thanks to the use of gas fuel. This air will become even cleaner with the use of compressed natural gas in the internal combustion engines of motor vehicles (which reduces emission of harmful substances into the atmosphere by 3-4 times). The use of natural gas in motor vehicles is also advantageous from an economic point of view.

At the November 1982 Plenum of the CPSU Central Committee Yu. V. Andropov, speaking of certain key problems in the basic sectors of industry, singled

out further development of the fuel-energy complex as a challenge of paramount importance. This establishes the great responsibility of the working people in the gas industry. The sector today has reliable raw material resources, a mighty production and economic base, and most importantly, skillful, highly qualified personnel enriched with many years of experience and capable of achieving even greater frontiers and meeting the challenges of uninterrupted gas supply to our country's national economy.

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CSO: 1822/11

OILFIELD MANAGER COMPLAINS INNOVATIONS NOT ALWAYS EFFECTIVE

Moscow PRAVDA in Russian 15 Aug 83 p 2

[Article by N. Mironov (Bashkir ASSR): "Not All Innovations Are Alike"]

[Text] Economic thought: initiative and enterprisingness.

A well that by all accounts should have given oil suddenly turns out to be dry. For oil producers this is a big minus in their work, signifying that somewhere they had made a mistake, that they had not considered something. But is this the only reason for the appearance of "dry" holes?

Today Bashneft' [Bashkir Oil Production Association] is a huge industrialized production complex. Many progressive methods for recovering crude were introduced here for the first time in the country. Hundreds of inventions and tens of scientific discoveries by BashNIPIneft' [Bashkir Scientific-Research and Design Institute for the Oil Industry] are the basis for the industry's current technology, bringing millions of rubles of profit to the country. At present most of the association's technical and economic indicators appear to be well above the industry's average. It would seem that speaking about "dry" holes against this background is a clear false alarm. For there are so many collectives for whom achieving the Bashneft' level would constitute a real victory....However, nothing so exposes the problems of the economic mechanism as the difficulties of a good working collective. And timely surmounting of them is a "green light" for those who follow.

What does Bashneft' run into at the current stage? Bashkiria today is operating 100 oilfields, two-thirds of them in the last stage of development. The cream, as they say, has already been skimmed. Most of the remaining reserves are at small fields. And the farther one goes, the more difficult it is to get each new ton of recovered crude. How to reduce outlays? It is clearly obvious--new recovery methods are needed. From whom, if not from scientists, does one expect practical recommendations?

I put this question to Bashneft' Association General Director Hero of Socialist Labor Ye. Stolyarov. And the unexpected answer:

"The division of oil recovery into 'old' and 'new' methods is not useful for the business. Many people think that if it is 'new,' that means it is better than that which is 'old.' That is the psychology. But I do not think that way...."

The opinion is curious. And for many, probably, unacceptable. But it exists, and, evidently, it is necessary to understand its sources.

Yevgeniy Vasil'yevich is an experienced oilfield worker. He has gone up all the steps of the job ladder--from bottom-level worker to the supervisor of a collective of many thousands.

"I am not an enemy of the use of new methods," Stolyarov continues his thought, "but it is not necessary to consider PAV's [surfactants] panaceas for all troubles. This is extremism!"

Oilfield workers call surface-active chemical substances, which saturate the water pumped into a formation, PAV's. Scientists have concluded that PAV's should promote more intensive oil recovery. But does this method always and everywhere give the expected benefit? In answer, Yevgeniy Vasil'yevich tells the story of one PAV, with the designation OP-10.

Its use at Bashkiria oilfields began 20 years ago, and it was concluded here long ago that the method was ineffective. Why then is it still counted in the oilfield workers' arsenal?

"It is not simple to stand up for an opinion if it runs counter to that of the ministry," says Stolyarov. "We have been waiting for a benefit since we started to use the PAV: so much effort and so many resources have been spent on introducing it, and suddenly to admit its insolvency!"

Yes, that is not simple....When a scientific dispute is under way, the existence of several points of view is natural. But when the scientists and practical workers are on one side, and on the other is administrative authority, then the forces here are unequal. Moreover, such confrontation costs the state dearly.

Let us open up two recent documents. In one of them, the technical and economic council of the Bashneft' Association asks the ministry "to examine the question of the desirability of conducting further research on the use of aqueous solutions of poorly active noniogenic PAV's. The BashNIPIneft' board's technical council recommends that the problem of the 'professional and ethical fitness of the originators of the technology for the posts they occupy' be resolved."

The second document is the decision of the bureau of the Scientific Council on Problems of Oilfields of the USSR Academy of Sciences: "It is considered that the decision to make industrial-test use of methods for increasing oil withdrawal from formations at Bashkiria fields by injecting OP-10 was adopted without adequate scientific substantiation, on the basis of poorly founded laboratory research."

"There is no scientific dispute here," N. Demin, chief of the section for development of the fields comments. "The ministry has established accountability for new methods for recovering oil. It is proper. The millions spent on this item should indicate that the industry's management is undertaking efforts to increase oil withdrawal at old fields. The greater the amounts of the funds expended, the 'more active' is the work that is being done in this

direction. Actually, that is not so. It is not the 'new,' but the effective that must be sought."

In following this principle, Bashkiria's oilfield workers have the best economic indicators in the industry. The injection of formation water, that which is found along with oil that is recovered, has been used widely here. Nature itself has taken care to saturate this water with those salts and solutions that are the best displacers of crude oil. Today no one calls this method new, considering that it is ordinary technology. Among other things, it is more economical.

Just how, from the economic point of view, does the innovation that has been introduced appear today? Ten million rubles have been spent in 20 years on conducting the experiment with OP-10. And its effectiveness? Alas, it has never been determined.

Matters are no better either with certain other methods for influencing oil withdrawal that are called "new." The share of their influence on fulfillment of the plans for recovery is about 0.67 percent.

"The majority of the designs for using new methods are unprofitable at today's prices for crude," concludes N. Demin. "In some cases because of the great depths, in others because of thinness of the productive formations, and in still others because of a shortage of the necessary polymers. And there are other factors for which we are not responsible."

Does this mean that the experiments for increasing oil withdrawal from the formation must cease? Of course not. The point is something else. It should not be thought that if the new methods do not figure in the report, that means that oilfield workers have stopped searching for ways to increase recovery. Are there really few criteria by which one can judge the effectiveness of the association's work?

"Perhaps there are too many of them," says Stolyarov. "Today there are 133! And this, judging by everything, is not the limit."

When you become acquainted with a list of these indicators, you will be convinced that they contain that same tendency, as is the case with the new methods--a distrust toward managers in the field. Indeed, in addition to the plan for total crude recovery, indicators of the amount of oil recovered from new wells and the amount of recovery by new developmental methods are corobborated. In addition to the amount of recovery of casing-head gas, the indicator "gas utilization factor" has been established, which, in essence, has been incorporated in the plan for recovery.

Numerous duplications of indicators only complicate planning and the evaluation of effectiveness when summing up the results of socialist competition and when awarding bonuses. A good half of the indicators can be charged to the actual executors, that is, the association's appropriate subdivisions.

What is in the ground is still, to a great extent, a secret for man. Oilfield workers come up against these riddles every day. Unnecessary regulation and

tutelage by the compilation of numerous directives and obsolete regulations only fetter the initiative of workers at the lower levels.

What is it that this situation costs, for example, when the association's scientific-research institute has to limit severely the amount of work that does not yield to rapid determination of the benefit in monetary terms? Should geology be equated to machinebuilding? In the latter case, the benefit can be seen back at the drawing stage. Everything the oilfield workers have is underground. In recent years, moreover, the institute constantly has been loaded with tasks outside the plan, which come from various administrations, without an allocation of funds and without coordination with the association itself.

"I think such decisions exist today because the ministry's staff workers are not motivated materially toward the final results of the industry's operations," says Ye. Stolyarov. "If there were mutual responsibility of the ministries and production associations and enterprises, based upon cost accounting, the attitude of each worker toward the business would be different."

Well, the suggestion is not new, it has been expressed several times in PRAVDA's pages by other enterprise managers. All the more important it is to act toward it with understanding, to study it attentively and, finally, to set it in motion.

Initiative and enterprisingness, and boldness in judgment and responsibility--it is not only traits of character that must be instilled. There is also a system of directives and regulations, and reporting and record keeping on everything that, in practice, either helps or impedes productive labor.

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WAYS TO INCREASE OILFIELD PRODUCTIVITY DISCUSSED AT CONFERENCE

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 8, Aug 83 pp 26-31

[Article: "Problems of Improving the Development of Fields"]

[Text] An All-Union Conference on the Question of Exploiting Experience in and Further Improving the Development of Oilfields met at Ufa in April 1983. In addition to the main report by Minnefteprom [Ministry of Petroleum Industry], which gave a general evaluation of the status of and prospects for progress in work in this field, which is important for the industry, special reports and communications presented by production associations and scientific-research institutes were heard at the conference. These set forth experience in the development of fields in various oil regions and the results of theoretical research by institutes, and questions of further increasing developmental effectiveness that have come to a head were raised. An active discussion of the reports and an exchange of opinions on some fundamental problems took place.

Tasks for improving oilfield development that are associated with the more complete use of the earth's resources were set in 26th CPSU Congress decisions. The congress emphasized that our national economy's successes will depend greatly upon the effectiveness of the extractive industries, for the development of which a substantial share of capital investment is allotted each year. In regard to oil, the congress noted that enormous reserves are to be found in increasing the capability to extract it from the ground.

In realizing the congress's instructions and the decisions of subsequent CPSU Central Committee plenums, Minnefteprom and its production associations and research institutes have in recent years executed, in collaboration with interdependent institutes and agencies, important measures for improving the organization and for raising the scientific level of oilfield development, and, based thereon, for strengthening the raw-materials base for developing the industry.

Much has been done to insure high quality and comprehensive substantiation of design decisions for developing the fields, strict requirements for observing these decisions have been introduced, and the responsibility of field

specialists and supervisors for achieving the developmental operating indicators set by the design and for constantly monitoring operation of the wells and of the reservoirs as a whole has been raised.

In recent years, many obsolete directives in the area of development have been subjected to analysis and critical review, and new, more specific regulations, which cover practically the whole set of questions connected with insuring more effective development of the fields, have been introduced. As a result, the quality and degree of scientific substantiation of design and technical documents for development have been improved, and that documentation has become a more reliable base for precise and substantiated current and long-range planning for oil recovery and for the industry's activity as a whole.

Calculation and analysis of the structure of oil reserves have greatly improved, and the level of planning for utilization of the reserves has been raised. With a view to expanding the resources of the fields, industrial tests for increasing oil recovery are being performed (industrial-test work is being accomplished at 120 sections of 53 fields, and some of them are already yielding additional crude-oil output).

The industry's scientific-research institutes have also achieved definite results, having raised greatly the scientific level for developmental designs and the substantiation of their technical and economic indicators. The amount of research on urgent problems of development has been expanded and its efficacy has been raised, and monitoring of implementation of the designs has been intensified.

The scientific and practical levels of oilfield development that have been achieved up to now will enable oil-recovery volume and coefficients that will correspond with the modern technology that is being planned on the basis of the design and technical documentation to be provided for adequately reliably and with favorable technical and economic indicators.

Despite very important positive trends in the theory and practice of development, not all the severe problems have been solved completely, and this was clearly manifested during the conference. Petroleum science still has not produced precise and specific answers to all questions that arise in developmental practice, and experience sometimes poses new ones that require extremely thorough analysis and theoretical study. Their emergence is natural, since substantial changes in developmental conditions have been characteristic of the oil industry during its development, as is the case for any extractive industry. Let us note some of them.

Thus, the structure of the oil reserves has become less favorable. This is caused mainly by the involvement in development of a growing number of fields with more viscous crude or with worsened oilfield-geology characteristics, which require the use of capital-intensive technology and substantial operating costs. As a rule, in every oil-bearing region, the structures that are more substantial as to volume and that are more favorable for expected productivity are discovered and explored during the initial period, the more

so since doing so raises the effectiveness indicator for geological exploration. But later, as the reserves of the main fields are used, the intermediate reserves and the productivity of additionally discovered fields are usually less, and geological-exploration effectiveness drops. This sets a natural trend toward a deterioration of the characteristics of newly discovered fields throughout the country as a whole.

At the same time, a practice that is negative in principle also has prevailed. At the producing fields, highly permeable formations in purely oil zones are worked most intensively, while poorly permeable and water-oil zones, as well as deposits of highly viscous crude, are being worked at one-half to one-third that pace. Working reserves this way is the least favorable strategy for utilizing the fields' resources, so the scientific-research institutes should work out more actively a technology for stimulating poorly productive deposits and for raising the indicators of their development to the level of those that are more productive.

Another feature is change in the conditions for oilfield operation that is connected with conversion of the main portion of the fields to a later development stage, mainly the third, which is marked by a deep reduction in oil recovery. The share of recovery from fields that are in the first developmental stage fell from 56.6 percent in 1970 to 21.1 percent in 1982, and the share of the reserves of these fields was reduced almost by half during that same period. Also, the average flow of new wells was reduced by 26.8 percent.

Because of the unfavorable shifts in the developmental stages for the industry as a whole, the annual retirement of oil-recovery capacity rose 3.6-fold from 1970 through 1982. This circumstance led to a need for a large increase in the volume of development drilling--4-fold and more--during the indicated period. The consequences of the fields' converting to a later stage of development also were a growth in water encroachment of the wells, increase in the labor intensiveness of servicing them, and change in the structure of the methods for operation.

Water encroachment of the well product has increased from 44.3 to 62.2 percent for the industry since 1970. The greatest increases occurred in the Bashneft', Tatneft' and Kuybyshevneft' [Bashkir, Tatar and Kuybyshev Oil Production Associations], and also in Glavtyumenneftegaz [Main Administration for the Tyumen Oil and Gas Industry]. Because of this, the share of flowing-well recovery was reduced, and ever increasingly the wells are transferring each year to the mechanized method of operation--primarily to more productive gaslift and electrical centrifugal pumping. The number of such wells has increased 4.8-fold since 1970, and in 1985 the inventory of them will be 95,000 (17,000 more than in 1982).

Increase in water encroachment leads to the need to build up systematically the fluid withdrawal from wells, which, on the average for wells of the existing inventory, has increased almost 1.4-fold since 1970, and, obviously, will grow. This will require, in turn, an increase in the productivity and reliability of the technical means for lifting fluids and an expansion of capacity for treating oil and for pumping oilfield effluent into formations. At the same time, work to prevent oilfield-equipment corrosion and to overcome complexities caused by deposition of salt, paraffin and so on, must be intensified.

It must also be considered that new fields often are discovered in regions with severe natural and climatic conditions. Some of them have complicated structures, crude oil with anomalous properties, and unfavorable oilfield-geology conditions.

The indicated changes in the conditions for development should be reflected in the design and technological decisions in order to prevent a reduction in the technical and economic indicators that are achievable when developing more productive fields. The creation and introduction of highly effective methods for development and recovery should counter the worsening of the geological, natural, and climatic conditions. This is the most urgent problem of scientific-research institutes and of the industry's production organizations.

Growth of final oil withdrawal should be a generalized indicator of operating effectiveness in this area. Wide use of development systems that are founded on artificial displacement of oil by water has enabled the oil-recovery factor to be raised by almost 1.5-fold on the average for the country's fields. If the expected final oil recovery factor of the Soviets' main fields is compared with similar foreign fields, the USSR's will be 18-40 percent higher.

One of the main tasks of scientific-research institutes, primarily VNII [All-Union Gas and Oil Scientific-Research Institute], the country's prime institute for the development of oilfields and of oil-recovery technology, and also of the science-and-production associations Soyuztermneft' and Soyuzneftepromkhim, and of all the production associations is that of changing the trend of the dynamics of the magnitude of oil recovery for the country as a whole by providing for steady growth of it.

This task should be solved simultaneously in two directions. The first is accelerated creation and industrial introduction of new methods for increasing oil withdrawal, the second is more complete use of the potential contained in improving the technology for development with waterflooding.

In speaking about the first direction, the substantial work that the industry has done to promote assimilation and improvement of various thermal and physico-chemical methods for stimulating oil deposits should be noted. It includes theoretical research of intrastratal stimulation mechanisms, in order to clarify the prerequisites for the more intensive displacement of residual crude. Standard practices for computing indicators and for designing stimulation processes are being developed, the geological and physical criteria for the applicability of each stimulation method are being determined, and the appropriate chemical reactants and equipment are being created. Scientific institutions of the AN SSSR [USSR Academy of Sciences] and interdependent ministries have become involved in the research, and scientific and technical collaboration with foreign firms has been organized.

Another part of the work in the indicated direction is industrial test research under oilfield conditions, which is being conducted in 21 associations. It must be said that, despite the encouraging results that have been obtained during theoretical and experimental research, this important matter is, on the whole advancing slowly. The production associations, NPO's

[science-and-production associations] and institutes often speak of the difficulties that arise, which sometimes lead to a need to solve new problems and to delays caused by interdependent organizations' not fulfilling their commitments, and so on. However, experience has indicated that diverse organizational failures and sometimes even the irresponsibilities of the operators do the most to prevent acclerated performance of the work. Very often during industrial-test work, the absence of an integrated systems approach to execution of the planned measures exerts a negative influence.

Even research on creating basically new processes for extracting residual crude are being executed slowly, at a time when certain technical ideas now being developed are of great interest, thanks to the simplicity, universality, and greater technical feasibility and effectiveness of the solutions proposed.

Experimental work on thermal methods for recovering crude are being conducted at 16 of the country's fields, and, despite the fact that not everywhere are they being executed at an optimal level, they indicate that these methods have adequately high effectiveness. Thus, the injection of hot water into the Uzen field already is yielding about 1 million additional tons of recovered crude. At the Kenkiyak field, average well flow and current oil recovery at a section that is being developed with steam stimulation are 2-fold to 3-fold higher, respectively, than at other areas.

The economic benefit here is assessed at 8 million rubles.

The use of in-situ wet combustion at Azneft' and Mangyshlakneft' [Azerbaijan and Mangyshlak Oil-Production Associations] fields has increased the flow of crude in responding wells 2-fold to 2.5-fold. A basically important result of experimental work with this method was proof of the possibility of extracting a substantial portion of the residual crude by this method after flooding. This is confirmed also by the experience of Bashneft' and Ukrneft' [Bashkir and Ukrainian Oil-Production Associations], where, since the start of moist burning, about 30 percent of the product has been crude in responding wells where water encroachment had been as high as 95-99 percent.

Problems that require imperative solution arose during the industrial tests. Thus, generator installations with high steam parameters were created for steam-heat stimulation, but the well equipment (packers, compensators, heat-insulated pipe and so on) turned out to be inefficient at such parameters, compelling a reduction in the temperature of the steam being injected. The problem of overcoming the appearance of sand entry in wells that are being boosted by thermal processes still is not being solved satisfactorily. As a result, the pressure and thermal energy created in the formation is not always being realized completely enough, and the necessary balance between withdrawal of the fluid and injection of the working agent is not being provided for.

Insuring safety when oxygen appears in the gas product of wells, especially in cracked and cavernous carbonaceous reservoirs, the utilization of combustion products and methods for controlling the process and for preventing corrosion of the field's equipment should be included among the urgent problems.

Industrial-test work on physical-chemistry methods of stimulation are being conducted within the associations with varying degrees of success. As a result of tests on polymer flooding of fields at Kuybyshevneft', Bashneft', Tatneft' and Mangyshlakneft', the potential for providing for growth of recoverable reserves at these fields by 5-8 percent has been confirmed. In-situ sulfonation of crude in Tataria and the pumping of high-pressure hydrocarbon gas at Grozneft' [Groznyy Oil Production Association], Stavropol'neftegaz [Stavropol Oil and Gas Production Association] and Ukrneft' have yielded positive results. As for test injections of OP-10 type PAV [surfactant] solutions at Bashneft', Tatneft', Nizhnevartovskneftegaz and Surgutneftegaz [Nizhnevartovsk and Surgut Oil and Production Associations], technical difficulties and organizational deficiencies during execution of the process still have not been overcome, and the purity of the industrial experiment is not being provided for adequately, so the associations and institutes are not giving an unambiguous evaluation of the operational benefit.

One of the extremely promising methods for increasing oil withdrawal is carbon-dioxide displacement. According to the data of domestic and foreign research, carbon dioxide can reduce oil saturation of a formation to 5 percent of the rocks' volume, while water does so only to 25 percent. On being dissolved in the crude, the carbon dioxide increases its volume by 10-60 percent, depending upon reservoir conditions, while the crude's viscosity is reduced 5-fold to 10-fold or more. Since the carbon dioxide is a more potent solvent than hydrocarbon gas, the process of "miscible-phase" displacement can occur at reduced reservoir pressure. An immiscible-phase displacement can also be effective. When using carbon dioxide, deposits with low reservoir permeability and high viscosity of the formation's crude can be flooded.

Thus, stimulation by carbon dioxide is a fairly universal process that is effective over a broad range of oilfield-geology conditions, and the main thing for its use is an accessible source of carbon dioxide and the appropriate operating equipment. Preparations are now being made for injecting it at Kuybyshev's Radayevskoye and Kozlov fields.

Many of the methods being tested for increasing oil withdrawal have been prepared on practically an industrial scale. Nevertheless, the research institutes need to clarify the criteria for the effective application of each method in good time and to determine precisely the technological parameters of the processes and the requirements for chemical reactants and equipment.

In connection with the second most important direction of operations for increasing oil withdrawal, it should be said first of all that the operating possibilities for waterflooding still are far from having been exhausted. Many years of experience in its use constantly suggest new ways for improvement, which will provide for growth of recoverable reserves.

Let us dwell on several more urgent questions. Thus, traditional methods for designing the development of fields do not consider completely enough the influence of the system for siting and the density of the well grid on oil withdrawal, since the generally accepted hydrodynamic calculation indicate, as a rule, an insignificant increase in oil withdrawal with indrilling. Meanwhile, a generalization of experience in developing the Urals-Volga fields

that was made by scientific-research institute staff workers jointly with production workers testify to a more considerable influence of grid density on oil withdrawal than had been visualized previously.

As has been established at the Arlan field, increasing the network density to 17 hectares per well from 33 yields an oil-withdrawal increase of 10 percent of the total reserves. The calculations indicated that indrilling the network at this field 1.4-fold made it possible to obtain up to 40 percent more recovery annually, with prime production costs being the same and with an economic benefit of 310 million rubles per year.

SibNIINP [Siberian Branch of the Scientific-Research Institute for the Oil Industry] has constructed, according to oilfield data, the dependence of the sweep coefficient of flooded formations on the well-network density for several poorly productive inhomogeneous collectors, and it has established that a reduction of the distance between the wells to 400 meters from 750 meters increases the sweep coefficient on the average from 0.35 to 0.85.

An analysis of the results of indrilling at fields in Tataria, Bashkiria, Perm and Kuybyshev oblasts and other oil-bearing regions that VNII made jointly with regional institutes confirmed the high effectiveness of these wells. Their introduction into operation not only did not exert a negative effect on recovery from the other wells, but it even led to some increase in fluid withdrawal from old wells, since it enabled the waterflood system to be intensified. It is interesting to note that most of the indrilled wells entered operation without water, although the surrounding wells were already water-encroached.

It has been established that oil recovery for a producing facility grows in proportion to the number of indrilled production wells. At the Romashkino field 26.6 percent of the field's total recovery was being obtained from indrilled wells, which make up 29.4 percent of the total inventory of producers.

Thus, in the light of the new data, the indrilling of the well grid at operating fields and at newly introduced fields is of considerable importance for increasing oil withdrawal. Nevertheless, in substantiating network density during developmental design, it should be remembered that it is not only a technological category but also an economic category. When choosing a denser well grid, the choice must be justified convincingly by an analysis of the oilfield data, taking into account developmental experience and the prospects for using the methods for increasing oil withdrawal.

At the same time, the indrilling of a network must be combined with measures for improving use of the well inventory already established, particularly by increasing their productivity and operating time between repair periods, by increasing the production coefficient, and so on. In the final analysis, regularization in use of the well inventory is also an important factor in achieving the designed oil withdrawal, since a definite place for working the formation's reserves is allocated in the design for each well's development.

In the 1960's and 1970's various modifications of systems for development by flooding--line, block, areal, selective and others--were propagated. The purpose of introducing them was to increase the intensiveness of development. It is apparent from experience in their use that the criteria for applicability of the indicated systems had not been adequately clarified and validated. Thus, during selective and spot flooding, it was usually recommended that the water of the wells with the best filtration properties be used for injection, which would facilitate the wells' assimilation and insure high injectivity. It was proposed, in this case, that even poorly permeable stringer would be covered by the displacement. However, experience has indicated otherwise. At the Novo-Yelkhovskoye field in Tataria a selective system for development that had been designed provided high design levels of oil recovery in the initial period, when the more productive zones were being worked intensively, but, after extraction of the main portion of these zones' reserves, recovery declined sharply, and in 1982 it was 1.6 million tons below the designed level and water encroachment of the well product proved to be 17 percent above the designed level.

Consequently, poorly productive formations and stringers, especially in deposits of complicated structure, should become subjects of the most serious attention of scientific-research and oilfield workers, since they contain fairly substantial oil reserves. Tatneft' and TatNIPIneft' [Tatar Scientific-Research and Design Institute for the Oil Industry] showed, by experimental operations at the Almetyevsk area of the Romashkino field, that there existed a realistic potential for substantially intensifying the development of poorly productive formations by optimizing the well grid as to density and location of the wells, regulation of injection pressure, differential development of formations, and the stimulation thereof with chemical reactants. As a result, the recovery of crude at a test section and the rate of withdrawal of reserves grew 5-fold, with a prime production cost for the additional recovery that did not significantly exceed the average for the area.

The same work is being performed at deposits in West Siberia and Turkmenia that have reserves that are difficult to extract, but not actively enough everywhere, and, therefore, not always with the proper effect.

The breakdown of operating facilities into smaller units has an important place among the more effective measures for improving development systems. The old practice of developmental design that existed in the 1950's and 1960's, when an operating facility combined formations that had essentially different lithological and physical characteristics, led to an extremely uneven working of reserves, which became especially appreciable in the water-encroachment period of development, during which it turned out that certain formations had not been covered by the displacement at all. It was necessary later to do lots of work to break the facilities at many fields down into smaller units, sometimes creating for this purpose independent networks of wells. As a result of this breakdown, tens of millions of additional crude were recovered. It follows from this that scientific-research institutes must, when designing the developments of fields, approach the breakdown of operating facilities into smaller units with great thoroughness and soundness.

First-priority measures for increasing developmental effectiveness should also include a strengthening of waterflooding systems (taking into account, needless to say, the prevention of erroneous practices of the past) by creating additional lines for injection, reducing the size of the blocks, converting from block systems to area and selective spot floods, transferring the injection front, differentiating injection by formations, and so on. At the same time, the substantial effect that optimizing the injection pressure can produce--in some cases by increasing it above the original reservoir pressure--(in poorly productive deposits), and in others by reducing it (for example, in cracked or cavernous collectors) must be realized. It is impermissible that injection pressures be determined not so much by optimal conditions for development but by the technical condition of the equipment or the presence of water for injection.

The potential of the forced fluid withdrawal method in encroached wells, which is well known from experience in old oil regions, should be dwelt on especially. In recent years it has been used widely at Devonian deposits of the Tuymazy field, and carboniferous formations of the Arlan field in Bashkiria also showed high effectiveness. With forced fluid withdrawal, a proportional flow of oil was obtained, the pace of drop in recovery was slowed, and the duration of operation was increased, the profitability indicators being completely acceptable. However, wider propagation of this method is being held back by the association's lack of a standard-practices procedure for selecting the wells and the conditions for conducting forced fluid withdrawal and the lack of a procedure for determining the technological and economic effectiveness. VNII and BashNIPIneft' should accelerate the preparation of such standard-practices procedures.

The reports at the conference advanced many valuable suggestions about improving developmental systems that were based upon a deepened analysis of oilfield results. Many reports contained promising technical ideas and new approaches to methods for analyzing and evaluating development effectiveness. All this testifies to the necessity for a most speedy generalization of developmental experience on an industry-wide scale, taking into account all that is new that the experience of recent years encourages, and, for the preparation, based on this, of more precise recommendations for effective utilization of the earth's resources.

At the same time, further improvement of developmental methods and systems requires a more complete consideration of specific oilfield-geology conditions during design and an objective evaluation of the effectiveness of developmental results, and this is possible only with systematic study of wells and formations and well-organized monitoring of developmental processes that use modern methods and equipment. In view of the special importance of this question, the conference heard a report about the status of hydrodynamic and oilfield-geophysical research, on monitoring the development of the fields. The report noted that, despite the large amount of work performed in this area in recent years, the state of affairs still does not meet the requirements that have been presented. The lag is caused to a definite extent by an inadequate supply of instruments and equipment, the failure in some cases to properly man the research services, and poor work organization.

A lack of improvement of some of the methods being used is telling on the success of research work. Reliable geophysical methods for a quantitative evaluation of current and of residual-crude saturation in perforated and unperforated intervals of the pay have not been developed. The matter of plotting flow and absorption profiles with a quantitative evaluation of consumption, and so on, is not proceeding satisfactorily. Work to create new technical equipment and methods for studying wells and formations, particularly for wells with high bottom-hole temperatures and pressures, is being performed slowly.

The improvement of development and the solution of its problems, whose time has come, are integrated tasks that require constant attention and the participation of practically all the services of the industry, scientific institutions, associations and enterprises. Their efforts should be aimed at achieving higher effectiveness in the utilization of the fields' oil and gas resources.

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INCREASED EFFICIENCY CLAIMED FOR TATARIA'S OILFIELDS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 22 Jul 83 p 1

[Article by U. Bogdalov (Almetyevsk): "Toward the Third Billion"]

> [Text] Tatneft' [Tatar Oil Production Association] workers have committed themselves to recovering 150,000 tons of fuel above the plan this year. A whole half year has passed, and the oilfield workers have reported on-time fulfillment of the commitment: customers have been sent almost 172,000 tons of high-quality crude oil.

For a person who is far from the problems of oil recovery, such an important revision of the commitments can cause perplexity: weren't the initial plans understated? No, the commitments were made objectively. The secret is simple: a set of measures, the most important of which were improvement of methods for stimulating the productive formations, intensified development of the fields and introduction of progressive equipment and technology, enabled the geological reserves that are being worked to be used more fully to no small degree.

Right now Tataria is working on the recovery of its 3-billionth ton of "black gold." Not one oil-producing region of the country has produced so much up until now. Crude has been flowing continuously for decades from the wells to the grouped gathering installations in a section of Anas Galeyev's brigade--a most experienced oilfield worker and winner of the USSR State Prize. And invariably, the whole complicated activity operates under a strenuous operating program. They carry on even when pouring rains and hurricane winds hit the oil-bearing beachhead.

But today is sunny at the oilfield facilities. Most of the 114 wells and oilfield facilities are visible from a hill. Looking at the ordinary scene, which is close to his heart, Anas Zakirovich points out on it, as if it were a living map, the disposition of his brigade's manpower. True, the collective is not big, but this is that very case where skill, not numbers, counts.

One of the leaders in Leninogorskneft' [Leninogorsk Oil Production Association], Galeyev's brigade has begun to introduce multiple-well servicing. Each operator now takes care of more than 10 wells. Experienced people who know their business, in any weather they support the production-operations mode that

is prescribed by the geologists and operating engineers. And often they do far more than what is required, as does even the brigade leader himself. Thus it was, for example, recently at one of the grouped installations, where, one after another, the sensors that send signals to the control desk stopped working. Specialists in electronics should have corrected the breakdown. But while they were arriving and attending to elimination of the malfunction, the flow of crude would be stopped. Therefore Anas Galeyev himself eliminated the fault in an hour and a half. As a result, almost a score of tons of oil were recovered that would have stayed in the ground "for a valid cause."

Mastering related specialties has become the rule for everyone here. This is one of the main reserves that has enabled the oil output producers to raise competition to a new level and come out with an initiative important for the industry: "Keep all wells in operating condition!" And, after having worked it out, to convert to a new stage in the labor rivalry, now under the slogan, "Maximum yield from each well!"

At the start of July, while the results of the work during the first half of the year were being summed up, Anas Zakirovich was on vacation. He went on vacation in an especially elevated mood. The reason was understandable: he already knew that during the half year the brigade had exceeded its annual commitments. And T. Chaplygin of the Leninogorsk NGDU [Oil and Gas Recovery Administration] planning section refined what had been achieved:

"As a whole, the brigade overfulfilled its annual commitments by 1,190 tons. The well utilization factor was 0.961, and, on the average, it was just slightly lower throughout the administration. For the whole collective of Leninogorsk oil producers has worked well."

The Tatneft' Association workers' success resulted from common efforts. Ten of the 12 oil and gas recovery administrations have already fulfilled or overfulfilled their commitments. All the collectives untiringly search for reserves for increasing the yield of crude. For example, specialists of the Aznakayevo Administration for increasing oil withdrawal and for workover are helping the oilfield workers in every possible way--rehabilitating wells under the difficult conditions of increased water encroachment, aging of the well inventory, and the multiple-formation nature of the oil-bearing areas. The administration's departments are skillfully experimenting, bringing the newest scientific developments into practice. Jointly with the scientists, Aznakayevo personnel are performing industrial tests of new plugging materials and operating flow schemes, they are checking methods for isolating upper water-encroached formations with cross-sectional shutoffs, and so on. All this has enabled many inactive wells to be returned to operation and the withdrawal of produced water to be reduced. And the main thing is that a reliable basis is being laid for stable operation during the second half of the year.

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ORGANIZATIONAL, PAY REFORMS NEEDED FOR DRILLING UNITS

Baku BAKINSKIY RABOCHIY in Russian 10 Jun 83 p 2

[Article by A. Mamedov, chief of Azizbekovneft' NGDU: "Whether a 'Standard Well' Is Needed...."]

> [Text] The Azizbekovneft' [Azizbekov Oil Production Association] NGDU [Oil and Gas Recovery Administration] recently observed the 50th anniversary of the start of industrial development of the productive strata of the Kale Field. Over such a long period the formations' fuel reserves have been greatly reduced, and the development conditions themselves have become complicated because of intense water encroachment and the appearance of sand, and the number of wells in the active inventory has been diminished. But the administration's collective has countered all these difficulties with great experience and knowledge in the field of engineering search for effective geological-engineering measures aimed at preserving the fuel-recovery level. The technical and economic indicators that the NGDU has achieved in its operations in the months of this year that have elapsed confirm that the collective is coping with the tasks that have been set, despite certain difficulties.

Five hundred tons of crude and 588,000 cubic meters of gas above the goals have been taken from the ground, and, in so doing, 133,000 rubles of above-plan product have been realized.

The collectives of the oil-recovery departments that are under Communists A. Aliyev, M. Asadov and A. Rzayev have made a meaningful contribution to these achievements. Along which basic directions is the struggle for intensifying fuel recovery in our situation being conducted?

There is first of all the drilling and the competent purposeful work with the operating-well inventory at fields that were developed long ago--a great reserve not only for stabilizing oil recovery but also for a later increase of it.

Substantial fuel reserves remain in the Kale and Buzovna-Mashtaga areas, according to the geologists' estimates. In considering the sparseness of the developmental grid of the fields and the current operating condition of the

well inventory, most of which have worn operating strings, the NGDU's specialists, jointly with AzNIPIneft' [Azerbaijan Scientific-Research and Design Institute for the Oil Industry] have done much work on geological-engineering substantiation of the desirability of drilling. It was determined that, for the Kale and Buzovna fields, it was necessary, for purposes of making more complete use of the potential reserves of the oil deposits, to drill 15-20 new wells each year. The expected average daily flow of crude from each of these is 5-8 tons. This is no small amount for us. Since the start of the year, with the help of the Apsheron Drilling Administration, the drilling of three wells has been completed. Two of them are now operating with the yields estimated, and, in the case of the third, workers of the first department will, in the next few days, perforate and complete it. Of great interest is well No 1450, which was put down at the Kale area with a designed depth of 4,000 meters and should reveal oil and gas deposits in Miocene sediments.

In all, it is planned to introduce into operation nine wells that will be drilled before the end of the year. A second important factor in stabilizing the oil-recovery level is, as many years of experience at Buzovna has indicated, sidetracking and the drilling of a second bore. Each such well put into operation usually gives 400-600 tons of oil per year, and, moreover, it is a reserve for taking geological-engineering measures for a return to overlying areas. At present, 14-15 wells per year are being rejuvenated by this effective method. However, for successful solution of the task that has been posed, this number is clearly inadequate: it should be increased to 25-30 wells per year. This step involves the supplying of workover brigades with the required drilling equipment, tools and other equipment and the assigning of highly qualified personnel. Some of these actions are beyond our capabilities because of the absence of a supply and equipment base. We need help here from Azneft' [All-Union Azerbaijan Oil Production Association].

In order to keep the active well inventory in operation and to preserve its productivity, the NGDU has, since the start of the year, performed 834 geological-engineering operations, 18 more than had been planned. More than 10,000 additional tons of crude were obtained this way.

The thoughtful, painstaking work of operators, foremen, geologists and engineers on the inactive wells has reduced their number. While at the start of the year such wells numbered 76, there are now 43. Before the end of the year, it is planned to restore 32 wells by means of workover.

The introduction of a job-orderfree system of operation in the underground repair department has produced a benefit. The time between repairs for operating wells has risen by 16 days for the NGDU as a whole, having reached 55 days. Accordingly, the average daily number of wells awaiting repair has been reduced by 10-12 units; the number of repeat repairs and repeat approaches to wells has been reduced by more than 60 percent. The material motivation of the workers of repair and preparatory brigades for the final results of their work has risen. The average wage for each of them has risen by 20-25 rubles. Finally, by reducing the number of wells that are idle while awaiting repair and by lengthening the time between repairs, it became possible to reduce crude-oil losses last year by more than 500 tons.

Work is also being done by the NGDU to introduce new equipment and progressive technology. Foam systems are being used in the technological process for workover and current repair of wells. Through the use of foam-cement solution alone for the purpose of restricting the influx of water and for stabilizing the rock of the production formation in 33 wells, it was possible last year to extract 4,800 additional tons of crude and to reduce appreciably bridging in their annuli. At the NGDU's oilfield facilities, wide use was made of inhibitors and salt depositions that were developed by AzNIPIneft. In 1982, 78 wells were given 352 treatments, enabling us to save 9,300 meters of pump and compressor pipe and 880 rods.

In collaboration with VNIPIgaz specialists, a lightweight drilling mud for exposing productive targets with low formation pressure was developed and introduced. The use of this mud at 10 wells during sidetracking and drilling of a second bore enabled an economic benefit of 300,000 rubles to be obtained. Positive results were obtained from using devices that protect against the harmful influence of sand and gas. All this, as is said, is good. However, those deficiencies that are reflected in the effectiveness of the work of the whole collective also must be noted.

The time has come when it is necessary to reexamine the standard structure of the NGDU staff and to review without fail its supply and equipment section and the NGDU's materials storage. For all oilfield workers well know that the existing system of supply through UPTOK [Administration for Production Equipment Servicing and Outfitting] workers does not insure rhythmic and uninterrupted operation for all NGDU activity, and it consumes much of the time of supervisors and chief specialists during the resolution of various problems.

Moreover, the organizational schedule for engineers and specialists of departments for the recovery of oil and gas does not call for workers who will provide for the supervision of operations at night, and these functions basically use workers of high qualification. That is why it is necessary to introduce here the duties of shift production engineers. And there is still another problem. Indicators for determining the pay category of an NGDU and its structural subunits should also reflect qualitative factors as well as quantitative factors. Thus, for example, in order to assign an administration to some particular pay category, indicators are taken that reflect the amount of crude recovered and the number of active wells, but no consideration is given to the labor intensiveness of the work, that is, no account is taken of the complexity of operating the field, the depth of the wells, the method of operation, the condition of the deposits, water encroachment, and so on.

Thus it also happens that an NGDU with small wells but a large number of them is in a pay category higher than one with complicated development conditions.

We consider it necessary to introduce the indicator "standard well," that is, to adopt an average well depth as a unit or to consider also the amount of oil recoverable. And to this end, to assign an inventory of wells to a specific category in accordance with actual well depths, and then the wage category must be established on that basis.

In implementing November 1982 CPSU Central Committee Plenum decisions, Azizbekovneft' oilfield workers are broadening socialist competition under the slogan "Maximum yield from each well." In finding production reserves in competent fashion, the administration's oilfield workers are trying to consolidate the goals that have been achieved and to increase still further the yield from old formations.

COMPUTERIZED DRILLING RIG DEVELOPED BY SOVIET SCIENTISTS

Baku VYSHKA in Russian 7 Sep 83 p 2

[Article by I. Kostakova of Novosti Press Agency: "Computerized Drilling Unit"]

[Text] Specialists for a long time have been thinking about how to automate the process of operating a drilling rig. How could it be done so that all of the important parameters such as the force on the bit, its speed of rotation, the resistance of the rock, and the power of the pump jet are reckoned not by a man, but by a machine? Various different solutions have been proposed. The most widespread is test drilling, the results of which underlie the basis of the subsequent process. But this is not efficient. Time is lost, and the bit is worn in the test drilling. And there is another disadvantage of this method: over the time of the test, which lasts an hour, the consistency of the rock can change. Then, in time, everything has to be set up again.

Soviet electrical engineers have proposed a novel method of interconnected control for a rig. Readings, characterizing the process, are taken by sensors directly in the course of the basic drilling. The data is put into a computer which, before hand, has been programmed for the optimum penetration of the drill into the given rock. The actual distance penetrated by the rig is constantly compared with the calculated penetration, and the computer sends a command for adjusting the speed of rotation or the pressure on the bit. The adjustment goes on continuously without stopping the drilling process.

The new control method, as yet, is only being used on rigs for deep drilling where the main machinery has a regulatable electric drive. It is exactly on wells with depths of several kilometers where the cost of the bit is relatively small, but to lift the string from a well having a depth of more than five kilometers in order to replace a bit requires 10-12 hours. The invention of the Soviet specialists permits increasing the service life of a bit by a factor of almost 1.5.

The saving from the use of the innovation on one rig working to a depth of more than seven kilometers exceeded 400,000 rubles a year.

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NEW MODEL OIL PUMP DESCRIBED

Baku VYSHKA in Russian 9 Sep 83 p 1

[Article from Azerbaijan Press Agency: "For the Oil Workers of the Country"]

[Text] A furnace for the chemical and thermal treatment of metal which is going into operation at the machine building plant imeni F. E. Dzerzhinskiy has permitted the enterprise collective to begin the serial production of a new kind of oil pump - a pump with a one-piece cylinder.

Oil workers in all regions of the country impatiently are awaiting its production. The new pumps are more reliable than the so-called linered pumps now found in oil production equipment.

The plant is being prepared in good time to produce the pump. Shops have been supplied with the special equipment designed for processing the long parts, personnel have been trained, and several trial specimens of the pump have been produced.

To begin serial production of the new pump, however, it is necessary to solve still one more problem. The fact is, that the principal part of the pump - a five-meter long cylinder - has to be nitrided; that is, to be covered with a film,invisible to the eye, which gives the metal special strength. The nitriding process is complex, requiring a temperature above 500 degrees. It is impossible to do it without appropriate equipment.

Designers of the plant together with specialists of the association "Azerelektroterm" [Azerbaijan Electric Heat Treatment] and the VNIIPTneftemash [All-Union Scientific Research Institute for Petroleum Machinery] developed a special furnace. Its installation, literally over several months, was carried out by the workers of the enterprise, and the new article was started into production.

The first lot of pumps with nitrided cylinders already have been readied for delivery. In the near future the plant will get into the planned level of production - 40,000 units per year.

Next year, the new pumps will be the principal production of the plant. To expand their output, there are plans to build two more furnaces, to expand several shops and to install new equipment.

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LATEST SCIENTIFIC ACHIEVEMENTS TO AID OIL WORKERS

Baku VYSHKA in Russian 3 Sep 83 p 3

[Article by TASS correspondent P. Ryabov: "New Developments for the Oil Fields"]

[Text] The energy program of the USSR requires an acceleration in the development of the oil producing industry as one of the main components of the fuel balance of the country. Before the end of the current Five-Year Plan, the extraction of "black gold" in the principal producing regions alone - Western Siberia and the Komi ASSR, Kazakhstan, and Udmurtriya - will grow by 100 million tons. It is planned to achieve such growth first of all by the introduction of the latest achievements of science and technology, by broad automation of the principal processes, and by a substantial growth in the productivity of labor.

Materials in an exposition in the industrial pavilion of the VDNKh SSSR [Exhibition of the Achievements of the National Economy of the USSR] tell about the effective developments of Soviet scientists and skilled workers which are directed at reducing the time for opening up the underground deposits of valuable hydrocarbon raw materials. Together with many other visitors, the Tass correspondent went to the exposition on the eve of the professional holiday for oil workers.

Fire Is an Extractor of Oil

The output of oil at the Arlansk deposit was increased by a factor of five after a fire was started in its productive formation. Such ignition was done by specialists in accordance with a plan for experimental operations of the BashNIPIneft [Bashkirsk Scientific Research and Planning Institute for Petroleum] and solved by means of an inflow of underground heat to prolong recovery from exhausted reservoirs. By the beginning of the research operations in 1979, the deposit had been heavily invaded by water and only about half as much of the heavy oil was being taken out as possible.

To accomplish what was planned, an air-injection well was drilled and, not far from it, a series of development wells and a shaft for deep observation. Then a source of fire was created in the formation and, to support it, the continuous delivery of air was begun. Actually, the fire is to remain for a period of six years - the experiment was designed for such a period of time. It now has been determined that for the recovery of each ton of petroleum, it is necessary to inject under the earth more than 1,200 cubic meters of air. Right now the economic gain from this experiment which is being carried out for the first time in the country, amounts to about 60,000 rubles a year.

In all, the Arlansk oil producers plan to extract more than 160,000 additional tons of oil by the use of fire.

Magnesium Stops Water

In oil extraction it frequently happens that with the withdrawal of the liquid raw material from a formation, an excessive amount of water comes in through cracks that have formed. This noticeably influences the effectiveness of the development of the deposits and lowers the useful yield of wells.

Specialists of the Ivano-Frankovsky Institute of Petroleum and Gas together with workers of the NGDU [Oil and Gas Administration] "Dolinaneftegaz" ["Dolina Oil and Gas"] proposed a recipe for closing the cracks leading into the oil formations. To eliminate the underground gap, a mixture of sand and granulated magnesium is pumped into it and then the well is closed for two days. During this time the necessary chemical reaction - the hydrolysis of the magnesium - takes place and creates a reliable water isolating structure.

The use of such a method to subdue underground water had tangible results. More than 50,000 tons of additional oil was obtained, and the quantity of moisture being extracted from the productive strata was reduced by more than 400,000 tons. All this brought to the oil workers a substantial saving exceeding a million rubles.

Diamonds for a Bit

For rapid and high-quality penetration of the very lowest strata of wells, specialists of the VNII [All-Union Scientific Research Institute] for Drilling Equipment proposed that producers use diamond bits. More accurately, they proposed using synthetic diamonds placed only on the end face surfaces of the working part of the tool and protruding beyond the limits of the matrix by a little more than a millimeter in all. This turns out to be sufficient to easily cut the rock in the path of a diamond bit. This rock is limestone, cemented sandstone, and rock salt. The speed of penetration is established depending on the hardness of the strata as also is the depth of drilling with one bit which,on occasions,is reaching a thousand meters.

Bits with diamond coatings were introduced at oil fields in the Ukraine and Siberia. A check in practice - with the rotor method of drilling - showed that the new bits increased penetration by a factor of 10-12 compared with modern slow-turning, rolling cutter drill bits based on equal mechanical speed. The Moscow Combine for Hard Alloys has been charged with the manufacture of diamond tools for the petroleum industry.

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NEW INSTRUMENTS FOR OIL WORKERS

Baku VYSHKA in Russian 28 Sep 83 p 2

[Article by F. Agodov, general director of VPO [All-Union Instrument Making Association], Geofizpribor [Geophysical Instruments] : "New Instruments for Oilmen ".]

[Text] From the forum of the June (1983) Plenum of the CPSU Central Committee, the words of the General Secretary of the Central Committee of our Party and President of the Supreme Soviet, Comrade Yu.V. Andropov, have resounded with great and powerful inluence: "A vast amount of work awaits us in the creation of machines, mechanisms, and technology both for today and for tomorrow. It is in prospect to accomplish the automation of production, to provide for the wide application of computers, and effectively, to reconstruct production in the manufacture of new products."

Defining the goal, our Party shows the way to achieve it. The recently adopted decree of the CPSU Central Committee and the USSR Council of Ministers about "Measures for Accelerating Scientific and Technical Progress in the National Economy" aims at accelerating the introduction of scientific and technical achievements into use and the creation of such organizational, economic, and ethical measures that supervisors, workers, scientists, and designers will take an interest in the renewal of equipment and technology so that work in the old way would be unprofitable.

The leading enterprises of Moscow were the first to respond to the Party's call, and took on increased obligations for accelerating the introduction into production of the latest achiements of science and technology and for raising the technological level of production. The initiative of the Muscovites was unanimously supported by our collective, and we adopted supplementary obligations. It was decided to modernize or eliminate all outdated articles from the plan before the end of the 11th Five-Year Plan.

To save materials and labor, the NIPI [Scientific Research and Planning Institute] "Neftekhimavtomat" ["Petrochemical Automation"] together with groups of designers, production engineers, and tool makers of the association developed a new design for an electropneumatic valve to replace the EKP-1/4 and EPKD now being produced. The new valve is several times lighter than its predecessors, it permits an annual saving of 82 tons of ferrous and 30 tons of nonferrous metal, and lowers labor consumption in the operations by 30,000 hours.

The valves are used as components of production equipment which uses compressed air as an energy source and also in various systems for pneumatic automation in the petroleum, petrochemical, and chemical industries. There are many orders for them. The demand exceeds expectations. More than 100 of the new valves already have been manufactured and sent to users. The collective intends in 1984 to double the productivity of labor in the production of the valves using an assembly line with computers, robots, and manipulators.

We keep the question of the reequipping of production at the center of our attention. To achieve growth in the productivity of labor, we plan on the basis of the widespread use of modern technology and automation and on the use of computer equipment, machine tools with ChPU [numerically programmed controls and robot complexes]. The personnel of the shops and brigades have given their word to save 90 tons of ferrous and 30 tons of nonferrous metal annually.

Our association, "Geofizpribor", is the traditional supplier of instruments, means and systems of telemechanics for the facilities of the petroleum industry of the country. Ninety percent of our production is for the oil workers. In the list of articles produced are more than 50 items.

In accordance with the Azerbaijani Communist Party's specified course for the intensive development of the sectors which determine scientific and technical progress, during the 10th Five-Year Plan a modernization of the main plant was carried out. The enlarged production areas and the renewal of equipment permitted more than doubling the volume of production and permitted the proportion of products having the State Mark of Quality to reach 34 percent.

The development of the instrument making enterprises of the country and of our association in particular, was determined by the decisions of the Party and the government.

In accordance with Party decisions, a branch plant was organized in the village of Goradiz in the Fizulinsk region. It is a separate and independent unit of the association. Its volume of production already has been doubled. Already in this year it has mastered and is producing 10 different instruments for delivery to oil workers, to agricultural complexes and for export. Construction is envisaged of a production building with a 5-million ruble output. It is unfortunate that local bodies still pay insufficient attention to the branch plant, not monitoring its work, and not cooperating in the creation of normal living conditions.

In a most direct manner instrument makers are connected with the solution of a problem posed by the 26th CPSU Congress; namely, by 1985 to bring the proportion of oil production in comprehensively automated oil fields up to 85 or 90 percent and to reduce labor costs for servicing one well by 16 to 18 percent. Achievement of such a goal is possible by way of using automated systems of control and the latest instruments and computer equipment. Our association is aimed at precisely such production.

In the spring of this year, users of our association's products again recommended for the State Mark of Quality the device "Neftyanik TM 620". It is one of the principal means of automating control systems for production processes in the oil industry. This became possible thanks to the steady work of plant personnel on improving the article. In short, the fundamental technical parameters were improved in accordance with the requirements of the users and in connection with the problems they had to solve in the complicated conditions of exploiting oil fields. I will note that the role of the users of a product now is becoming a principal one in raising its technical level. This also has taken place with the ChTP-3 teledynamometer system which is widely used in pumping Apsheron wells. Before the successive recertifications "Azneft" [Azerbaijan Petroleum] representatives required that a number of changes be made; namely, improvement of the control panel so that the operator can use it not standing, but sitting, replacement of several subassemblies for greater reliability, and an expansion of the functional capabilities that would lead to the application of microprocessing equipment.

Instrument products have a tendency toward rapid obsolecence. After three or four years of use they are modernized or taken out of production. For us this is explained by steadily raising the technical level of our products in collaboration with our clients.

We have concluded discussions about cooperation with many users - oilmen of Tatariya, Bashkiriya and Tyumen. What basic purpose are we, the makers of instruments, pursuing? First of all - information. How do our instruments and means of automation and telemechanics work under real operating conditions? For instrument makers it is especially important to know accuately the evaluation of their products so as to bring about constructive changes in timely fashion and to better adapt their products to work under the specific conditions of use.

The decree of the CPSU Central Committee and the USSR Council of Ministers about "measures for Accelerating Scientific and Technical Progress in the National Economy" more rigidly regulates the relationship between manufacturers and users of products. The development of a new or modernized product, the placing of it into production, and also the discontinuation of its production is accomplished according to agreement with the users. For the rejection by users of equipment made to their orders or for their taking a prolonged time for placing it into service, the orderers will bear a material responsibility.

Our plant has available the resources to increase the production of telemechanical devices for the "Azneft" association and the VPO [All-Union Production Association] "Kaspmorneftegazprom" ["Caspian Sea Oil and Gas Industry"]. But as experience shows, the annual deliveries of our products to the nearest users are at a level of 5 percent of the total production. What is more, not one "Khazar" device, which was developed by the NIPI "Heftekhimavtomat" (in the city of Sumgait) especially for offshore production facilities, has been acquired by VPO "Kaspmorneftegazprom" even though the plant mastered the production of them in 1980. All these articles are being delivered to other associations in the Ministry of the Petroleum Industry. Such a situation can

be explained only by the fact that the "Azneft" and "Kaspmorneftegazprom" associations do not have personnel for servicing microelectronic equipment and therefore, in this case, they prefer to use the antiquated "Kaspiy" system which gives less information, has been removed from production, and units of which now are delivered exclusively for spare parts.

Now, VPO "Kaspmorneftegazprom" has somewhat increased orders to the plant for 1984, but not as much as we would like. It made us happy for a while that they were changing over from the method of installing automatic devices right at the operating facilities to the more efficient method of installing the means of automation on the production equipment which is produced by the Baku plant PO [Production Association] "Soyuzgazmashremont" ["Union Gas Machinery Repair"].

A great desire of instrument makers is to increase their contribution in the development of the petroleum industry of the republic and to assist our oil workers to revitalize their reputation as champions of technical progress by being first with the introduction of all technical novelties in the country. At the plant we have done much toward this but more is in prospect to be done in collaboration with the users.

In recent years we have successfully increased the reliability of articles from 0.89 to 0.92by the widespread unification of standard designs, by the use of stronger materials, and by the introduction of advanced technology - nickel plating, alloying, and galvanoplastics and,at the same time,all these processes were automated.

Two automated systems for monitoring and diagnostics - one for modules and the other for bundles of conductors - which were developed and introduced by the NIPI "Neftekhimavtomat" and the plant, not only reduce labor consumption in adjustments but also permit conducting one-hundred-percent monitoring of subassemblies and devices, increasing the reliability of systems and making it easier to put devices into operation at facilities. Each of the systems introduced consists of a minicomputer "Elektronika 60", peripheral devices for input and output, and devices for structural, algorithmic, and power connection to the objects being tested with the computer. Now, the checking of a bundle consisting of several hundred conductors takes several seconds whereas, before, each conductor was checked for breaks separately, and that wasted several hours.

The high effectiveness of the automatic system of monitoring and diagnostics pleased the users of our products. The VPO "Kaspmorneftegazprom" and other oil and gas-producing enterprises sent orders to our plant for the manufacture of such systems in order to use them as servicing apparatus for telemechanical equipment manufactured by our plant. We willingly fulfill such orders.

The widespread introduction of automation leads to the piecemeal assembly of functional modules. It is envisaged that the productivity of this segment of the work will be increased by the introduction of the "solder surge" production soldering process.

According to the assignment of the plant, the SKB [Central Design Bureau] "Geofizika" of the Academy of Sciences of the Azerbaijan SSR, in the third quarter of the current year will complete the development and by the end of the year the plant will manufacture and introduce an installation for the automated making of connections in units by the method of twisting. Control of the device will be carried out in the block section of the plant and it will eliminate errors in the installation of subassemblies.

The plan for the technical progress of the enterprise specifies a change in the make-up of metal cutting equipment. A place is being made for special machine tools and tools with numerically programmed controls. In the final analysis, all our plans have the main purpose of producing the newest kinds of articles that are reliable and of high quality and which will fully satisfy the requirements of the national economy.

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NEW FINNISH-MADE DRILLING SHIP ASSIGNED TO SOVIET FAR EAST

Moscow PRAVDA in Russian 19 Jun 83 p 2

[Article by stringer V. Ryabchikov (Yuzhno-Sakhalinsk, 18 Jun): "The Geologists Have Gone to Sea"]

[Extract] The diesel-electric motorship "Mikhail Mirchink" made a surprise visit to Korsakovo port. This is the first ship in the Far East designed specially for drilling operations.

The ship has augmented the Far East Offshore Deep-Drilling Oil and Gas Exploration Expedition, which is exploring the shelf.

"Our diesel-electric motorship is the third in a row built by Finland's shipbuilders on Soviet Union order," says V. Zhizhko, chief of a section of the expedition. The ship greatly enlarges opportunities for off-shore geologists, and it will enable them to do prospecting work with great benefit. Suffice it to say that our drillers are now in a position to drill holes under water, to 6½ kilometers, where the sea is up to 300 meters deep."

A drill rig of almost 25 meters has been erected at the center of the ship. It is just like its dry-land "sisters," but it is equipped with a telescoping pipe-rod. The pipe, lowered to the bottom, will enable drilling to be conducted under water in accordance with all the principles for dry-land technology, drilling mud to be delivered uninterruptedly, and the well to be blocked off from penetration by sea water. A deepwater diving complex on the ship will enable underwater work to be done at depths of up to 300 meters.

The diesel-electric motorship is equipped with a system that holds the ship at a required point and on a prescribed course. So it is that traditional anchors are not necessary. The system is controlled by three computers.

A helicopter pad has been built on the stern. It is designed to accommodate rotary-winged craft of the MI-8 type.

The crew of the diesel-electric motorship, under the command of former sailor captain-director G. Milyutin, is getting ready to go out on its first voyage--to Sakhalin's western coast.

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OFFSHORE BLACK SEA GAS TO GO TO CRIMEA

Moscow TRUD in Russian 26 Aug 83 p 1

[Article by L. Zorin (Crimea): "Gas from Black Sea Depths"]

> [Text] Natural gas recovered from the Black Sea's continental shelf has begun to arrive on the Crimean Peninsula. For the first time during its whole industrial development, the Crimea has converted to supplying its own "blue' fuel," taken from offshore sources.

Our helicopter flies over the open sea. The direction is northwest. Gas is being recovered there, far from the shore.

And now below, manmade steel islets have appeared. From above they look exactly like slender, delicate etageres scattered about the sea's endless surface.

The helicopter went in for a landing and the "etagere" began to grow to the eye, being transformed into a colossal structure that has been firmly planted in the seabed by steel latticework. Here it is, the platform that drilled through the "crown" of the gas storehouse. From the helicopter window one can see the heavy waves rolling against the steel island and breaking up into spray. The sea is restless today. However, on top of the platform it is nice and dry. The almost medical cleanliness strikes the eye at once.

"It cannot be otherwise," says N. Il'nitskiy, chief engineer of Chernomorneftegazprom [Black Sea Oil and Gas Production Association]. For it is only a few dozen kilometers from the oilfield to the Crimea's resort area, where millions of people vacation and regain their health. That means that not even one small stream of gas must fall into the Black Sea."

Gas-field workers have tried to the utmost to meet all the water inspectors' demands, in order to prevent any possible pollution. Clay and cement are delivered here in sealed containers. Effluent is pumped into injection wells hundreds of meters below the seabed. Almost all processes here are followed automatically.

"We lower into the well itself a sort of 'plug,' which is ready in case of any emergency to instantaneously bar the path of a gas stream to the top," says N. Il'nitskiy.

The helicopter pad's flags begin to tremble because of the rotor, and again, to the very horizon, there is continuous water. The steel strand of the gas pipeline that lies on the bottom cannot be seen through the waters' depth. Ministry of Gas Industry subunits had to overcome many difficulties when they laid this underwater artery down. The foul sea bottom in the construction area forced rejection of the traditional pipelaying ship. In order to reduce the number of voyages and, therefore, the risk, it was decided to weld the pipe into 3-kilometer lengths on shore and to tow them intact to the joining site.

It is obvious today: by laying all 72 kilometers of the sea portion of the gas pipeline by the basically new method, the gas-field workers saved the national economy millions of rubles. However, prospecting does not stay in one place. When, on returning from the gas-field facility, we approached the pipe-welding base on the shore, the helicopter's shadow cut across a whole bunch of kilometer-long pipelengths, which were gently rocking on the bay's surface. The builders have now decided to bring the whole bunch of pipelengths out to sea all at once and to weld them far from the shore. This method was used during construction of the second Golitsyno-Crimea underwater arterial. The innovation permitted maximum use of the summer period, which is favorable for laying the line, and a reduction of the erection time by two-thirds.

...Our flight was completed at Glebovka, where the installation for the integrated treatment of Black Sea gas was located. We landed. The rotor blade cut the air increasingly slowly. But now there is an odd thing--the noise does not let up but, on the contrary, it is reborn in another form--the remaining sounds are thick, fizzy and hammering.

"The piston is moving!" shouts N. Il'nitskiy. "It drives the water out of the gas pipeline after it is erected. Soon there will be gas in Glebovka...."

I am imagining an enormous foamy "mixture," far at sea, rushing headlong, like a torpedo, driven along the pipe by the gas stream to the Crimean coast. The gas is moving.

It is possible that in the future the Crimea itself will begin to supply gas to the Ukraine's south, thus transforming it from a consumer to a supplier.

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CSO: 1822/348

BRIEFS

NEFTECHALA DRILLING PROGRESS--Neftechala--The brigade of drilling foreman Knight of the Order of the Emblem of Honor I. Mirzoyev, of the Neftechala UBR [Drilling Administration] reported a couple of days ago completion of the task for the first 9 months of the year, having drilled about 1,500 meters of rock since the start of the third year of the five-year plan, for which the goal was 900 meters. The net effective speed in making hole was almost 290 meters per rig per month, instead of the 180 meters planned. Foreman I. Mirzoyev's brigade is now preparing to lower intermediate casing into the well to a depth of more than 2,850 meters, and it is filled with resolve to accomplish this work rapidly and with good quality. [Engineer D. Gezalov] [Extract] [Baku VYSHKA in Russian 28 Jun 83 p 1] 11409

ALI-BAYRAMLY WELL REPAIR--Ali-Bayramli--Workers of the well-workover department of the Shirvanneft' [Shirvan Oil Production Association] NGDU [Oil and Gas Recovery Administration] have turned about 100 wells over for operation ahead of schedule. This has enabled the repair of almost 10 wells more than called for by the plan, and many additional tons of crude have been received from them. And the repairmen's labor productivity has increased 3½ percent in this case. [Oilworker pensioner A. Babayev] [Extract] [Baku VYSHKA in Russian 19 Jul 83 p 1] 11409

AZERBAIJAN OFFSHORE LABORATORY OPERATIONS--Baku--The collective of the central laboratory of Kaspmorneftegaz [All-Union Caspian Sea Offshore Oil and Gas Production Association] is exceeding socialist commitments by far in its work these days. Having carried out since the start of the year about 2,500 analyses of samples of rock taken from exploration wells drilled under the Caspian's bed, of formation water and crude oil from offshore fields, and of cement and weighting agent for drilling mud, the laboratory's workers are now working on August's account and are raising the pace from day to day. [N. Mushailov] [Extract] [Baku VYSHKA in Russian 19 Jul 83 p 1] 11409

UKHTA OIL PRODUCTION--Ukhta--Since the start of the year 80,000 tons of fuel above the goal have been sent to Komineft' [Komi Oil-Industry Association] customers. Collectives of the second and fourth sets of oilfield facilities of Usinskneft' [Usinsk Oil and Production Association], which are under experienced production engineers I. Orekhov and V. Abramyanets, are leading in the socialist competition to meet ahead of schedule the tasks of the third year of the five-year plan. The oilfield workers' success is the result of a noteworthy rise in the intensity and quality of all work with the well inventory, a sharp reduction in the number of inactive wells, and the introduction of new wells into operation ahead of schedule. Suffice it to say that the facilities for 16 wells have been built up above the plan since the start of the year. [V. Krukovskiy] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Jul 83 p 1] 11409

ALYATI OFFSHORE OIL STRIKE--Karadag, Azerbaijan SSR, 25 Jun--More than 150 tons of oil per day--that is the flow rate of a well drilled by the brigade of foremen F. Agayev and F. Ibragimov to a depth of 3,650 meters under the Caspian Sea bed. Output has been obtained from the new Alyati-Offshore area. Attempts were made previously here to penetrate the earth, but unsuccessfully: high formation pressures prevented this. Modern equipment has enabled this barrier to be overcome. Hole was made by the combined deep rotary method. Thus, the 14th oil and gas field in a row has been opened up in the Caspian. The erection of four more fixed platforms, from which drilling of the next wells will be started, is going on. [L. Tairov] [Text] [Moscow PRAVDA in Russian 26 Jun 83 p 2] 11409

NORTH PERM OIL EXPLORATION--Perm Oblast--West Urals oilfield workers are going ever farther into the north. The Bezhskoye field here has been explored. The penetrators of the earth's depths previously touched 20 wells down, and these are now being put to work. The first 200 tons of the northernmost "black gold" has arrived at Permnefteorgsintez [Perm Association for Oil Refining and the Production of Organic Synthesis Product]. [V. Ukolov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Jun 83 p 1] 11409

RAKUSHECHNAYA DEEP DRILLING--Baku, 26 Aug--Deep penetration has started for the first time in the Rakushechnaya area, where previously only shallow drilling had been performed. A well with a designed grade level of 4,500 meters has been initiated. It will uncover productive crude-oil deposits on the Kazakh Shelf of the Caspian Sea, to the south of oil-bearing Mangyshlak. A multitude of local structures favorable for the accumulation of hydrocarbon raw material has been found. The experienced collective of the floating drill rig, "60 Let Azerbaydzhana," under drilling foremen Z. Garibov and F. Mamedbeyli, is drilling the first superdeep well. [L. Tairov] [Text] [Moscow PRAVDA in Russian 27 Aug 83 p 1] 11409

NEW BOTTOM HOLE DEVICE--A device developed by scientists of the Mining Institute imeni G. V. Plekhanov will help specialists to make maximum use of the reserves of drilling-equipment capacity. Staff workers of the Mine-Machinery Design and Machinebuilding Technology Department yesterday completed its preparation for use. Until now not one of the drill rigs produced for creating deep wells of small diameter has had accessories on which workers could set previously known parameters of the process. This revealed one of the reasons that equipment often operates with different productivities under identical conditions. A major role is played here by the experience and qualifications of the driller and his skill in choosing an optimal set of drilling parameters. The Leningrad scientists' innovation will enable values of the equipment's basic parameters, such as rpm of the drilling tool and the force of its feed on the bottom, to be registered. The first tests previously conducted, where ore workers were mining mica, indicated high precision and reliability for the device. Its use has enabled equipment productivity to be raised greatly, and the time needed for drilling a well has been reduced. [A. Chumakov] [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 15 Jul 83 p 1] 11409

HELICOPTERS TRANSFER RIG MODULES--Gaz-Achak (Turkmen SSR), 24 Aug--An unusual aerial bridge was arranged between two deserts in Central Asia. Helicopters of the Chardzhou Aviation Enterprise transferred multiton drill-tower modules and other erection equipment over the 400-kilometer distance between the Karakumy and the Kyzylkumy on quick trips. The unusual operation was successful. Thus were preparations started for the industrial development of the new Samantepe gas-condensate field on the right bank of the Amu-Dar'ya. Within its depths, according to specialists' assessments, are tens of billions of cubic meters of the "blue fuel." A repair base for drill rigs has been created here, and a rotating-duty settlement has been built. [CHARDZHOUSKAYA PRAVDA editor V. Sorkin] [Text] [Moscow PRAVDA in Russian 25 Aug 83 p 2] 11409

YAMBURG'S FIRST PRODUCTION WELL--Tyumen--Industrial development of the Yamburg gas field has started. Testing of the first production well, which was drilled by V. Gavrilenko's brigade, was completed yesterday. Yamburg proved to be a tough nut. The well is not deep--about 1,350 meters, but drilling it took almost a month--far longer than usual. But the drillers acquired valuable work experience under the most complicated conditions. For even Yamburg's neighboring arctic fields--Urengoy and Medvezh'ye, where the brigade worked previously--seemed to be a green and warm area, compared to this icy wilderness. Here you find neither a bush nor a small tree, there is permafrost, and -40 degrees is an ordinary temperature. A drill rig and the necessary equipment and fuel were sent here over the Northern Sea Route during the navigation season. The builders erected on the site's frozen soil a foundation of squared beams, metal and cement. And after this the derrickbuilders set up a 300-ton drill rig. When the bit penetrated the permafrost zone, the well was cased with specially strong steel pipe. In the very near future the builders will lay to the underground borehole a pipeline almost 30 kilometers long, over which Yamburg gas will go to the pioneering settlement's boilerhouse. **Development** of the new raw-materials storehouse is an important path for fulfilling November 1982 CPSU Central Committee Plenum decisions, which paid special attention to developing the fuel and power complex. This year it was decided to drill five more production wells at the field. [TASS] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Jun 83 p 1] 11409

NEW TOMSK FIELD PRODUCES--Tomsk--Sredniy Vasyugan is an oil explorers' settlement in the north of Tomsk Oblast. Geologists of the Vasyugan Expedition have obtained an oil gusher at a new field--the Yuzhno-Tabaganskaya area. A. Kurennyy has a rare vocation--he is a tester of the earth's depths. To be precise, a master in sampling deep wells. He is one of the veterans of the search for oil in the Ob region. He has been a driver, a driller and an electrician, so he knows all the work involved in drilling. The exploration hole, a miniature window on the underground, was drilled at enormous cost and effort. And genuine jeweler's skill is needed in order to study carefully a formation at a depth of 3 kilometers, and at times even deeper. Kurennyy got on familiar terms with oil gushers at the oblast's very first field more than 20 years ago. Since then the brigade has always been among the best in the industry, and Russia's geologists study its experience. It has sampled hundreds of wells and has obtained hundreds of gushers. The new Yuzhno-Tabaganskoye field is the collective's 23d. Such success would make any explorer envious. It so happened that on this same day a young foreman, M. Plakhtyr,

from the neighboring Western Expedition, discovered his first storehouse of fuel. The exchange of views about the gushers was like a veteran's relay handoff. This year has been a successful one for Tomsk geologists: tasks for drilling holes have been overfulfilled, as have tasks for increasing oil and gas reserves. Four new fields have now been plotted on the oblast's map. At least 3 more are expected before the end of the year. [L. Levitskiy] [Text] [Moscow IZVESTIYA in Russian 11 Jul 83 p 1] 11409

PUROVSKIY RAYON GUSHER--Salekhard, 8 Aug 83--The arctic earth is hard to get at, but minerals explorers are equipped with high-powered modern machinery and well thought out technology, and they are still discovering new productive formations of liquid hydrocarbons. This time the collective of the northern rotating-duty expedition, Udmurtneftegazgeologiya, which is working in Lower Ob lands, had the luck. While making hole in rock at the Komsomolsk field, which is situated in Purovskiy Rayon, they obtained an oil gusher with a high flow rate from a depth of 2.5 kilometers. [PRAVDA stringer N. Mikhal'chuk] [Text] [Moscow PRAVDA in Russian 9 Aug 83 p 1] 11409

SEVERNOYE VAR'YEGANSK OILFIELD--The 2-millionth meter of production well has been drilled at the Severnoye Var'yegansk Oilfield, which is in Tyumen oblast. This is a result of the work of the Ivano-Frankovsk Drilling Administration collective that is participating in assimilating the riches of the northern part of the country. It is noteworthy that Carpathia's drillers conquered the second millionth meter of well twice as rapidly as they did the first. Improvement of the rotating-duty expeditionary method of organizing operations, the elimination of idle time, introduction of the brigade contract, coordination of operations with interdependent entities, and brigade labor rivalry helped to speed up the drilling pace. [M. Fedik] [Extract] [Kiev PRAVDA UKRAINY in Russian 12 Jul 83 p 1] 11409

VYBORG SEMISUBMERSIBLE RIG CONSTRUCTION--Vyborg, Leningrad Oblast--The construction of semisubmersible floating drill rigs at the Vyborg Shipbuilding Yard has been put on stream. The gigantic structure of one such steel island, which is intended for work on offshore shelves, was put into the water yesterday. The period for erecting it on the building slips was cut by almost a month in comparison with the prototype of the series. The enterprise, which until just recently had specialized in the construction of high-tonnage merchant ships, has switched to output of the new product. The shipbuilders are hastening the pace of assembling cells of floating rigs, which are designed for drilling holes up to 6 kilometers deep under water that is 200 meters deep. Progressive technology, particularly the conduct of erecting operations with the use of consolidated box modules, is supporting the acceleration. Plasma cutting is being widely used in cutting patterns for precision parts, and the brigade form of organization and wages has been widely propagated at the plant. [TASS correspondent L. Frolov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Sep 83 p 1] 11409

NOVYY PORT'S FIRST COMPLETION--Novyy Port, Tyumen Oblast--Drilling of the first production oil well at the Novyy Port field was completed yesterday. Development of this underground storehouse, which is located on the Yamal Peninsula, marks the start of the creation of a new oil and gas producing region in the Far North of West Siberia. It is planned to explore for more raw-material

reserves and to drill production wells simultaneously. Several kilometers from the drill rigs, the erection of a settlement for construction and oilfield workers is under way. Structure for housing and administrative buildings has been shipped here over the Northern Sea Route. The Yamal forest tundra has been transformed in record time into a reliable supplier of oil. For example, one of the youngest oil and gas recovery associations in the region--the Noyabr'skoye--has recovered more than 6 million tons of raw material since the start of the year. With the introduction into operation of the Novyy Port field, shipments of Yamal crude will grow substantially. [TASS correspondent V. Zhilyakov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Sep 83 p 1] 11409

NORILSK RECEIVES NATURAL GAS--Norilsk--Natural gas of a new field--the Severosoleninskoye--was lit yesterday at smelting units of the Norilsk Mining and Metallurgical Combine. It arrived over the country's most northerly gas pipeline, which is on piles and extends over the tundra for almost 340 kilometers. "Each year natural-gas consumption increases in the Far North region, which is being developed vigorously," said N. Avdeyenko, chief engineer of Norilskgazprom [Norilsk Gas Industry Production Association]. The first two clusters of wells of the new field are adding another million cubic meters a day to this gas stream. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 12 Aug 83 p 1] 11409

MORE GAS IN VOLGOGRAD--Volgograd--It was considered that the oil reserves of Volgograd Oblast were running low. But suddenly well No 5 of foreman B. Suslov's brigade yielded a powerful gusher from a depth of 4,700 meters. The well's flow rate is more than 100 tons per day. A new field has been opened up. Soon Volgograd drillers will undertake penetration of two more wells, in order to determine the field's reserves more precisely. The field is located not far from the Volga and is alongside the Volgograd-Kamyshin highway, a factor that will reduce the costs of transporting raw material. Still another field was explored in Volgograd Oblast somewhat earlier, at the start of the year. Prospecting for underground fuel continues. [Yu. Kas'yanov] [Text] [Moscow IZVESTIYA in Russian 7 Jun 83 p 1] 11409

AZERBAIJAN OFFSHORE PLATFORM CONSTRUCTION--Azerbaijan SSR--A powerful base for a future artificial island has arrived at the drilling spot of the next oil and gas wells offshore. The structure, I shall speak frankly, is gigantic. It weighs almost 300,000 tons and is 126 meters long and 70 meters wide. And this is only half of the platform. The first part of it was delivered earlier. The support is transported in the horizontal position. And now foreman A. Dadashev, installer V. Tat'yanin, welders Sh. Shirinov and F. Ramazanov and others have begun to erect the cumbersome steel thing vertically. At first they did some balancing--they opened the plug and the sea water began to fill the compartments of the floating sides. The unit lent itself readily to and took up the stance of an island. The major portion of it, 110 meters, went under the water, and a lesser portion of it, less than 15 meters, was raised above the water. Various items of equipment are to be erected on the new little island, which was founded on two pyramidal units. A three-story building with a helicopter pad on the roof is to be placed here. In it will be hotel-type living space, a dining hall and a dispensary. And, finally, the drilling of wells will start here. There will be 24, twice as many as on the preceding platform. This many bores have not been put down previously from one island in the Caspian. [L. Tairov] [Text] [Moscow PRAVDA in Russian 13 Jul 83 p 2] 11409

URENGOY CONDENSATE SEPARATOR PLANT--Novyy Urengoy [Tyumen Oblast)--Urengoy's traditional vocations are being augmented by a new one--gas-treatment worker. Construction of the first installation for the industrial recovery of gas condensate has started at the celebrated field. Previously only natural gas was obtained here, recalls TASS correspondent V. Zhilyakov. The installation is a real plant in the arctic tundra. Receiving gas from a depth of 3 kilometers, it will not only dry it but will also separate condensate from the raw material, which then will go along a pipeline to refineries. The whole country is helping the Urengoyers to master the field in integrated fashion. The Ukraine, for example, has sent drillers here, the Komi ASSR construction workers. It is planned now to build four such installations at the field during this five-year plan. [Text] [Moscow GUDOK in Russian 25 Aug 83 p 1] 11409

ANOTHER AZERBAIJAN OFFSHORE WELL--In the Area imeni 28 Aprelya, still another well, No 8, which was drilled from stationary platform No 1 by the brigade of drilling foremen Muslim Gadzhimetov and Arkadiy Avanesyan of the Neftyanyye Kamni MUBR [Offshore Drilling Administration], has been put into operation. Successful completion of the productive facility at a depth of 3,640 meters--in discontinuous formations and the 10th horizon of the Balakhan formation--has given good results. The well gushed with 380 tons per day of crude that is suitable for turnover. It is important to note that all the work on constructing the exploratory well were carried out almost 2 months ahead of schedule. A high state of organization and order during drilling and the brigade's skill in using equipment and materials effectively helped greatly here. A thrifty approach to the job enabled prime operating costs per meter of penetration to be reduced and state funds in the amount of 100,00 rubles to be saved. Right now, four wells which send 1,800-1,900 tons of Caspian crude daily to the tanks are working on stationary platform No 1, which is located a few kilometers from Neftyanyye Kamni. [V. Tikhonov] [Excerpts] [Baku VYSHKA in Russian 27 Aug 83 p 2] 11409

CASING SHORTAGE AT USINSK--Ukhta--The telephones were getting white hot at the Usinsk drilling trust. As if by common agreement, the drilling foremen phone management day after day, demanding: "Give us pipe; things are at a standstill!" Especially persistent is foreman Gabdulkhat Sadykov, who supervises the drilling of deep production well No 807 at the Usinsk oilfield. "Don't you understand?" he shouts into the telephone. "Four hundred meters are left!" One can understand the foreman's anxiety: a well that is almost ready has been standing idle for days waiting for casing. Emergencies are almost inevitable in such a situation. And they have already occurred at two drill rigs. It is easy to imagine that there will be more, for this is the 20th brigade in Komineft' [Komi Oil Production Association] that has been forced to cease drilling while waiting for pipe. If timely steps are not taken, in a month no more hole will be made at new production wells at all. But the drillers have problems that are more than just important: a path to the oil that is 770,000 meters long is to be laid this year. What is the matter, why has such a critical situation taken shape? The Nizhnedneprovsk Pipe-Rolling Plant, the Rustavi Metallurgical Plant and the Severskiy Pipe Plant are tripping up the oilfield workers with enviable coordination. They have failed in the planned delivery to the northerners of, in all, more than 6,000 tons of casing. Without the pipe, as is known, wells cannot be turned over. In searching for a way out of the situation, the oilfield workers are

sending "pushers" to the plants. Appeals have been made to USSR Minchermet, to Deputy Minister N. Tulin, but, despite his intervention, there are still no changes for the better. On the contrary, one of the messengers reported recently from Dnepropetrovsk: the variety of pipe that the oilfield workers need still has not arrived at the plant for rolling. The question arises: is it not time to stop the empty drawn-out chatter and make the guilty ones answer fully? [V. Krukovskiy] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Aug 83 p 1] 11409

NEW EMBA AREA DISCOVERY--Guryev Oblast--The Guryev drillers' search for a field in Vostochnaya Prorva of Yuzhnaya Emba has been crowned with success. Discovery of a new, thick oil formation in the roof of the Aalen sandstone series is the result of many years of research. The geological explorers, after drilling several holes, delineated the new horizon. All the wells have yielded oil and gas with high flow rates. This has made it possible to recommend the oil formation for industrial test. The discovery by the geological explorers of the Balykshi Exploratory Drilling Expedition of Embaneft' [Emba Oil Production Association] will enable oil recovery, which has been fading at many old fields of Yuzhnaya Emba, which has been under development for more than half a century, to be revived. [V. Sutyagin] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Jul 83 p 2] 11409

OILFIELD NAMED FOR PIONEER--Tyumen Oblast--More than 16,000 tons of liquid fuel have been recovered above plan at the oilfields of Povkhneft' [Povkh Oil Production Administration]....This is a line from an ordinary production summary by Glavtyumenneftegaz [Main Administration for Oil and Gas Recovery at Tyumen]. The only peculiarity is the name of the administration. Stepan Anan'yevich Povkh was in charge of the brigade which, in drilling the first production well at Samotlor, sort of threw open the door to the underground storehouse. In commemoration of an excellent man and specialist, one of the fields that were discovered has been named after him. The pace of deliveries of raw material from these fields is growing constantly. [Yu. Perepletkin] [Text] [Moscow IZVESTIYA in Russian 4 Jun 83 p 1] 11409

MODULAR DRILL RIG FOOTINGS--Volgograd--The Emblem of Quality has been awarded to sectional unified footings for drill rigs--products of the Volgograd Machinery Repair Plant of Soyuzneftemashremont [All-Union Association for Oil Machinery Repair]. The modular structure will enable it to be used repeatedly, practically without repair. After completion of an operation, the footings, which are equipped with skids, are easily transported to another point. Moreover, they have been "thinned" by 30 tons--by more than a third--in comparison with the previous model. [I. Mordvtintsev] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Jul 83 p 2] 11409

MODULAR DRILL RIG ERECTION--Ukhta (Komi ASSR), 25 Aug--This year 34 drill rigs--7 more than planned--were built by the derrickbuilders of Ukhtaneftegazgeologiya [Ukhta Association for Oil and Gas Geological Exploration]. Thanks to use of the modular method of construction, the time taken to erect a drill rig has been reduced by 6 days. Since the start of the year, the explorers of the depths have drilled more than 110,000 meters of deep hole here under an annual plan for 155,000 meters. Prospecting is being conducted in Komi ASSR arctic regions, where it is planned to obtain the main growth in oil and gas

reserves. Two industrial-sized fields of oil have been discovered in the north of the autonomous oblast during this five-year plan, and the petroliferousness of another three areas has been established. [PRAVDA stringer A. Kurkov] [Text] [Moscow PRAVDA in Russian 26 Aug 83 p 2] 11409

OLD AZERBAIJAN FIELD REBORN--Baku. A group of wells of the Baku Oil and Gas Production Administration (Leninneft') has experienced a second birth. The equipment was removed 50 years ago from these wells, which were drilled at the start of the century, for they were considered depleted. But this year the geologists prospected the section with new equipment, and a collation map of the formations indicated that there is fuel here. An oilbearing formation was found just a little deeper than one from which oil had been recovered earlier. The oilworkers drilled down the remaining meters to the oil, set up a pumping jack and replaced old pipe. And the wells have given crude. [TASS] [Excerpts] Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Aug 83 p 2] 11409

AZERBAIJAN OILFIELD IMPROVEMENTS--Baku--Department No 2 in the Oil and Gas Production Administration imeni 26 Bakinskikh Komissarov is called experimental. Its collective willingly introduces into production new scientific and technical developments aimed at increasing withdrawal. For the first time in the republic, the use of gas "anchors"--modernized devices for separating the gas contained in the oil--has started here. The "anchors" have increased the efficiency of the pumps and extended their operating time. Mastery of new anticorrosion compounds developed by Azerbaijan scientists has helped oilfield workers to increase the wear-resistance of the pipes and equipment. Carrying out the new methods for raising oil withdrawal will help the collective to achieve good final results. It was possible this year not only to stabilize oil withdrawal from one of Azerbaijan's oldest oilfields this year but also to pump more than 1,000 tons of "black gold" above the plan. [D. Melikov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Jun 83 p 1] 11409

NEW CASPIAN OFFSHORE WELL--Production well No 53, a new one on a shoal, has been completed by drilling. The collective of the 3d Offshore Oilfield of Chelekenmorneftegazprom [Cheleken Offshore Oil and Gas Production Association] has accepted and successfully developed the new well. Operation of the 10th oil-bearing horizon started at a depth of more than 3½ kilometers. Industrial oil and casing-head gas are coming from Caspian depths. The geologists forecasts that this well will be among the high flow rate wells has been confirmed. Its introduction into operation will enable daily recovery for the association as a whole to be increased by 67 tons of oil and by almost 40,000 cubic meters of gas per day. [V. Lebed'] [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 19 Jun 83 p 1] 11409

VOZEYSKOYE OILFIELD ON TARGET--Usinsk--The country's most northerly oilfield, and the Usinskneft' Administration's fourth, has come up to its designed level of fuel recovery. These days 100 more tons of oil than called for by the design for developing the Vozeyskoye field goes into the Usinsk-Ukhta-Yaroslavl pipeline from the field, which is located above the Arctic Circle. This success is the result of labor collaboration of the oilfield workers' collective that Communist V. Abramyanets supervises with its partners in the competition, which was organized under the "Workers' Relay" principle. A mechanized well inventory is being created at a rapid pace at the oilfield, and much

more work on optimizing the operating system is being performed. Preventive measures for deparaffinization of the wells have added a considerable increment, reduced the inactive-well inventory and increased the quality of well repair. [V. Il'in] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Jun 83 p 3] 11409

CSO: 1822/349

STATUS OF ERECTION OF IGNALINSKAYA AES, ALLIED FACILITIES REVIEWED

Vilnius SOVETSKAYA LITVA in Russian 16, 20, 26 Jul 83

[Article by L. Baltkal'nis: "1,500,000"]

[16 Jul 83 pp 1-2]

[Text] A million and a half kilowatts--this is the capacity of the first power unit of the Ignalinskaya Nuclear Electric-Power Station.

Each trip to its construction site is like a journey into the future. It is true, the fact that it already exists in this day and age is somewhat unusual. For example, many of its features--innovative technology and equipment and many of the human-interrelationship aspects--had been slated for tomorrow, where everything that is at present only taking shape will be developed and improved. At the same time, the continuity of our plans and the momentum of their ascent up the steep slopes of the economy's development, from the large to the gigantic, are more clearly visible in Snechkus, perhaps, than anywhere else. In 1980 the Soviet people noted with pride the 60th anniversary of Lenin's GOELRO [State Commission for the Electrification of Russia] Plan. And now the gigantic power program that Yu. V. Andropov described at the June CPSU Central Committee Plenum as "the greatest document of long-range importance, in its own way a GOELRO for the modern era" is being realized.

The Ignalinskaya AES has a noteworthy place in this program.

And now let us try to answer this simple and logical question: "Why is the gigantic power complex being erected at precisely this time?"

In the 1960's, thanks to the introduction into operation of the Litovskaya GRES imeni V. I. Lenin of Litovenergo [Lithuanian Regional Power Administration], not only had the republic's needs for power been completely met, but a large portion of the power was being sent outside the republic's borders. However, as a result of the economy's burgeoning development, demand rose rapidly. In 1980 the USSR Unified Power System sent Lithuania 370 million kWh of electricity from its mighty stream. In 2 years this flow tripled. And so it is that the first reactor at the Ignalinskaya nuclear station will go into operation at an extremely opportune time.

And still another question: "Why is a nuclear, not a thermal, power station being built?"

It would seem that the fact that each year 67,500 railroad cars of coal, but only 3 of uranium fuel, would be needed to operate a 1½-million kW capacity station, is reason enough. This circumstance also is of enormous importance: the AES will cause less than 1 percent of the harm to the environment that a thermal station of equal capacity would.

The year 1983 is the startup year for Ignalinskaya's nuclear station. The first power unit, brought into operation by the 1½-million kW giant reactor, will produce current. However, work is being done today not only on Drukshchyay's shores. So the information about practical execution of the power program that we are starting to publish today will tell about the builders not only of the nuclear station but also of power transmission lines, transformer substations and accumulators of various types.

1. It Is a Prototype--That Means That It Moves Out Ahead

...We are standing on the very same spot from which, in the summer of 1980, we feasted our eyes on the metal scaffolding of the structure that was just beginning to take shape in the unified whole of the main building of the Ignalinskaya Nuclear Electric-Power Station. As the builders say, the building has now been covered over, and it is all but completely dressed in its gray concrete garb. And that is why, probably, it seems to be somewhat thickset.

Let's take a look, let's compare, let's make some contrasts....After that, on returning to the editorial office, we located in the newspaper's files the issue of SOVETSKAYA LITVA of 29 June 1980 and, being inwardly proud of the definiteness and realism of our plans, we read these words: "We went with the director of the Leningrad Nuclear Electric-Power Station, Lenin Prize winner Nikolay Fedorovich Lukonin through departments of the country's largest AES. This was in the new city of Sosnovyy Bor, on the shore of the Gulf of Finland, but it took little fantasizing to imagine oneself at the Ignalinskaya nuclear station. Not one that is under construction but one that is already operating.

"The more so since Nikolay Fedorovich now and then referred to it: he gave the family names of people who had gone through the construction school of the Leningrad AES and were now erecting the station on Lake Drukshchyay. He spoke about the Izhorskiy Zavod Association, which had already started to manufacture specially designed equipment for Ignalina. He told about the readiness of the Leningraders to accept the future operators of the plant on probation, after emphasizing, in so doing, that it is less complicated to teach, let's say, an operator who tends a nuclear reactor than it is to teach a pilot."

And here it is, the Ignalinskaya nuclear station, already on the threshold, so to speak, of its "shining hour," the startup of the first power unit. We go into the building, in which the builders are still working, and much remains to be done before the decorating work is completed, and right away there comes the mental image of the well-tended Leningrad AES premises. That is precisely how it will be here also at the new station. Everyone is striving to achieve that. The room for the nuclear reactor, the gargantuan generators, the unitized control panel, the vast halls, the densely installed cabinets of

electronics....Everywhere installing work is going on or is being completed, everywhere startup and setting-up work is going on, everywhere hundreds and thousands of the most highly qualified specialists are practicing their "wizardry" on complicated facilities. The country is supplying nuclear power stations with the most perfected creations of its science, equipment and technology.

And if one imagines scientific and technical progress as an arrow aimed at the future, then the sharpest of them is apparently found here at the AES. For it is a prototype station--that means that it is moving ahead, paving the way for electricity factories with reactors of 1½-million kW capacity. Before this there were, as the power engineers say, the "million kilowatters," including even the Leningrad AES. The one that is being built at Ignalina and which also, in the very near future, will be charged with nuclear fuel will be well studied and mastered. Therefore, after the "physical startup," the reactor in which the reaction will be started will undergo so-called industrial-test operation under the watchful eye of scientists. There is a special scientific-research section for this purpose at the Ignalinskaya AES.

"In following its recommendations, we are gradually beginning to build up power-engineering capacity," says senior chief of shifts B. Antonov. "This is a very complicated and painstaking process on new equipment...."

It should be said that the operating personnel have already taken the station into their hands. They are accepting equipment after the installing and setting-up work, actively participating in both the one and the other, they are switching the equipment into operation, and they are performing integrated testing of the systems. Shifts that perform all processes, whose manning has been completed or is being completed, are working round the clock on a rigid schedule. The average age of the operating personnel is 27 years. Naturally, the question arises at once: "Where do they come from, where were they trained, and, in general, what requirements are made on a person who has decided to work at a nuclear-power station?"

In the time that has elapsed since 1980, Snechkus has received a permanent registration of about 300 specialists who have graduated from the Leningrad AES school. Moreover, Nikolay Fedorovich Lukonin himself, the meeting with whom was described above, recently became director of the Ignalinskaya AES. As for the rank-and-file operating personnel, all of them have undergone on-the-job training at various AES's of the country. Including the one at Leningrad, which, with full justification can be called the midwife of the Ignalinskaya station. In combination, of course, with the 500 enterprises that manufactured special equipment for it....

"What brought you to the shores of Lake Drukshchyay?" we asked engineers who had come to work at Snechkus from the Leningrad, Kurskaya, Chernobylskaya, Novo-Voronezhskaya and other AES's. In posing this question it was already known that all of them had obtained promotions at Ignalinskaya, and this, of course, was one of the motivating factors. But still, an absolute majority justified the transfer by an interest in what was new in the station's nuclear power engineering.

Now about the requirements that are made on operating personnel. Chief of the station's technical operations section, N. Sorokin (incidentally, he worked at the Leningrad AES as a deputy shift chief) set them forth briefly. In the first place, education not lower than secondary-technical. Second, a high level of vocational training. Third, if one may say so, a positive state of discipline. At nuclear-power stations, conversations of the type, "Why should I do this work and not someone else?" or, "I will postpone this job until tomorrow," are completely ruled out. Here, they even speak and hold meetings somewhat differently than is done at other collectives. Without excessive verbiage, without splashes of vanity and emotions, they are mathematically precise and comprehensive. An order is law, as is irreproachable observance of official responsibilities. After a vacation or a prolonged illness, work with a supernumerary is mandatory, and only later comes independent performance of shift duty.

Matters have been organized in such a way that the operating personnel, as they say, check with their own hands everything that they are to tend. For instance, K. Khokhlov, deputy chief of the Thermal Automation and Measurements Section, participated in the consultations on a number of design decisions, ordered equipment and selected personnel. Right now this department's shifts are working together with the setting-up personnel, they are monitoring the installing work, and they are preparing for startup. Their field of responsibility is enormous: automation, computers, equipment for monitoring, measurements and operational protection....Graduates of the Kaunas Polytechnical Institute and computer specialists have been pouring into the collective recently.

...Much has changed at Snechkus in the past 3 years. The settlement has doubled in population. New housing tracts, new streets and new buildings for social purposes. But while in 1980 the most attractive aspect of the construction that was being conducted here was the complete and decisive negation of simplified versions and temporary solutions, now, unfortunately, both the one and the other are occurring noticeably. Of course they resort to this, as is said, not for better living but because they have been forced into it: a severe shortage of housing has dictated all possible omissions and permissiveness. The number of brick buildings has been cut, there are more panel buildings. The construction of children's institutions and of the amenities has lagged seriously. The quality of the housing being turned over has been lowered. As chairman of the settlement's soviet, V. Ivkovas, emphasized in reasoned fashion, all this leads to a worsening of the architectural appearance of the future city and adversely affects the level of its comfort. Obviously, something different is needed, but not hasty solutions that meet only the needs of the moment. For the cities are being built for centuries, and people will have to live in them in the 21st Century.

We spoke about this with the new Ignalinskaya AES director. Of course, all of Nikolay Fedorovich's thoughts are riveted these days on the basic task--startup of the first power unit. The construction workers should be able to do much more. A large number of key problems of a scientific-research nature await his quick decision. The fact is that, as was pointed out to us, the board has neither the personnel nor the time for a comprehensive analysis of the urban-development policy that now exists. However, the anxiety and

dissatisfaction are being examined completely accurately. And this encourages the assurance that the builders of Snechkus have only temporarily retreated from their former principles, that a city worthy of the Ignalinskaya AES will take shape on Drukshchyay's shores.

...The station is being readied for startup. The country's first "million-and-a-halfer" is facing startup. Happy journey to it!

A Chronology

1974. The first group of specialists arrives for construction of the Ignalinskaya AES.

1975. Erection of a construction-industry support base was started.

1977. The first cubic meters of concrete for the foundation of the future Ignalinskaya AES were placed. The first housing and secondary school at the power-engineering builders' settlement were turned over for operation.

1981. The laying of the footing slabs for the first turbogenerator was completed in record time.

1981. The Draugiste cinema, which seats 2,600, and a musical school were introduced into operation.

1982. The Western Construction Administration collective won the All-Union Socialist Competition for the first time.

1982. The erection of a nuclear-power reactor was completed. The AES's central hall was turned over. Assembly of the nuclear reactor's operational conduits was completed.

1982. A shopping center, buildings for a post office, telegraph office, savings bank and pharmacy, a new secondary school and a kindergarten were put into operation in Snechkus settlement.

1983. Current for the nuclear power station's in-house needs was received.

1983. A department store, a book store and another kindergarten were opened up in Snechkus.

1983. The brigade of Deputy of Lithuanian Supreme Soviet S. Gavlovskiy produced the millionth cubic meter of concrete.

[20 Jul 83 pp 1-2]

[Text] 2. New Channels for Rivers of Electricity

High-voltage transmission lines--these manmade channels of rivers of electricity--run through fields, ascend mountains, cut through forests and intersect deserts, bringing energy to places where people live and work.

Introduction of the Ignalinskaya Nuclear Power Station's first power unit into operation is organically associated with the existing expansion of the power grid and of all the activities that accompany it. That is why the work is boiling right now not only on the shores of Drukshchyay, where an AES is being built, but also in many other parts of the republic. Energy produced by the atomic giant's generators will be sent into the USSR Unified Power System along several new high-voltage lines.

"LEP" [electric-power transmission line]--is what an electrical power transmission line is generally called in abbreviated fashion--and the people who erect them are "lepovtsy." They are constantly away from home on official business, with all the domestic and wordly inconveniences that ensue from this, as is said in the field, and they are quite busy working toward another brigade on rights-of-way that extend for many tens of kilometers. You can't get along here without knowing the person. That is why we went to the operating sections of the Ignalinskaya AES-Panevezhis LEP with A. Baronas, the chief engineer of the administration for the construction and erection of electric-power lines.

The Volga car rolled speedily along the highway's smooth asphalt. The summery landscape pleased the eye with the brightness of the colors, the richness of the fields, and, wherever you cast your glance, the openwork of the high-voltage transmission-line towers. Metal and concrete giants that carry on their shoulders insulator strings and strands of wire, as if affirming on the ground the industrialization theme of the century. A. Baronas now and then named the years the lines were laid and told about their significance, which unchangingly came down to the fact that the rivers of electricity will serve the people more completely and effectively.

We obtained the specifications of the LEP that had been sent to the builders. The length is 165 km. The potential is 330,000 volts. Two sections are doing the work on the route, and there are four basing points. Frankly speaking, it can be said honestly that they beat the deadlines for doing the work: laying the line occupied little more than a year, although there were only about a hundred "lepovtsy" in the collective. And, naturally, right away we tried to guess the "secret" of such speed. It is not accidental that the rest of the story will be, in essence, precisely about this....

The first section of "lepovtsy" was stationed in Panevezhis. Its supervisor, V. Dapkus, was not in, but superintendent P. Gedzhyus, who has been building power lines since 1969, introduced us to the progress of the job.

"The laying of footings for the supports began in our section in the fall of 1982," he said, giving the events in chronological order. "It is known that an LEP knows no obstacles, so at times we had to work in places most unsuitable for construction. Where no one walks or drives to. Sometimes even on equipment that is specially adapted for working in swamps. So it is that first of all we laid down approach routes. We obtained prefabricated reinforced-concrete items for the footings from a Kaunas combine of production enterprises. Naturally, this sped things up very much. By the new year the footings had been laid over the whole length of our section of the line. Understand, the 'lepovtsy' were not accustomed to losing the gift of time or to work halfheartedly."

And now the circumstances enable us to see it for ourselves. A conversation in the room neighboring the superintendent's office, which resounded on a fairly high note, attracted attention. It was explained that Communist Yu. Sharkis's brigade, which was at full strength, had expressed dissatisfaction over idle time, which was dragging on. This collective, which was coping excellently with prefabrication of reinforced-concrete supports for the Ignalinskaya Nuclear Electric-Power Station--Panevezhis LEP, was already working on another line. However, the brigade had been returned for a certain time in order to eliminate shortcomings that can be found when a new line is turned over for operation. It was felt that the "lepovtsy," first, did not permit the possibility of any kind of defects, and second, they were seriously annoyed by the interruption of the strenuous pace that was habitual for them.

And P. Gedzhyus meanwhile was now telling about the high-iron workers of A. Bakanavichyus's brigade, whose specialty was that of hanging the wires.

"How fast did this brigade go along the route?"

"About 15 kilometers per month."

"And the weight of the wires?"

"That is easy to compute, knowing that 10 tons of wire and half a ton of cable are required for each kilometer of LEP."

"How did the transfer of the LEP to the operators occur--all at once or by parts?"

"The operators literally follow on our heels. They maintain a distance equal to one span."

"Isn't this a sort of 'Workers' Relay' in practice?"

"It is similar....They check on us most thoroughly...."

The LEP supports, which are completely ready and equipped, are coming right up to the Panevezhis transformer substation. Expansion and rebuilding is going on here, to enable the new river of electricity from the Ignalinskaya nuclear station to be received and sent out in the required directions. Suffice it to say that it is here that one of the largest transformers in the Union is being installed. A group of specialists from Administration No 8 of Elektrotsentromontazh [Trust for the Installation of Electrical Equipment in the Central Economic Region] has been doing the basic work on the substation here for 10 months now.

"We are on schedule," states P. Volod'ko, supervisor of one of the brigades. "We are installing electrical equipment and means for protecting the line. Everything will be completely ready by the time the LEP starts up. And, of course, with irreproachable quality...."

And again the Volga rolls over the asphalt. At 121 kilometers from the Ignalinskaya nuclear station, according to A. Baronas's determination, we turn off

into a settlement. Not far from the suspensions on the metal supports, somewhere in the sky, people are working.

"They are removing the rigging," the chief engineer remarks.

Beside the supports are a telescoping lift truck, a tractor and a motor vehicle. Six "lepovtsy" are here. There is the driver, and there is the tractor operator. Not the slightest sign of a division of work into "mine" and "yours." Everyone is performing the common task, and, because of this, it is certain that it will move forward speedily. One involuntarily recalls certain other organizations, where wages are paid in such a way that the driver, let's say, having delivered his freight, will fritter away his time, watching the work of the brigade, which is short of people, from the sidelines. To the honor of the "lepovtsy," they have managed to "relate" the production workers of various vocations to the final result.

Our next conversation is at Anikshchyay, where the center of the second superintendency construction section of the new LEP is located. V. Ruplis's brigade hung wire from the 120th to the 199th supports. That is as far as Utena. Then it worked in the Panevezhis direction. The brigade leader has already spent 10 years on LEP erection. It would seem that matters still have not changed for many years.

"As long as my health permits," he remarks: for the high-iron worker, it is not at all simple to get the physician's permit to perform his job. "Of course, enormous responsibility rests on the brigade leader's shoulders, and now and then head-breaking construction and erection problems have to be resolved on the spot....To make up for it, there is great independence, the widest scope for one's own mind, and for one's own decisions. And this, you will agree, is of no little importance....What kind of line do I prefer to build? Those of 110,000 volts. The ones that we are finishing right now require incomparably greater expenditure of effort and energy. But once it is necessary, that means that it must be done."

And he waved his hand broadly, as if offering the new power-transmission line that goes to the Ignalinskaya nuclear station as a witness.

[26 Jul 83 pp 1-2]

[Text]. 3. The Kayshyadorskaya Pumped-Storage Electric-Power Station

And so construction of the Ignalinskaya Nuclear Electric-Power Station's first power unit has entered the prestartup period. The day is not far off when, gradually gaining strength, it will add still another to the country's rivers of electricity. It will have a capacity of 1½ million kW. In order to send its streams to the needs of the national economy, new high-voltage power lines are being erected, and substations are being built. But this is not enough, where the matter of the power of an AES is involved. The difficulty here lies in the fact that, for effective operation, nuclear reactors require a stable load, or, as the specialists say, a base load for each of the 24 hours of the day. But how is this to be achieved when demand is reduced at

night--from maximum consumption to 0.7? Unfortunately, mankind still has not discovered a way to store electricity for future use, as we have, shall we say, in the case of fossil fuel.

But still the scientists and engineers have managed to resolve this task. True, not directly, but by round-about paths. One of them is the construction of consumer regulators. Such regulators, with a total capacity of 66,000 kW, are already operating in our republic, and five more are in the construction stage. These are electrode boilers, which heat water at night, when the energy in the system is at a surplus, in accumulator tanks, which are enormous thermos bottles. During the day the accumulated heat is consumed on a schedule. Experience has shown convincingly that it is cheaper to operate consumer regulators than boilerhouses based on fossil fuel. For example, personnel are reduced from 28 to 2. By the end of the 11th Five-Year Plan the total capacity of electrode boilers in the republic will reach 200,000 kW. Their potential for meeting the municipal needs of large communities and resort cities is being studied.

Another way to accumulate energy lies in the construction of pumped-storage electric power stations (GAES's). SOVETSKAYA LITVA has repeatedly told about them, so readers need reminding only about the operating principle of these unusual electricity factories. Water is accumulated here; when there is a surplus of electricity, it is raised by pumps into an artificial basin that is located much higher than the main water reservoir. When the load on the power grid reaches its peak, the accumulated water is discharged below, setting turbine units into motion. Millions and millions of additional kilowatt-hours of electricity are sent to customers.

The first builders came to the shores of Lake Drukshchyay and the Kaunas Sea almost simultaneously. Some of them were to erect the Ignalinskaya Nuclear Electric-Power Station--the others to build the Kayshyadorskaya Pumped-Storage Electric-Power Station. Erection of the GAES was charged to the Litovenergostroy [Lithuanian SSR Power-Engineering Construction Administration] collective, whose glorious labor biography includes the Kaunasskaya GES, the Litvoskaya GRES imeni V. I. Lenin and other makers of electricity. Here are some figures that characterize the station itself and the amounts of work that have to be carried out for its construction. The GAES's capacity will be 1.6 million kW, the full volume of the upper basin will be 46.48 million cubic meters, and the water surface's area will be 292 hectares. The builders are to move about 20 million cubic meters of soil, to place 727,000 cubic meters of monolithic concrete and 140,000 meters of prefabricated reinforced concrete, to erect about 100,000 tons of metal structure and machinery, and to introduce 95,000 square meters of housing space into operation. The deadline for introducing the first 200,000-kW capacity turbine unit has been set for 1985.

And now let's mentally transfer ourselves to the site in question, which is located not far from the upper basin of the Kayshyadorskaya Pumped-Storage Electric-Power Station. From here, from a height of almost 100 meters, a breathtaking panorama of the large construction site is opened up. Toward the nearest shore, the blue expanse of the water of the Kaunas Sea, dotted with white triangular sails, takes on, so to speak, a working appearance. Massive

suction dredges, in supplying the new concrete plant with sand and the construction project with gravel, drive a slurry from the bottom along a network of pipelines. Bulldozers smooth the shoreline strip. Dump trucks roll along the roads in an endless file. Excavator shovels swing about in the vast foundation pit near the station's building.

A gigantic concrete staircase, which bears a name that is fairly odd to the uninitiated--a pressure-pipeline pile field--drops steeply to the bottom. Several steps have already been finished. Piles--footings for eight water lines--will rise up on them. The outer diameter of each is 8.3 meters, the inner diameter is 7.5 meters. Delivering these colossal concrete pipes here was an insuperable task for any type of transport. Therefore, they were fabricated in place, for which purpose a special casting yard was established.

"We are going to take more than a million additional cubic meters of soil from the foundation pit," chief of the mechanized complex No 1, I. Avtushenko, makes it precise. "It will be deepened by 38 meters below the level of the Kaunas Sea. The soil is heavy, of the third and fourth categories. Right now it is of the 'aleurite' type. This is sand and water. It is not easy to get it. The machinery sinks in....How is the work getting on? Three brigade-contract agreements have already been fulfilled on time. Average output has reached 168 percent. Right now a fourth agreement--from 26 June to 25 September--has been concluded....You know, in order to get the complete picture, it is best to set out for the place where the soil is dumped...."

And here things were spirited, with excellent arrangement of the work! The earth shivered and sagged under wheels, and the strained rumble of engines rent the air. Fifty-six dump trucks of the first and second (the chief is A. Dulerayn) mechanized complexes did not arrive but literally burst onto the construction site and instantaneously, on emptying the truck bodies, hurried back to the foundation pit and the excavators. The driver of our "uazik" [motor vehicle made at the Ul'yanov Motor-Vehicle Plant] was forced several times to move his vehicle for fear that at any moment the roaring hulks of the KrAZ's [motor vehicles made by the Kremenchug Motor-Vehicle Plant] and KamAZ's [motor vehicles made by the Kama Motor-Vehicle Plant] would crush it. Three high-powered bulldozers were barely able to level the soil.

"Well done!"--it was simply impossible to conceal our admiration.

"What brigade leaders!" responded I. Avtushenko lively. "Brigonis, Kunyak and Misyavichyus! Drivers of the very highest category and excellent organizers, who have passed the school of many large construction projects. About 100 equipment operators have arrived here from KamAZ [Kama Motor-Vehicle Plant] alone--I'm also from there. Still there are not enough people. Therefore, we work in two shifts, but we could work three. Tell about this in the newspaper. I hope that people who are ready for a difficult job will respond without fail."

Day by day, the construction project near the Kruonis settlement is increasingly straightening up its shoulders. The USSR Ministry of Power and Electrification has intensified its help with people and equipment. As L. Budris, deputy chief of the Production Equipment Section of the administration that is

building the Kayshlyadorskaya GAES, noted in his conversation, "we and the general contractor are now working about 400 people, but there are, in all, 5 times as many." For example, a collective of the Dnepropetrovsk Construction Administration of Gidrospetsstroy [Association for the Construction of Special Hydraulic-Engineering Facilities] collective is working on the pressure-pipeline pile field. Specialists from Ekibastuz, Alma-Ata, Sverdlovsk, Gorkiy and many other cities are employed at the facilities. And student construction detachments have arrived for work. They have been sent to the Kaunas Sea shore by Vilnius, Minsk and Baku vuzes."

"Right now our administration is working on two basic tasks: it is participating in erection of the upper basin's retaining wall, and it is completing work on the creation of an auxiliary construction support base"--L. Budris introduces this in the course of the matter. "We cannot rejoice over special successes, but there are, as they say, positive achievements: we managed to fulfill the plan for the second quarter. This, you know, is the first time...."

Two brigades--those of A. Ratkyavichyus from the administration for construction of the Kayshyadorskaya GAES and of V. Ilyushenko from the All-Union Order of Labor Red Banner Spetsgidroenergomontazh [Trust for the Erection of Special Hydropower Engineering Facilities]--are employed these days on erecting the footing for the upper basin's retaining wall. Both collectives were formed here, in Kruonis. As a rule, from people who had participated in the construction of the Litovskaya GRES imeni V. I. Lenin. For example, B. Radzyavichyus worked there from the very start, and N. Zakharov worked on the seventh and eighth units. And the brigade leaders themselves are very experienced. Communist A. Ratkyavichyus has been doing construction work since 1964. He finished first the foreman's course and now the Vilnius Polytekhnikum. V. Ilyushenko erected the Nurekskaya and Ingurskaya GES's and right now is in charge of the section's trade-union organization.

"Each section is required to place 820 cubic meters of concrete," states A. Ratkyavichyus. "This process is continuous. So it is that in these cases the brigade's worktime is determined by the start and the finish of the laying. As a rule, we manage it in 28 hours...."

V. Ilyushenko's brigade is fabricating and installing reinforcement. Quickly, deftly and reliably. Mutual action and mutual understanding with A. Ratkyavichyus's concreting workers is complete. This is very important for success of the job. The collectives came to this facility not for a week, not for a month, or even for a year. After erecting the footing, they are to erect the retaining wall itself on it. The length of each is 1,700 meters.

V. Ilyushenko complained about a severe shortage of qualified construction workers. Right now there are 70 men in the section's collective, but twice as many are needed. Most annoying of all is that there are many who want to take part in erecting the Kayshyadorskaya GAES. Thus, according to data that the trade-union committee chairman has at his disposal, there are now about 100 requests at Spetsgidroelektromontazh to be sent to Kruonis for permanent assignment. But the requests cannot be granted because of the lack of

apartments. Unfortunately, at this construction project growth of the collective greatly surpasses the pace of housing construction.

...It was getting toward evening when we rode away from Kruonis. We met heavy cement carriers, and buses from Elektrenay were carrying the second shift to work. The great construction site was visible from the eminence of the upper basin, the bed of which still had to be deepened and cleared out. Strenuous work was boiling at all its sections.

> We have acquainted readers with this portion of the power-engineering program that is being realized in our republic. The amount of work is enormous, the tasks, which are at the cutting edge of scientific and technical progress, are complicated, the builders' work is tenacious, and the efforts of many collectives are mutually related. Startup of the first 1.5-million kW power unit of the Ignalinskiy Nuclear Electric-Power Station will pour still another mighty river of electricity into the USSR Unified Power System. And ahead are new, important goals, new achievements in the fruitful field of carrying out the power program--the GOELRO program under modern conditions.

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CONSTRUCTION OF NUCLEAR HEAT-SUPPLY STATION UNDER WAY AT VORONEZH

Moscow PRAVDA in Russian 8 Jul 83 p 1

[Article by A. Starukhin: "The City Will Be Heated"]

[Text] A nuclear station for supplying heat is being built at Voronezh.

On a work table in the superintendent's office, replacing the ashtray, is an antipersonnel mine. It was found here at the construction site, among the oak groves, where four decades ago, bloody battles raged for 212 days and the front line held intact. Perhaps the superintendent, leaning over drawings, was pondering the contrast between his current occupation and the purpose the "ashtray" formerly had. He is building the first prototype nuclear station for supplying heat.

The construction project is being developed on the shore of an urban "sea" that was created in the floodplain of the Voronezh River, 5 kilometers from the city. A three-dimensional figure that hangs on the wall reproduces the basic contours of the facility, at which the two nuclear reactors look like agricultural silo towers. The "AST" [nuclear heat supply station]--the abbreviated designation of the station--is still difficult to interpret. But we became accustomed to "AES"--nuclear electric-power station--in a short time.... It was right here at Voronezh, 19 years ago, that, for the first time, a prototype electric-power unit began to operate, and then the next unit, up to the fifth in a row.

The sandy site, about four soccer fields in size, barely lists in the direction of the reservoir. The first buildings and groups of mobile housing are at the upper edge. And beyond there, are the foundation pits, up to 7 meters deep, already concreted, and reinforcing cage of the future slabs for the footings of the main building. And above them cranes tower to the clouds, Gulliverlike. Groves of oak scattered alongside look like scrub forest in comparison with them.

"We are starting to lay concrete for the slabs for the nuclear reactor," says superintendent Vladimir Nikolayevich Uvarov, pointing with a gesture to the steel grating spread below. "The slab is 3 meters thick. The job has been entrusted to Nikolay Zhirnov's well-known brigade. The lads excelled at the Novovoronezhskaya AES, where they worked for more than 5 years."

The jobs are, for the builders, not simply different assignments. They are the biographies of people, their growth and their destiny. The AST project proved to be memorable for Nikolay Zhirnov, who had just been admitted to the party. Nikolay Ponyavin, brigade leader of one of the best collectives of Mosspetsatomenergomontazh [Special Moscow Trust for the Installation of Nuclear-Power Equipment], was able to organize speedy installation of lifting cranes here, and then the assembly of reinforcing cage. And now metal formwork is ready for erection. The brigade decided to do the concreting of the below-grade work for the reactor with its own personnel. A broad qualification profile? They learned much on the scaffolding of the Kurskaya and Kalininskaya Nuclear Electric-Power Stations.

In covering the whole site at a glance, you imagine boilerhouses and smokestacks. But no, they are not part of the landscape. What then will rise up among the trees and the green bushes? Two reactors with a total capacity of 1,000 MW will be located at the site. They will be capable of meeting the requirements for heat and hot water of an urban rayon with a population of 400,000. About 400 small boilerhouses will be eliminated. In so doing, it is proposed to save annually 900,000 tons of fuel--coal and petroleum product. The sky above Voronezh and its surroundings will be clearer.

Beyond the reservoir the silhouette of one of the city TETs's with a trail of smoke is visible. It burns a trainload and a half of coal per day, and 600 people tend it. The AST's capacity will be 5-fold that of a TET's, and there will be about 500 people. The fuel for the reactor, which does not pollute the atmosphere, is supposed to be changed once in 6 years.

Moreover, working conditions will be sharply improved. The two main jobs at the AST are those of operator and mechanic. There will be more people here in white jackets than at a polyclinic.

"Incidentally, one of the AST's working drawings has specified a stack above the reactor," says chief of a future department V. Losilkin. "It is a ventilation pipe, for changing the air."

"The developers called for 20 hectares of hothouses. A satellite city will rise up alongside," continues A. Konoplev, chief of the station's production-equipment section. "The collective of a housing construction combine from Tolyatti made a contract to erect high-rises of improved layout in accordance with models of their beautiful city. The work is to be gigantic: in 3 years the first unit should go into operation, then the second. But this is only half the job. The design for construction of the AST's second line was approved recently--another 2 units are to be turned over for operation prior to 1990."

The Novovoronezhskaya AES has already become an irreplaceable school for training personnel as operators for other power stations that will operate on nuclear fuel. The specialists have managed to beat a path to the AST site.

The "heart" of the AST are reactors of the water-cooled water-moderated type, which have distinguished themselves on the icebreaker "Lenin" and at the Novovoronezhskaya Nuclear Electric-Power Station. But the AST will receive still more improved equipment, which is reliable in operation.

A. Plotnikov, director of the nuclear heat-supply station that is under construction, sums up his knowledge of the construction project:

"Right now only a section and several small subcontracting units--about 300 people--are operating at the site. Soyuzatomenergostroy [All-Union Association for the Construction of Nuclear Electric-Power Stations] is to establish a large administration, so that at least 2,000 builders and installers will be employed permanently at the facilities. I will express also a wish to the Voronezh Komsomol: there are still very few youth at the construction project, which expresses progress in power engineering."

11409
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OUT-OF-SEQUENCE EQUIPMENT DELIVERIES SLOW SMOLENSK 'AES' ERECTION

Moscow TRUD in Russian 12 Jun 83 p 1

[Article by A. Sed'ko, senior superintendent of the Desnogorsk Installing Administration of Tsentroenergomontazh [Trust for the Installation of Power-Engineering Equipment in the Central Economic Region]: "Topsy-Turvy..."]

[Text] A letter to our mailbox.

A "tenth wave" of equipment for the second power unit has swamped the warehouses of the Smolensk Nuclear Electric-Power Station. Mountains of packing cases of various sizes, which have been piled up several stories high, apparently should inspire the installer: you have been provided with work for many months ahead. And how!--150 million rubles' worth of valuable equipment which awaits installation!

Only we cannot start to install any equipment. A multimillion "gross" is no good to us. Give us such-and-such specific units of equipment in a set, on schedule and in the precise operating sequence.

So now they have put us on a spot here. It turns out that all these Mount Blancs and Everests of equipment are intended for the upper floors of the second power unit. But that which should stand on the lower levels, which should be installed today, is almost always absent.

This does not refer to trifles that one can handcarry and install on the day prior to starting up the second million-kw unit. Large multiton machines that should be installed today, while there is no ceiling-floor over the appropriate premises, are lacking. And if the builders, whom we are thus holding up, will not wait for us but proceed upwards, then the delivery of large and heavy equipment to the site of installation will strongly remind one of pulling a camel through a needle's eye.

For example, we badly need various kinds of pumps. The places are ready, it is necessary to go on, but there are no pumps. It has long been time to install deaerating columns and 120 cubic-meter tanks. No one knows when they will arrive. The laborious but important assembly of high-pressure pipelines is being impeded. We lack 1,200 tons of these pipelines, as well as 26 tons of extensions for remote drives.

Who has tripped us up? The suppliers? It turns out that it is a main administration of our own ministry, namely Glavenergokomplekt [Main Administration for Supplying Complete Sets of Power-Engineering Equipment].

After flooding the construction project with equipment for the upper stories of the second power unit, this USSR Minenergo [Ministry of Power and Electrification] main administration did the Smolensk AES a bad turn, having sent the most necessary, first-priority articles elsewhere. But indeed, under the agreements for delivery, these articles supposedly should have arrived at the construction project last year. Naturally, the agreements were extended, but in this case the deadlines for delivery were changed to the middle and end of this year, and even to 1984, the year for startup.

And thus an upper echelon of Minenergo, an outfitting administration, has organized the arrival of equipment in topsy-turvy fashion. These articles carry first priority and are very much needed at the Smolensk AES. It is bitter to acknowledge it, but the suppliers are triply right when they say that, before appealing to them, it would not be amiss to look to one's own ministry. For the contractor, the client and the installing organizations, and even Glavenergokomplekt, are all subordinate to USSR Minenergo.

But I still address the main question to V. N. Kondrachenko, chief of Glavenergokomplekt: did the main administration's workers, when supplying complete sets of equipment, really intend to observe the directive about startup of the second power unit of the Smolensk AES in 1984?

Things are busy at the construction site today, and I appeal to the collectives of the supplying plants: try to seek out reserves and ship the equipment ahead of time. We ask this of the collectives of Berdyansk's Yuzhgidromash plant, the Moscow Plant imeni Kalinin, the Podolsk Plant imeni S. Ordzhonikidze, the Barnaul Boiler Plant, Belgorod's Energomash Plant and other enterprises. Timely startup of the power unit depends greatly upon your help, dear comrades.

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SUPPLY DEFICIENCIES SLOW CONSTRUCTION OF BALAKOVSKAYA 'AES'

Moscow SOVETSKAYA ROSSIYA in Russian 10 Aug 83 p 1

[Article by A. Baginskiy, M. Dityuk and A. Okulov, installer-brigade leaders (Balakovskaya AES, Saratov Oblast): "Useless Shifts"]

[Text] SOVETSKAYA ROSSIYA at the Balakovskaya AES

There has been silence and desolation for several months now at the finished floors of the reactor department. Installing operations cannot be performed at them--there are no cable, pipelines, equipment, and so on. Our subunits cannot cope with the plan. We have already appealed several times to the construction-project management--solve the supply problems more energetically. In response they point out to us bulging files of inquiries, telegrams and letters to the ministry, the outfitting organizations and the manufacturing plants. Their contents are identical: we ask you to send equipment to Balakovo more quickly.

We know that USSR Gosstroy and USSR Gosplan have reexamined the standard deadlines for shipping the equipment. But our suppliers not only do not hurry to reorganize their work, but they do not even cope with the deadlines previously specified. For example, the Izhorskiy Zavod Production Association failed to deliver filters, Atommash failed to deliver gate valves for the reactor building, and Glavenergokomplekt [Main Administration for Supplying Complete Sets of Power-Engineering Equipment] of USSR Minenergo [Ministry of Power and Electrification] did not supply cable products and fixtures. The Balakovites have been expecting pumps for half a year now from the Sumy and Kataysk plants and heat-exchange and tank equipment manufactured by these plants: the Machinebuilding Plant imeni Ordzhonikidze in Podolsk and the Krasnyy Kotel'shchik Plant in Taganrog. The list could be extended. All attempts to obtain the products on time have ended up completely unsuccessfully. The power-equipment installers have found themselves in a most complicated situation. There are shortfalls in the shipment of hundreds of units of various fixtures and equipment. The Kursk Plant for Nonstandard Equipment and Pipelines, the Novomoskovsk Boiler and Machinery Plant and the Kuybyshev Plant for Boiler Auxiliary Equipment and Pipelines have fallen short in shipments of more than 800 of the planned 1,653 tons of pipelines. Despite repeated promises and assurances about the shipment, the Barnaul Boiler Plant failed to send four tanks for condensate. Work on the installation and construction of these units at the special building has stopped. A set of fixtures for

high-pressure pipelines was not received from the Belgorod Plant for Power-Machinebuilding in the second quarter. The installers are idle. And the quality of the products that we obtain from the suppliers cause special concern.

It is time, in our view, to take an urgent look also at the procedure for supplying construction projects with complete sets of equipment. Currently prevailing practice hinders both acceleration of the work pace and of work organization at the jobs. Here is just one example. According to the schedule that provides for startup of the station, our administration of Gidroelektromontazh [Trust for the Installation of Hydroelectric-Power Equipment] should do 4.5 million rubles' worth of work this year. But during the first half of the year only a bit more than a million rubles was assimilated. The reasons? We cannot keep on schedule because of the lack of cable and of the ducts for them. Judge for yourself--out of 1,250 kilometers of cable needed for the year, funds have been allocated only for 405 kilometers. And not one meter has been obtained yet. Some have promised to give it to us only at the end of the fourth quarter and at the start of next year. The same thing also happens with the ducts in which the cable is to be laid. Out of 430 tons, 10 have arrived.

The installers, because of the lack of a work front, have transferred to other jobs. As a result, the lag behind schedule results in an enormous increase in labor costs. Take, for example, the heat exchanger, which weighs about 30 tons. Had it been on hand, a crane could have set it up in place in an hour. But now, with the ceiling-floor installed, this machine had to be towed along narrow corridors in order to set it on the footing. The specialists have estimated that delayed delivery of equipment will require of the power-equipment installers alone additional tens of thousands of man-days.

The indifference that enterprises, plants and subunits of our own ministry are showing toward progress of the construction project and the lack of discipline are especially surprising. A lack of commitment by Glavenergokomplekt and its services and by other subunits of the industry's staff--Gidroelektromontazh [Trust for the Installation of Hydroelectric-Power Equipment] and Energokomplektoborudovaniye [Trust for Supplying Complete Sets of Power-Engineering Equipment]--has become chronic. It is time, surely, to deal with them with the greatest severity.

We cannot be reconciled with the fact that our worktime is used so ineffectively. The most extreme measures on the part of ministries, agencies and enterprises are necessary, in order to sharply improve the supplying of materials and equipment to a most important construction project.

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BRIEFS

IGNALINSKAYA AES CONSTRUCTION SUPPLY--"Alignment on the Reactor!" That was what the report published on 26 November 1982 was called. In particular, it stated that the Izhorskiy Zavod and Krasnyy Kotel'shchik Production Associations of the Ministry of Power Machine Building, and also the Yuzhgidromash Plant of the Minister of Chemical and Petroleum Machine Building, are delaying the delivery of certain types of equipment for the Ignalinskaya AES, which is under construction. V. Pershin, Deputy Minister of Power Machine Building, has reported to the editor that the criticism is recognized as correct. The ministry's board, together with supervisors of the enterprises, reviewed progress in the delivery of equipment to nuclear power stations, and the deadlines for its manufacture were planned. The ministry has established continuous monitoring over the progress of production and the delivery of equipment. The secretary of the party committee of the Izhorskiy Zavod Power Machinebuilding Production Association, Yu. Moiseyev, stated that the report was discussed at meetings of department collectives that are carrying out orders for the manufacture of steam separators for the Ignalinskaya AES. The complaints expressed in it against the Izhorskiy power machinebuilders were recognized as correct. The party committee has called to party account those who allowed the delay in shipments to occur. Specialized sections have been established in departments, and the manufacture of equipment for the AES's has been organized on a continuous schedule. The report was discussed also at open department meetings of the Yuzhgidromash plant, states V. Bezrodnyy, director of that enterprise, and party committee secretary A. Berezan. The criticism against the plant was admitted to be correct. Measures were developed for insuring accelerated delivery of equipment, and a staff for monitoring its fulfillment has been established. [Text] [Moscow PRAVDA in Russian 19 Mar 83 p 2] 11409

ZAPOROZHYE AES CONSTRUCTION--The block of the main building, the metal structure for which was developed by GPI Dneproproyektstal'konstruktsiya [Dnepr State Scientific-Research and Design Institute for the Integrated Design of Metal Constructional Structure] for the Zaporozhskaya AES, has been unified. It is being used for other similar nuclear power stations of 1 million kW capacity. The building of the AES's main housing consists of a machine room with a span of 45 meters and a height of 35.5 meters and a diaerator section with a span of 12 meters and a height of 43 meters. The machine room is equipped with 2 rows of overhead-traveling support-type cranes with load-lifting capabilities of 200/32 and 15 tons. The metal structure was developed on the basis of the wide use of a variant design. Parts made of high-strength

steel, grade 14G2AF, and effective rolled section were used in large amounts. The roof was assembled from integrated panels, the walls from keramzit-concrete structure. Consolidated 12x24-meter fully readied modules were used in the machine room's roof. Address for inquiries: 320600, Dnepropetrovsk, pr. Karla Marksa, 59, GPI, Dneproproyektstal'konstruktsiya. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 4 Mar 83 p 3] 11409

HEAT ACCUMULATORS FOR AES'S --The scale of the Soviet Union's Unified Power System allows the use of more economical power units of high capacity. The most effective of all such equipment is operated at a constant base load, and this means that it is undesirable to stop at night, when the requirement for electricity is least. In our country many power units of 1 million kW each are in operation at nuclear power stations. In order to regulate the load-curve schedules and to impart flexibility to such large units, a group of specialists of the State Scientific-Research Power-Engineering Institute imeni G. M. Krzhizhanovskiy (ENIN) and the Riga Department of Atomteploelektroproyekt (ATEP) [Institute for the Design of Nuclear Heat and Electric-Power Stations], under the supervision of Candidate of Engineering Sciences Laboratory Manager V. Chakhovskiy, have developed a nuclear station with heat accumulators. A model of such an installation can be seen at the exhibit, "Inventiveness and Rationalization-83," at the VDNKh SSSR [Exhibition of Achievements of the USSR's National Economy] in the section, "Power Engineering and Electrification." According to calculations, such a station will enable the AES's capacity to be regulated. In so doing, heat of the nuclear power unit's secondary circuit will be withdrawn in the form of hot steam and water during the hours of the lowest load on the power systems. It is proposed to use it during peak hours for converting the turbine to a boosted operating mode. [Ye. Kondrat'yeva] [Text] [Moscow IZVESTIYA in Russian 14 Jul 83 p 3] 11409

SEISMIC-RESISTANT CHARGING MACHINE--Volgodonsk--The machinebuilders of the Volgodonsk Production Association Atommash have won a major labor victory. In a ceremonial setting, the country's first recharging machine in a seismic-resistant version, which was manufactured ahead of schedule and was rated "excellent" at acceptance, was turned over to Zaporozhskaya AES power engineers. In design, it is a 50-ton robot that combines the most complicated equipment, mechanisms, transport systems and instruments. In carrying out 26th CPSU Congress decisions about the accelerated development of nuclear power, the Atommash Association collective has mastered the production of reactor vessels, steam generators, transport-engineering equipment and biological protection for nuclear power stations. And now the recharging machine has augmented its specialization. Atommash is gathering strength dynamically. Operating under the motto, "We will build it on time, and we will assimilate it ahead of time!", the collective in just 6 months of the current year of the current five-year plan increased the output of equipment 4-fold over the corresponding period of last year. In striving to respond to June 1983 CPSU Central Committee Plenum decisions, Atommash's collective has resolved to manufacture ahead of time--by the October anniversary--a second recharging machine, which is intended for the Balakovskaya Nuclear Electric-Power Station. [V. Ogurtsov] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 8 Jul 83 p 2] 11409

'ATOMMASH' MAKES LARGE ROBOT--A first gigantic robot for nuclear power stations has been manufactured at Atommash. The purpose of the unusual machine,

which is similar to an overhead-traveling crane, replaces nuclear-fuel cassettes in AES reactors. The robot is destined for the Zaporozhskaya AES. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 28, Jul 83 p 3] 11409

CRANE FOR AES CONSTRUCTION--Zaporozhye--A series of traveling gantry cranes that designers of the Zaporozhye Power Machinery Plant have developed jointly with scientists is intended for the construction of nuclear power stations. The fabrication of the first of them, which will operate during erection of the Balakovskaya AES, was completed 4 months ahead of schedule. The new lifter's potential matches gigantic construction projects well. It can lift a 200-ton load to a height of 76 meters and shift it along the horizontal for a distance of up to 80 meters. This will enable buildings and reactors made of consolidated modules to be assembled and the work to be greatly accelerated. This year the effective lifting equipment will leave Zaporozhye for construction of the Kalininskaya, Rostovskaya, Krymskaya, Kurskaya, Novovoronezhskaya, Rovenskaya and other AES's. [TASS] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Mar 83 p 2] 11409

PROGRESS ON BULGARIA'S AES'S --Erection of a fifth unit has started at Kozloduy, Bulgaria's nuclear-power engineering center. It was in just June of last year that the fourth unit of 400-MW capacity was turned over for operation here. The fifth marks the start of a new generation of reactors--of 1,000 MW capacity. Two such "giants" will operate at the station. Soon the Kozloduy AES will get a long-awaited "relative"--preparatory work on the erection of a second Bulgarian nuclear power station has started at Belen, where 4 units of 1,000 MW will operate. By 1985 the republic's AES's will generate 26 percent of all the electricity, 40 percent in 1990 and 45-50 percent in the year 2000. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Jan 83 p 3] 11409

KURSKAYA AES POWER FLOW--Belgorod Oblast--The Kursk AES's power stream has begun to arrive at the load center that feeds the Oskol Electrometallurgical Combine imeni L. I. Brezhnev construction project, an important project of the five-year plan. The load was placed on the 200-kilometer power transmission line that connects the nuclear power station with transporting substations, and on the metallurgical substation. From here, power will go to the Oskol giant, which is being erected in accordance with 26th CPSU Congress decisions. [TASS] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 4 Jan 83 p 1] 11409

FEED PUMPS FOR AES'S --Sumy--Economical feed pumps, the serial production of which has been assimilated at Sumy's Nasosenergomash [Power Machinery Association for Pump Production] imeni 60-Letiya SSSR, are intended for nuclear power. Each consumes 10-million kWh less electricity than units of the previous model. The first new pump was sent to the Ignalinskaya AES. Prior to the end of the year, the Lithuanian power engineers will get five more such pumps. [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 14 Jan 83 p 1] 11409

CHUKOTSKIY AES REBUILDING--Magadan--Rebuilding has started on the Arctic's first nuclear power station, which is located in the Chukotskiy settlement of Bilibino. This will enable its operating reliability to be raised--to allow the region's mining enterprises to step up the pace of extracting precious metal. A. Stashuk's brigade, which has been working here since the very start

of the construction of the nuclear facility, has already erected the pumphouse for the peak-load coolants. The bricklayers are now starting to build another facility. [V. Zhurba] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Mar 83 p 1] 11409

ZAPOROZHYE'S AES CONSTRUCTION CRANE--Zaporozhye--20 Jan--The products of the Zaporozhye Power-Engineering Machinery Plant's workers are sent to hundreds of places in the country. This year they are to fill an important order for the Balakovskaya AES builders. The Zaporozhyers should fabricate for them a special crane of 200-ton load-lifting capacity. Its use will enable the erection of buildings and the installation of reactors, lifting modules to a height of up to 76 meters. Assembly of the metal structure has been charged to the best fitters' brigade, which is supervised by V. Mostov. The work will be performed strictly on schedule. The bridge of the crane and the supports have already been fabricated. It is planned to fill the order in the first quarter, half a year ahead of schedule. The Khar'kov Branch of Energomontazhproyekt developed the design for the special traveling gantry crane. (PRAVDA stringer I. Sergeyev] [Text] [Moscow PRAVDA in Russian 21 Jan 83 p 2] 11409

KOSTROMA AES CONSTRUCTION--Construction of the Kostroma Nuclear Electric-Power Station and of the settlement for the new AES's power engineers--Pionernyy--is proceeding successfully. Specialists from many parts of the country have come here, to the new construction project. Shock work is being performed on the erection of facilities for housing and for cultural and domestic-amenity purposes in the Pionernyy settlement by brigades of builders and installers from section No 2 of the AES's construction administration. Apartment houses of various colors and made of prefabricated structure have risen up in a row. A school, kindergarten, dining hall and a club with an athletic hall have been located in picturesque surroundings of pines and birch. The construction of a foodstuffs and manufactured-goods stores is being completed. [Ye. Golubev] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 6 Feb 83 p 1] 11409

TATARSKAYA AES CONSTRUCTION--Kazan--The mortar-and-concrete plant at the Pionernyy base of the Tatarskaya Nuclear Electric-Power Station has begun to yield output. A general-purpose installation of 30 cubic meters of concrete per hour has been started up here. This will enable the whole complex of construction and installing operations at the new power-engineering facilities to be greatly speeded up. Previously, the Nizhnekamsk and Zainsk concrete plants supplied concrete for the AES's construction. Now production has been arranged directly on the spot, at Kamskiy Polyany, enabling transport costs to be reduced and erection of the Pionernyy base, the purification structures and a temporary dock at Kama to be speeded up. [V. Goncharov] [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 9 Dec 82 p 1] 11409

AES TURBINE ROTOR PRODUCTION--Leningrad--The blacksmiths of the Izhorskiy Zavod Association have broken their own record. To date, they have made forgings from ingots with a maximum weight of 235 tons, but now, for the first time in domestic practice, they have completed the forging of an item from an ingot of 290 tons. A technology for fabricating solid-forged rotors for million-kW turbines for nuclear power stations was developed for this forging. Such rotors cut the time for producing the turbine 1½-fold to 2-fold and save

as much as a thousand tons of metal for each unit. Supplying the enterprise's metallurgical production facilities with the newest equipment has helped in mastery of the production of rotors from gigantic ingots. The formula for the steel for the giant parts and the technology for producing them were developed with the help of the country's scientific centers. Izhorskiy's workers plan to bring the weight of the monoliths up to 400 tons during this five-year plan. [TASS] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Jan 83 p 1] 11409

CSO: 1822/324

NON-NUCLEAR POWER

SECOND UNIT IN OPERATION AT SHAMKHORSKAYA GES

Baku VYSHKA in Russian 12 Jul 83 p 1

/Article: "Industrial Current Is Now Available"/

/Text/ As of 11 July the second power unit at the Shamkhorskaya GES had generated power for the Unified Transcaucasion Power System for three consecutive 24-hour periods. The construction of this hydroelectric power station was stipulated in the Basic Directions for the Economic and Social Development of the USSR in the Years 1981 Through 1985 and the Period up to 1990.

Installers from the Transcaucasion Administration of the Leningrad Spetsgidromontazh Trust /Special Hydroelectric Power Station Installation Trust/, who assembled the unit using two bridge cranes, completed the task nearly two months ahead of schedule. And now the long-awaited moment has come: industrial current is now available!

The builders and installers rightly believe that the collectives of the electrical equipment machine building plants in Kharkov, Novosibirsk, Zaporozhye and several other cities in the RSFSR and the Ukraine are their partners in this effort. While competing on the "workers' relay race" principle in the construction of the GES, the associated enterprises have delivered equipment to the construction site ahead of schedule. In so doing they have opened up a work front for the installers.

The Shamkhorskaya GES construction project has been undertaken in difficult techtonic conditions. A large part of the terrain selected for the construction of the power station was swampy and the relief had an abundance of breaks and cracks in the rocks and rocky soil. However, the builders successfully overcame all of these difficulties. They raised a dam that was some five kilometers in length along its crest, making it the longest structure of its kind in the republic. It spanned two rivers at the same time - the Kura and its tributary, the Shamkhorchay; the hydrounit was raised at the point where the two rivers converge.

The Shamkhorskaya GES has a rated capacity of 380,000 kilowatts and is the largest hydroelectric power station in the Azerbaijan SSR. A reservoir with a capacity of 2.7 billion cubic meters of water is part of the hydroelectric complex. More than 75,000 hectares of fertile, but essentially dry land will be irrigated with water from this reservoir. This land is located in the Shamkhorskiy, Khanlarskiy and Kasum-Ismailovskiy rayons. The man-made sea will also be used as a source of water for the city of Kirovabad and its industrial area.

The Shamkhorskaya GES will be the first stage in the cascade that is to be built in the middle current of the Kura River. Its four hydroelectric power stations will make it possible to increase the production of electricity in Azerbaijan and to put a great deal of land into agricultural use. The regulation of the flow of the Kura River will improve conditions for shipping on the river and will promote the development of its fishing industry.

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PLANS FOR SREDNEYENISEYSKAYA GES REPORTED

Moscow SOVETSKAYA ROSSIYA in Russian 16 Mar 83 p 1

/Article by V. Zhilyayeva: "In the Rapids of the Yenisey"/

/Text/ Within the State Experts Commission of the USSR Gosplan they are examining the technical-economic justification for the construction of a future giant of the hydroelectric power industry - the Sredneyeniseyskaya GES. The justification was developed by the All-Union Planning, Surveying and Scientific-Research Institute imeni S.Ya. Zhukov /Gidroproyekt/.

The fate of this power station has not come into being easily. Prior to the Great Patriotic War /WWII/ it was clear that this power station was needed for the development of Eastern Siberia. The design work was started in the 1950's at the same time that they were working on the Bratskaya and Krasnoyarskaya GES's. The Sredneyeniseyskaya GES was to have been situated closer to the regions that were being developed than were the Bratskaya; and it promised to be more powerful, but... News about the discoveries of geologists fell like snow on the head: a deposit of polymetal ore, which was needed by the national economy, was found in the area that was to be flooded by the reservoir for the Sredneyeniseysaka GES. Debates started and the decision about the construction of the power station was delayed for many years. Finally, its time has come.

The chief engineer for the project, Ye.A. Smirnov, reports that, "we had to come up with a design for the siting of the GES that made it possible to continue exploiting the polymetal deposit. We selected the dam site below the place where the Angara River flows into the Yenisey. At this point at one time the river broke through the mountain ridge of the Yenisey and for a distance of several kilometers it flows between the steep cliffs, which are made up chiefly of gneisses - rock of volcanic origin. Nearby are concentrated the city populations of Lesosibirsk, Novoyeniseysk, and Yeniseysk, which are in the zone of influence of the GES."

Some figures will help us to comprehend the scale of the construction project that is getting underway on the Yenisey River. The amount of earthmoving work alone will amount to nearly 70 million cubic meters; there will be 3.7 million cubic meters of concrete and reinforced concrete work. The total length of the head structures - the earthen and spillway concrete of the dams - is nearly five kilometers, a third of which is for the channel of the river. The "height" of the dam from the crest to the tail race will equal the height of a 20-storey building. The drop of the water levels will be nearly 50 meters. The reservoir is to be filled in two stages. The units will start up when the water head reaches 25 meters. The water level will reach its planned mark sometime around the year 2000.

The projected average annual energy output of the Sredneyeniseyskaya GES will be 31 billion kilowatt-hours. The power station is rated at six million kilowatts with a possible increase in the future. Inspite of the fact that the cost for the construction of the reservoir, which includes compensation for the flooding of fields and agricultural land and outlays for moving people out of the flooded zone, will exceed the cost of the hydrounit itself, the project is still an economically sound undertaking which will produce inexpensive energy. It will be possible to rapidly develop the mining, metallurgical and timber industries in the area.

Once the hydroelectric power station is completed the means of transportation on the Angara River will improve. At its mouth there is an inconvenient point at which the water is only some 90 centimeters deep. Such shallow water is common along the current of the river. When the GES raises the water level, larger ships and rafts with a deep draught will be able to travel on the Angara River. For the ships to pass through these spots, they will build two-chamber, two-strand locks with a side pool. The raising and lowering of ships will be accomplished in two stages and ships will be able to move in two directions at the same time.

Just as everywhere else where hydroelectric power stations are being built, the Sredneyeniseyskaya GES will become the foundation for the formation of a new industrial region in Eastern Siberia.

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NON-NUCLEAR POWER

CHEBOKSARSKAYA GES NO 8 UNIT BEGINS OPERATING

Moscow PRAVDA in Russian 12 Apr 83 p 1

/Article by Yu. Knyazev, independent correspondent for PRAVDA: "The Eighth Stage: On the Spot Report"/

> /Text/ Power unit No 8 of the Cheboksarskaya GES has provided its first electric power for the USSR National Power System. Altogether there will be 18 power units. The machine room is gradually rising out of the right-hand shoreline toward the left-hand shore. In December 1980, when the first power unit was put into operation, the machine room was small. Now its length is almost a quarter of a kilometer. When all of the power units have been put into operation, the machine room's length will be greater than half a kilometer.

The manager of the duty watch, engineer V. Illarionov, provided some curious figures: "Our young hydrounit has already generated more than 2.6 billion kilowatt-hours of electricity. A record was set in the first quarter of this year - we produced more than 600 million kilowatt-hours of electricity. Our Cheboksarskaya GES kilowatt-hour is quite inexpensive. This is the result of the high mastery of the workers assigned to the new hydrounit and the rapid assimilation of the installed capacities. In recent days all attention has been concentrated on preparing for the spring flooding. All equipment has been prepared for battle readiness: the cranes, gates and so forth."

In the machine room there is every-day life. Specialists perform their watch. A group of engineers from the Leningrad Elektrosila Association measures the work parameters of one of the units. On beautifully formulated stands we see the socialist pledges of the various shops and services of the Cheboksarskaya GES. Here we also see documents about the best efficiency experts and teachers. We reach a new facility, which is adjacent to the GES building. In the large room panels have been built in in a semicircle. Here they are working on the main control panel for the new power station. Soon it will be in operation. From here dispatch communications will be maintained with various cities. A dining hall was recently opened in this building.

An open-work metal mast has been raised high above the Volga River and the facilities of the hydrounit. This marks the beginning of a new power line route - a LEP-500. Soon several other similar supports will be going up, which will give the entire hydrounit its own appearance.

The locks, which were put into operation in 1981, have come back to life. Many thousands of ships have already passed through the locks. The first ship for this navigation season was the powerful icebreaker, the Kapitan Chadayev. It passed through the lock of the Cheboksarskaya GES in March. It broke up the ice in the Cheboksarskoye reservoir and then led the first caravans of cargo ships.

This year the builders of the GES must put another three power units into operation. In the Chuvash ASSR a detachment of installers from the Volga Administration of the Spetsgidroelektromontazh Trust /Special Hydroelectric Power Station Installation Trust/ is at work. Many of them are responsible for the installation of a hundred and more turbines over the past ten years while working on the construction of hydroelectric power stations. The efforts of the experienced workers have resulted in the assembly of power unit No 8 in record short periods of time: in three weeks altogether. It would seem that one should be pleased with this record. Yes, the mastery of people and their skill in applying all efforts must be praised. But are records always needed and useful? And is it not true that at times we must pay too great a price for observing schedules? Thus has it happened that from the very start of the construction of the GES in the Chuvash ASSR they were unable to establish a smooth pace of work. The builders were always off schedule. And then all hopes were placed on those who were to be working at the finish. And so the installers were compelled to "storm" day and night.

P. Starodubtsev, a communist and veteran of hydroelectric power station building, notes with vexation that, "following the start-up of power unit No 8 (just as power unit No 7 and all the others, by the way) the usual slump set in. And we should have learned something from our past experience and achieved the needed level of smoothness in our work and established a flow-line organization of labor."

This is true. For the most part the assigned work schedules for the facilities of the new GES are not being observed. At present, for example, the construction of the service bridge for the head race of the hydrounit is coming to an end. Now there are few who recall that the bridge should have been completed at the moment that the Volga River was spanned. And the delay in the completion of this key project was quite costly to the construction project.

There are quite a few temporary walls standing in the machine room. The longer that they stand the more expensive it will be to erect permanent walls.

The hydroelectric power stations, which were built on the main street of Russia, will stand for centuries. And there cannot be any unfinished work here. One cannot count on the hope that at some time in the distant future something will managed to finish the work that has been started. Everything here must be durable, beautiful and reliable. For this the project needs exemplary order and a smooth pace of work.

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BAYPAZINSKAYA GES CONSTRUCTION REPORT

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 3 Jun 83 p 1

/Article by S. Smirnov, correspondent: "Report: The Beginning of a River of Steel"/

> /Text/ The start in the construction of the Baypazinskaya GES has reached a new stage of work. Yesterday at noon in the turbine water conduit No 1 the first element of the metal facing was installed. From this point in time the builders of the next hydroelectric power station in the Vakhsh River cascade proceeded to the solution of one of the key problems, which determines the start-up of the first power unit.

They have prepared for this event carefully and for a long time. The installation of the turbine water conduits, through which the water of the Vakhsh River will rush through the disk gates to the power units, is the responsibility of specialists from the Gidromontazh Trust /Hydroelectric Power Station Installation Trust/. Up to now the installers had very little to do on the Baypaz River project; and now their time has come. First they must weld the shells out of thick strips of a special steel. The metal for these enormous elements was delivered to the construction site by the Chekhov Gidrostalkonstruktsiya Plant /hydraulic steel structures/, which has long been a partner of the Nurek builders operating on the "workers' relay race" principle.

At the base of the Gidromontazh organization, which is located here on the Baypaz River, the briade of electrowelders, which is led by A.P. Gorbulenko, has assembled several such steel rings. The welders came to the assistance of another collective of hydroelectric power station installers, which is led by a young, but already seasoned brigade leader, M. Vayner. For most of them this is already their third construction project, after the Nurekskaya and Kolymskaya GES's.

The heavy Kirovets truck crawled to the spot where the lowering of the structure was to commence. The steel cumbersome object, weighing more than 17 tons and having a diameter of 7.6 meters, rested on the deck of the trailer. In just a few minutes the installers had connected it to the arm of the crane and the operation began.

For those who had witnessed and participated in the installation of the shells on the Nurek, this event was not quite the same. There, in contrast to the Baypaz, there was more room and convenient sidings led to the tunnels. Here things were different: the exit portal was located on a tiny spot and the only opportunity for introducing the metal structure was from an installation location situated at a height of 15 meters.

The shell was lowered slowly on cables. At the controls of the crane sat Yu. Visker, an experienced crane operator from the section of mechanized work. He carefully follows the commands given by the foreman of Gidromontazh, A.N. Ivanov. Installers V. Rudakov, Yu. Zadorozhnyy, Yu. Stoyakin and their brigade leader, M. Vayner, were prepared to receive the steel ring down below.

The entire operation of lowering the shell lasted several minutes. It rested solidly on the cart, which had been installed on the guide rails. The winch did its work and the first element of the metal facing was lost in the darkness of the 90-meter water conduit.

The second and third shells follow the first. Then the installers proceed to the second water conduit; and they will assemble the bifurcation chamber beneath the ground. The Gidrospetsstroy workers will work with them in reinforcing the metal cores of the tunnels with concrete. To fully complete the first turbine water conduit normally takes three months. But the builders expect to do the task in half that time.

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