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CURRENT SITUATION IN POLLUTION CONTROL

Bucharest ERA SOCIALISTA in Romanian No 23, Dec 76 pp 15-19

/Article by Dr Eng Virgil Ioanid: "Current Aspects of Territorial Planning and Environmental Protection"<sup>7</sup>

/Text/ Correlation between economic progress, over-all territorial planning and improvement, and environmental protection is now one of the major theoretical and practical problems confronting the world and each individual country.

The main economic activities with the greatest impact upon general development are inseparably bound up with industrialization and expanded extraction and processing of large quantities of raw materials and energy resources. These processes are open systems in relation to the environment, with which they make massive exchanges of substances in all forms. A number of essential demographic changes are also taking place in the density and geographic distribution of the population, especially through urbanization and migration, which are directly affecting some environmental characteristics.

There are broad fields of interaction between planning and environmental protection. Territorial planning, urban and rural, may be regarded as the entirety of theoretical and practical efforts to construct and utilize the material environment in which the activities of communities go on (work, travel, recreation, social contacts, education etc.). (1) This implies that especially in the last few decades it has rapidly progressed beyond its initial stage (resulting from the historical form of its appearance) as a supplement to architecture for the sole purpose of improving the allocation of buildings, traffic arteries, parks and other functional areas. And this also implies the subordination of territorial planning, as a field and mode of action, to socioeconomic planning. So regarded, territorial planning can by its comprehensive methods substantiate and justify the choice of measures flowing from the general developmental strategy that the planning expresses at any given point.

The interdependence of territorial planning and environmental protection is clear from the foregoing alone, as well as the direct and indirect relationships determining and affecting the two fields. Territorial planning, urban and rural, includes a series of economic, technical and artistic disciplines

and it acts upon the socioeconomic development of an area by improving the population centers and their surroundings in all respects, including some that directly affect the quality of the environmental factors (water, air and soil).

Under the particular conditions of the present rate and level of Romania's socioeconomic development, the correlation between territorial planning and environmental protection is essentially governed by certain main characteristics.

Industrialization, as the main source of Romania's all-around progress, is based upon better exploitation of more natural resources and rational use of manpower. Productive forces using nonpollutant or less pollutant technologies can be advantageously located as near as possible to the areas with labor forces of largely agricultural origin. This minimizes migration of the population, conserves and makes maximum use of the housing reserve (while raising the standard of comfort), and eliminates all kinds of waste of time and energy, which waste is caused by irrational increases in the length of the communication lines and in the travel time between residential areas and places of work.

The contribution of territorial planning to the determination and implementation of this policy is to be seen in the fulfillment of the party program for installing 300-400 new, adequately equipped urban centers, which will absorb most of the growth of the nation's urban population while providing for a high degree of environmental protection and preservation of the quality of the air, waters and soil.

The problems and scope of environmental protection also include some ecological factors, namely direct relations between living organisms and their environment. As we know, through extensive and concentrated regional measures to obtain pronounced and immediate results some substances were used with well-defined effects upon one phenomenon but bad effects upon the local ecological system, as in the case of excessive use of substances like DDT or the massive deforestations in various parts of the world which led to the rapid deterioration of unprotected lands. (2)

The problems of interaction between development and environment are not new. Communities have always been confronted with the effects of this interaction throughout their historical evolution. But until recently the relatively low developmental level of production tools prevented the impact of their use upon the environment from disturbing the natural ecologic balance except very rarely.

An essential deterioration took place toward the middle of the last century in England, where the development of capitalism had concentrated various kind of harmful effects in the same areas at the same time. These effects were aggravated by the presence of extremely dense working populations living under precarious conditions. The symptoms of serious pollution of the air, waters and soil appeared for the first time in English cities and were fairly accurately described and recorded in a number of medical reports on the state of public health. These reports are quoted by Engels and mainly refer to certain slums of Manchester. Detailed and precise description of the environmental pollution in some French and English cities and its social consequences in the cities

where the process of capitalist industrialization was advanced is also to be found in some of the literary works of Dickens, Gaskell, Taine, Balzac and Sue. Interaction between development and environment is now particularly pronounced, amplifying the role and tasks of territorial planning as a factor greatly affecting both.

A first effort promoted by territorial planning for environmental protection concerns the entirety of techniques and measures to rationalize the geographic location of industries and residential areas in order to avoid compounding and concentrating harmful effects and to give free rein to the natural self-purifying capacity of the environment (through sunlight, winds and oxidizing). The various international conferences and meetings on problems of environmental protection (3) have also extensively discussed and analyzed the effects of industrialization and increased consumption of natural resources upon the quality of the environment.

Industry is unquestionably the main production means of modern society and the basis of its development. The fact that some industrial branches, or rather some kinds of industrial processes, are now polluting the environment cannot be blamed upon technical progress or concentrating exploitation of natural resources in big units. It is true that the nonpollutant or less pollutant technologies have not always received due attention in the industrialization process. This is most often to be explained by the narrow and mistaken interpretation of economic effectiveness whereby the costs of environmental protection are artificially separated from the total production outlays.

The relationship of industrialization to environmental protection takes on distinctive features in the developing countries. Various international meetings have very frankly and convincingly expressed the idea that the developing countries wherein industrialization has hardly begun are justified in exploiting their natural and manpower resources with less antipollutant equipment, short of compromising or annihilating the natural self-purification capacity of the environmental factors. But the facts have shown that the worst pollution is caused not by industrialization but by economic backwardness, famine, endemic diseases, and lack of protection against natural disasters, which affect a great part of the world's population.

Accordingly the relationship of territorial planning to environmental protection is quite different in the underdeveloped countries, which are making great efforts toward socioeconomic progress, than it is in the intensively developed countries, where the concentration and compounding of pollutants constitute a real danger and where there are technical and financial resources to check pollution at its very sources. Moreover modern industrial development itself, with its pronounced diversification and specialization, has led to the appearance in the last 10 or 15 years of industrial branches producing equipment to protect the environmental factors. At a certain stage of development and in accordance with the socioeconomic requirements, industry is capable of profitable series manufacture of antipollutant equipment and technologies at acceptable prices. This was also convincingly confirmed by the exposition on this subject held in Stockholm in 1972.

Territorial planning has many ways of avoiding compounding and concentration of pollutants in a given region, such as special locations for certain kinds of more harmful technologies, consideration of the local microclimatic factors (temperatures, prevailing winds, sunlight, currents) when starting industries, observance of minimum protective distances from communities and areas of agricultural production, planting protective screens, etc. These measures, called territorial, can be supplemented by others to reduce the harmful effects of some industries: partial measures for a first stage and complete ones for the subsequent stages.

World experience shows that these measures are quite viable and very economically effective from the standpoints of both environmental protection and the technologies used, especially if they are accompanied by a strict and efficient system of control. We should mention here a number of models and methods for evaluating the effects of industrial activities and those of the population centers upon the quality of the environment, which methods concern water, soil and air management or collection and disposal of wastes and use modern simulation techniques based on the systems theory. (4)

For example, such a model can be prepared for a stream or river basin including its delta or estuary and allowing for areas extending as far as 30,000-40,000 square kilometers. The model analyzes the combined pollutant effects of the industries and densely populated communities in an area, as well as the effects upon the sea or ocean into which the watercourse flows. It also analyzes the degree of water pollution at 25-40 observation points in the basin and, on the basis of the periodic control (daily or twice a week), infusions of antipollutant substances are discharged (when the maximum level of admissible pollution is approached that is determined according to the existing standards and correlated with the natural self-purification capacity) or improvement is ordered in the operating parameters of the purification stations located downstream. In the case of water, the purpose of such a system is to maintain a certain level of the oxygen dissolved in it. Comparable models exist or can be prepared and adapted to the particular conditions of the various regions for controlling and combatting air pollution, for controlling local ecological systems, for the central areas of cities, for soil protection and conservation, etc.

At present Romania is also making and successfully testing studies indicating that it is quite possible to construct efficient systems to control the quality of the environmental factors in the centers of such municipalities as Bucharest, Brasov, Iasi, Cluj-Napoca, Timisoara et al., where the effects of air pollution are compounded by too heavy motor vehicle traffic and the noise of public transportation vehicles. Some cities have taken steps to reduce the discharges of carbon monoxide and unburned hydrocarbons from the unregulated operation of internal combustion engines and to permanently or temporarily ban the vehicles from certain very crowded central areas. Experience fully indicates both the effectiveness of these measures and the possibility of extending them.

The metabolism of the populated areas is another aspect of the relationship between territorial planning and environmental protection. This metabolism is generally defined as the total exchange of substances and energy between a

population and its activity (other than industrial) on the one hand and the environment on the other hand. As indicated in the publication SCIENTIFIC AMERICAN, some studies have led to the finding that 1,000 inhabitants consume 625 tons of water, two tons of foodstuffs, 3 tons of coal, 2.8 tons of liquid fuel, 2.7 tons of natural gases or the equivalent, and 1 ton of motor vehicle fuel in 24 hours, while 500 tons of used waters, 120 kg of solids suspended in water, 2 tons of household wastes, 150 kg of sulfur dioxide, 150 kg of toxic particles, 100 kg of nitrogen monoxide, 100 kg of unburned hydrocarbons, and 450 kg of carbon monoxide are discharged. (5) These metabolic elements represent average values based on annual inputs and discharges in communities of various kinds and sizes with certain characteristics of climate, relief and town planning, but all having a standard of technical and municipal equipment providing a decent level of comfort. It is estimated that in 1975 about 40 percent of the world's urban population was living in cities with the foregoing metabolism and that the proportion will reach 90 or 95 percent toward the end of the century. Moreover these indices are based on measurements made in population centers in temperate zones, where the succession of seasons generates average annual differences in temperature greater than 18°C. These temperate zones are now the geographic environment of over 90 percent of the world's population, which situation will most likely continue in the future.

In view of the demographic evolution predicted by the end of the century and the expected gain in the degree of comfort, eventually the main antipollutant measures will have to allow for the metabolism of the urban population centers. Therefore a broad field of research and promotion of techniques to do away with the bad effects of the metabolism of the population centers upon the environment is already being planned.

Structural analysis of the metabolic exchanges between a settlement and the environment indicates that most of the discharged substances are used waters, which must be collected via an efficient sewerage system and neutralize before discharge in order to be recycled. The chief difficulty is that the water resources, especially those of drinking water, are limited and usually do not coincide in location and distribution in a region with settlements. The large inputs of power needed for catchments of water at great distances are very expensive, while treatment and purification of the waters require complicated equipment and take up relatively large areas of land and much time at the present technological level.

Aside from water, the other discharged substances come from millions and millions of individual sources such as heating dwellings, disposal of household wastes, and operation of vehicles. All these sources of toxicity, very many of which are mobile, create great difficulties in organizing, controlling and neutralizing the pollutant discharges and are very expensive to combat. Despite the technical lag in the elimination of these sources of pollution, solutions exist. They are based upon centralized heating systems, industrial processes for neutralizing domestic wastes and their use as secondary sources of energy and useful raw materials.

The centralized heating systems for dwellings, so far largely confined to our urban communities, are now being expanded in cities like Bucharest, Constanta,

Craiova, Galati et al. By using the heating networks that are being constructed to supply the new residential areas with thermal energy and by planning them for a capacity somewhat higher than that strictly necessary for the new apartments, we can gradually connect residential areas with old buildings in good condition to the heating network and greatly enhance their standard of comfort.

Furthermore, in accordance with the measures adopted in pursuance of the decree of the State Council on collection and exploitation of wastes, modern stations for recycling wastes which, among other things, will produce thermal energy for heating residential areas will be located first in Bucharest and Constanta and later on in other urban communities.

In the course of the changes expected throughout the world in the next 20 or 30 years, improvement in the way of life, greater mobility of the population, and increased consumption of foodstuffs should be mentioned among the essential components of the quality of life and standard of comfort with major implications for the environmental factors, and all three of these major aims directly affect the latter. The possible bad effects upon the environment, if adequate protective programs are not adopted and practical measures are not taken, could be aggravated by the increasing concentration of the population in general and of the urban population in particular. According to the U.N. classification system (whereby communities of more than 5,000 inhabitants are considered urban), about 20 percent of the world's population in 1920 was urban. In 1960 the proportion reached 34 percent, and in the year 2000 it will probably be 52-55 percent. In absolute figures, about 3.5 billion people will be living in urban communities, but the degree of urban concentration (the percentage of the population living in cities over 100,000) is increasing 3 times faster than the percentage of the urban population. (6)

From the standpoint of protecting the environmental factors, urban concentration represents an undesirable increase and aggravation of the pollution in the population centers, increasing the technical and financial effort to reduce it. Undue densities of population, often associated with undue distances from places of work, are factors fostering pollution.

Having recently developed particular methods and careful structural analyses of the county networks of communities, the county planning studies made in Romania reveal, in comparative alternatives, how urbanization and rapid growth of the urban population can take place without seriously affecting the environment. To generalize our experience, it may be said that a network of small and medium urban communities well distributed in each county's territory has definite advantages in regard to environmental protection as compared to urban concentration and the priority or exclusive growth of cities over 100,000. For instance, the cost of installations to protect the environment (construction and operation) in a community with 80,000-100,000 inhabitants is 2.5-3 times greater than the total costs for three or four urban communities with 20,000-30,000 inhabitants.

Territorial planning, urban and rural, can reduce and counteract the effects of the metabolism of population centers through the preparation, in comparative alternatives, of studies of the development of networks of communities. These

studies also offer alternative distributions of the population in a territory for periods of 20-30 years, with direct effects upon reduction of concentration in cities even in case of a full and rapid urbanization process.

On the level of each population center, the present territorial planning effort can rationalize the population densities in the residential areas or main working areas to avoid too small as well as too great densities. Both extremes are also detrimental to environmental protection, since unduly long transportation distances for persons and products as well as the accumulation of polluting factors ultimately aggravate pollution, either directly or through consumption of essential power. In connection with this problem, territorial planning can recommend and control the rational use of urban land, differentiated according to categories of cities, in order to gradually rationalize the per capita consumption of land broken down according to essential categories (square meters of land for industry, housing, traffic, social-cultural facilities, trade, children's playgrounds, parks etc.)

Moreover, by controlling the locations of the main residential and working areas territorial planning can determine and promote a model for rationalizing the duration of public travel with reasonable limits for the structure of the network of communities, for the comfort of the public, and for environmental protection. The public transportation routes, the kinds of vehicles used and their speeds of operation can be determined so that the technological and operational aspects of the transportation system will least affect the environment.

Another area of interaction between territorial planning and environmental protection is what might be called "the power balance for construction and exploitation of the constructed material environment." It is a relatively new field of qualitative and quantitative analysis of the effectiveness of the present system of construction and exploitation of the population centers from the standpoints of efficiency and consumption of power directly for exploitation as well as indirectly for construction properly speaking.

The problem is that of expressing in power units the consumption for construction and use of the various types of buildings and installations absolutely essential to the population centers, in comparative alternatives, for purposes of minimizing the power units in all stages of construction and use of the buildings and installations. Minimizing the power inputs means reducing the quantities of power used for construction (foundations, supports, finishing etc.) as well as those used for shipping materials from long or very long distances.

The Party Central Committee's conference on industrial planning and construction pointed out the need of curtailing the consumption of cement and reinforced concrete in all branches of construction and especially in industrial construction. The manufacture of cement and reinforced concrete requires a heavy input of power, which is incorporated in the completed construction. This also applies to housing construction which, according to the latest decisions adopted, will amount to about 980,000-1,000,000 apartments in this five-year plan, or twice the 1971-1975 figure.

Careful analysis of the functional and technical performance of a number of urban facilities constructed and used in various Romanian cities indicates that considerations of prestige and ostentation of some districts, buildings and urban complexes (structure, architectural composition, heights, level of technical equipment) have often wrongly determined the adoption of measures causing a considerable waste in the power balance. For example, modern foundation techniques permit construction of practically any kind of foundation, on any land and for any building. But this does not mean that any method is justified. Unwarranted inputs of cement, reinforced concrete, wood, steel and other expensive materials result in a negative power balance even in the stage of constructing a population center.

Then the problem arises of local building materials obtainable from short distances, conserving the power needed to ship the large volumes and weights characteristic of construction jobs. Moreover the traditional construction processes used in some areas of Romania that are actually the results of a long process of adjustment of communities to the actual environmental conditions can be taken over and adjusted to modern requirements without sacrificing their more valuable feature, namely rational use of the local elements, which ultimately makes for a favorable power balance.

The effects of a favorable power balance are even more relevant in connection with the exploitation of the localities and subsystems that the substructure provides. The cost of power for producing and shipping a liter of drinking water increases with the horizontal and vertical distance between the source and the consumer and depends upon the initial quality of the water made potable.

In this connection, a correct territorial planning solution establishing a proper use of the land and a rational density system (with structures of moderate height) also contributes to a favorable power balance. Grouping of most or all of the municipal networks in underground tunnels (water, sewers, electricity, gases, telephone, heating) leads, in construction and in operation, to savings in power both under normal working conditions and in case of accidents and repairs.

The more economic the power balance of the construction and exploitation of the communities will be, avoiding waste, the more rational in the light of the next 20-30 years the share of the constructed material environment in the total power balance will become. This is highly important even if we only consider the fact that on the national level about 2.5 million urban dwellings are to be constructed by 1990, which represent only a part of the constructed material environment and which will entail a heavy input of power.

On the world level the housing construction effort is increasing considerably. In 1960 the world's urban population was about 1 billion, while the number of dwellings in cities was about 200 million. It is estimated that only one third of these dwellings, about 85 million, are in good condition and will be in use by the end of the century. According to the forecasts, the urban population will reach about 3.5 billion in the year 2000, so that 875 million dwellings will be needed. When we estimate that on the world average four dwellings per 1,000 inhabitants were built in cities between 1960 and 1975 (much less than

needed merely to improve the existing housing conditions), we obtain a total of about 60 million dwellings, so that about 700 million new dwellings will have to be built by the end of the century, allowing for wear and tear on the dwellings existing in 1960. (7)

Of course it should be noted that this requirement for dwellings is not uniformly distributed over regions and that the most urgent needs are in the underdeveloped countries, wherein nearly all the economic, social and technical difficulties that cause the housing crisis are concentrated.

If we add urban transportation, now one of the great consumers of power and generators of pollution, to the construction and use of the dwellings and related municipal facilities (water, sewerage, heating), we can better understand the importance and scope of the decisions to be made in the next 10 or 15 years concerning the power balance of the populated centers. Actually urban transportation is oriented from the standpoint of power as well toward the priority promotion of collective, more rational and more effective transport systems with highly reliable technologies. Under these circumstances it is normal to give increasing reconsideration to the streetcar, perfected and adapted to modern street traffic, for use in the busiest areas of big and very big cities.

I have outlined the main kinds of relations between territorial planning and environmental protection. The experience of Romania and other countries in recent years, the studies and pilot projects promoted by various international organizations, and the investigations made indicate that particular territorial planning measures can directly contribute to the immediate reduction of some sources of environmental deterioration. There are also extensive possibilities for local measures flowing from the existing laws, measures supplemented by educational efforts and public participation so that the effectiveness of territorial planning will naturally extend to environmental protection as well. And finally, to be sure, coordinated research and planning efforts are needed as well as studies and projects devoted to the most rational use of the natural and constructed environment to obtain a better quality of life for the public with minimum consumption of power and other resources.

#### FOOTNOTES

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5. SCIENTIFIC AMERICAN, Vol 213, No 3, 1965, pp 178-194.
6. United Nations, "Forecast of World Population," World Conference on Population, Bucharest, 1974. Working Report No 5.
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## DEPUTY MINISTERS CITED FOR FAILURE TO IMPLEMENT ANTI-POLLUTION MEASURES

Minsk SOVETSKAYA BELORUSSIYA in Russian 25 Dec 76 p 2

[Article: "Clean Water for Our Rivers"]

[Text] An investigation has shown that several of the Republic's ministries and departments are not adequately carrying out the Party's and government's decrees on measures to prevent pollution of rivers and other water basins.

The Ministries of Automotive Transport, Timber and Wood Processing Industry, and Meat and Dairy Industry have displayed a lack of interest in fulfilling the decrees issued. For a number of projects they did not ensure the timely drafting of planning estimates for purification facilities or include them in the plan for the current year, and for individual enterprises they limited themselves to merely depositing the funds for their share in the construction of city sewer systems and facilities scheduled to be put into operation during 1977-1978. As a result, the orders of the directing organs on putting an end to the disposal of unpurified sewage in the Black and Azov Sea basins were not carried out by six enterprises of these ministries.

The organization of the construction of purification facilities and sewer systems by the Ministry of Agricultural Construction of the Belorussian SSR [BSSR] was highly unsatisfactory. Projects are not regularly supplied with the necessary materials, machinery, and manpower, and the organization of work is poor. As a result, over ten months of 1976, only five of the 21 planned purification complexes were put into operation.

The Polotsksel'stroy Trust has not adequately carried out the government's decree on supplying water for the operation of the purification facilities of the Lyntupskiy distillery. During the accounting period, there has been only 44 percent fulfillment of the annual plan for construction and installation work. The construction project has recruited less than 30 percent of the working force.

Construction organizations of the Ministry of Agricultural Construction of the BSSR permit a great deal of defective work in the laying of pressure and gravity collecting mains. As a result, a portion of them fail to function

after being put into operation, and state funds are spent to correct the defects. The specific causes of the low quality work have not been ascertained, and as a result the omissions are repeated in newly built projects, and the guilty persons are not made to answer for this.

Because of defective work, this year the Slutsksel'stroy Trust had to move a section of collecting main No 9 in the city of Slutsk. The state suffered a loss of tens of thousands of rubles. In December 1974, the trust put into operation the purification facilities of the Kletsk cannery, which up to the present time have not been able to function normally because of the poor quality of the pressure collecting mains. The management of the Slutsksel'stroy Trust is slow in proceeding to eliminate the defects and putting the mains into operation.

The management of Brestsel'stroy was responsible for the failure to put into operation during the first half year in the Berezovskiy meat-packing plant purification facilities with a capacity of 4,100 cubic meters per day. In 1975, CPMK-74 [expansion unknown] permitted defective work in the building of a gravity collecting main. A section of the collecting main 260 meters long had to be relaid, and as a result the state suffered a financial loss of over 15,000 rubles. For the above reason, the capacities of the meat-packing plant that were introduced in January of this year have not been used up to the present time.

The organizations of the Ministry of Industrial Construction of the BSSR are not coping with the tasks of acquiring sewage purification means and putting purification capacities into operation. In ten months of this year construction and installation work worth 8,440,000 rubles or 80 percent of the annual plan has been fulfilled. Of the five purification facility complexes included in the national economic plan for 1976, which were to be put into operation during the first three quarters, four have been put into operation.

The management of trust No 3 has behaved irresponsibly with regard to fulfilling the instructions of the BSSR Council of Ministers. It did not provide the purification facilities of the Slutskiy meat-packing plant with building materials, machinery, and manpower in time, and for this reason they could not be put into operation at the time specified by the government - in the second quarter of 1976.

As before, the building of the purification facilities of the Shklovskiy paper factory, Spartak, is not proceeding satisfactorily. As of 1 November, the buyer had not supplied the project with 1.5 km of armored cable, thereby jeopardizing the putting of the sewage purification facilities into operation in the current year. Here construction trust No 12 has carried out only 53 percent of the volume of construction and installation work.

Work by trusts Nos 13, 16, 20, and 21 of the BSSR Ministry of Industrial Construction on sewage purification facilities planned for delivery in 1976 is being carried out poorly. These facilities are for the Bobruyskiy hydrolytic

plant, the Obol'skiy brick plant, the Svetlogorskiy artificial fiber plant, and the Belorusskiy automotive plant in the city of Zhodino. In ten months 45-60 percent of the annual plan for construction and installation work for these projects has been completed.

After reviewing the results of the investigation, the BSSR Committee for People's Control called to the attention of the following deputy ministers their failure to exercise the necessary supervision over the fulfillment of Party and government decrees on the prevention of pollution of rivers and other water basins of the Black, Azov, and Baltic Seas: V. I. Kozlov of the BSSR Ministry of Automotive Transport, V. A. Lebedev of the BSSR Ministry of Timber and Wood Processing Industry, and A. A. Yakimchuk of the Ministry of the Meat and Dairy Industry.

For permitting delay in fulfilling contract work plans and in putting purification facilities into operation during the current year and for inadequate supervision over the quality of construction work on these projects, Deputy Minister of Agricultural Construction of the BSSR V. I. Kalinichenko was rebuked and Deputy Minister of Industrial Construction of the BSSR S. P. Tyushkevich was reprimanded.

The Committee called upon the Ministry of Industrial Construction of the BSSR (N. T. Arkhipets, minister) and the Ministry of Agricultural Construction of the BSSR (V. D. Danilenko, Minister) to call to account the persons who were immediately to blame for the unsatisfactory progress in the construction of purification facilities and the failure to put them into operation, and to take exhaustive measures to ensure that they would be put into operation without fail during the current year.

The chief engineer of construction trust No 3 of the Ministry of Industrial Construction of the BSSR, N. Z. Asheychik, deserves to be severely punished for the failure to put the purification facilities of the Slutskiy meat-packing plant into operation, but since as a result of measures taken by him the purification facilities are now in operation, it was decided to limit the matter to discussion by the committee.

M. I. Molchanov, the deputy director of the Shklovskiy paper factory, Spartak, was reprimanded for tardiness in supplying materials for the purification facilities of the city of Shklovo, for the delivery of which the buyer is responsible.

To partially compensate for the financial loss caused the state by the lack of supervision of the quality of work performed during the construction of the Berezovskiy meat-packing plant gravity collecting main, V. F. Pisarchuk, chief engineer of the SPMK-74 [expansion unknown] administration of Brestsel'stroy of the BSSR Ministry of Agriculture was fined a month's salary.

It has been reported that materials on the defective work permitted on collecting main No 9 of the city of Slutsk have been turned over to investigating organs so that the guilty persons can be called to account.

USSR

WATER SUPPLY AND POLLUTION CONTROL IN SVERDLOVSK

Moscow MEDITSINSKAYA GAZETA in Russian 8 Oct 76 p 2

[Article by G. Vashenin, deputy chairman of the executive committee of the oblast Soviet of Workers Deputies (Sverdlovsk): "A Matter of Honor--For the Purity of Water"]

[Text] The map of the Middle Ural is covered with a network of blue veins and dots. However paradoxical it may seem at first glance, we are experiencing an acute water shortage. The upper reaches of the rivers and even the large lakes are not capable of providing enough water to Sverdlovsk and other cities of the oblast with their enormous industrial potential. Neither are the known underground sources distinguished by abundant reserves.

The situation has become especially difficult in the last three dry years, when there were no large runoffs either in the spring or the fall. The Iset' and the Chusovaya, which supply Sverdlovsk, have been exhausted as sources of water supply. Several facilities were built making it possible to provide for the city's needs with reserves from the Revdinskoye and Mar'inskoye reservoirs, Lake Tavatuy, Lake Ayatskoye, and, finally, Lake Itkul' in Chelyabinskaya oblast.

But all of these were temporary measures. The essential solution to the problem of supplying Sverdlovsk with water involves pumping it from the River Ufa in Chelyabinskaya oblast. Special facilities and the Nyazepetrovskoye reservoir were built for the purpose. The first pipeline, delivering three cubic meters of water per second, is now nearing completion. Next will come a second pipeline of the same capacity. By the end of the Tenth Five-Year Plan another reservoir is scheduled to be built on the Ufa. And at that time we will be able to consider the water problem for Sverdlovsk to be solved for a relatively long term--up through the year 1990.

In order to get a better idea about the scale of operations, let me say that 170 million rubles will be spent on the Ufa project alone, including 60 million from industrial enterprise funds. Moreover, in addition to Sverdlovsk it has been necessary to be concerned about supplying water to Nizhniy Tagil, Krasnoural'sk, Verkhneturinsk, and other large and small cities of the oblast.

The problems relating to water are still on the agenda. They have been discussed many times at sessions of the oblast Soviet of Workers Deputies and meetings of the CPSU Oblast Committee Bureau.

More substantial and efficient solutions have also been found for problems relating to the prevention of pollution to the water by industrial wastes. The volume of water recycling increased by 15 percent last year alone and by 35 percent during the five-year period. At present 80 percent of the water used by enterprises is being recycled. During the Ninth Five-Year Plan 155 facilities were put into operation to clean up industrial effluent and sewage as well as recycling systems. A total of 180 million rubles was spent for these purposes; this is approximately three times more than during the Eighth Five-Year Plan. In all, the enterprises of the oblast have 384 treatment facilities in operation with a total productivity of about two million cubic meters per day.

The enterprises are focusing special attention on the adoption of waste-free and effluent-free technological processes, also the extraction of valuable materials from waste water. A great deal has been done by the Sinarskiy and Pervoural'sk pipe plants, the Iset' metallurgy plant, the Sredneural'sk copper plant, and a number of others.

All of this has breathed new life into our rivers and lakes. In many bodies of water there are no more detectable toxic compounds; the content of other polluting elements has also declined. The cleaning up of the water sources and the work done on the construction and remodeling of drinking water pipelines in 33 cities and workers' settlements of the oblast have substantially improved living and working conditions for the people. In competition for the best landscaping of cities and population centers over the last three years the challenge Red Banner of the RSFSR Council of Ministers and the AUCCTU has been awarded to 12 of our cities.

A substantial achievement: in the last few years there has been a change in the psychology of managers, their attitude toward environmental protection, in particular with respect to water. This effort has now become a matter of honor for them. At one time the oblast executive committee adopted a decree which stipulated that any remodeling or construction of production facilities would be authorized only if the department at the same time began to build treatment facilities, water pipelines, and sewage facilities.

One of the enterprises feeling the effect of this decision was the porcelain plant in the city of Bogdanovich. When the enterprise was started, the USSR Ministry of Light Industry imposed the necessary obligations. In connection with the fact that work on the utilities networks was going too slowly, however, we were obliged to issue two decrees to halt construction. The issue was stressed both in the All-Union and the Republic Ministries of Light Industry. The firm stand and the consistency of the oblast executive committee and the organs of the state sanitation inspectorate

produced the desired results. At the end of the five-year plan the city had received more than 12,000 cubic meters daily of excellent drinking water and treatment facilities for municipal and household sewage.

These tactics made it possible for us to improve sanitation and hygiene conditions for the people in the cities of Nizhniye Sergi, Rezh, Verkhnyaya Salda, Pervoural'sk, and others.

Some ministries have adopted a very serious approach to the water problem. Thus, the Ministry of Nonferrous Metallurgy discussed this problem at a meeting of the board of directors and issued an order which set out a detailed plan of adoption of recycling systems in the sector's enterprises located in Sverdlovskaya oblast. The work is scheduled to cover two years, and funds have already been allocated.

During the Tenth Five-Year Plan, Sverdlovskaya oblast faces enormous tasks relating to enlarging its industrial capabilities. Efforts to clean up the environment--the magnificent landscape of the Urals, the rivers, lakes, and forrests--will be conducted even more diligently. Incidentally, in the master long-term plan of development of the national economy drawn up to the year 1990 this section is accorded a substantial place. It calls for specific measures along such lines as the technical retooling of industry, rehabilitation of the land, and comprehensive cleaning out of the environment. A total of 764 million rubles will be spent during the Tenth Five-Year Plan just to improve the water, for example.

In all, the plan incorporates 380 measures. Among the most important of these are: the adoption of waterless or nearly waterless technological processes in the Kirovgrad Copper Smelting Combine, the Sredneural'sk Copper Smelting Plant, and the Nizhniy Tagil Plastics Plant. Naturally, further development will characterize water recycling systems, facilities for recovering valuable materials from waste water, the construction of treatment facilities for industrial and municipal sewage water, and the remodeling of existing facilities. The rafting of timber will be stopped, and wood wastes will be cleaned out of the river channels. A plan has also been drawn up for the development of municipal and drinking water pipelines; proposals call for expanding them in 31 out of 44 cities in the oblast. At present this project is being examined by Gosplan RSFSR.

In order for our plans to become implemented in practice, we are focusing considerable attention on control over the implementation of decisions that have been made. Special staffs are operative in the oblast and city committees of the party; members of them exercise control over the progress of construction of waste water and gas and smoke emission treatment facilities, water pipelines, and sewage networks; they are keeping track of progress in the adoption of water recycling systems.

We have been discussing measures relating to water protection. They represent just a part of the considerable work being done on the Middle Ural in order to preserve and multiply its natural resources.

## NEW INEXPENSIVE WATER PURIFICATION SYSTEM

Moscow TRUD in Russian 17 Dec 76 p 4

[Article by G. Stolyarova, chief engineer of the Novosibirsk Chemical and Pharmaceutical Plant, candidate of pharmaceutical sciences: "Water Without Contaminants"; today's issue of POISK discusses work of the scientists of the Siberian branch of the USSR Academy of Sciences]

[Text] An inexpensive method of water purification has been introduced resulting in fewer contaminants than stipulated by the state standard. [in bold-face]

It is difficult to count the industries that require fresh water in order to operate. The existing purification means are expensive, unproductive and often require several repeated cleansings.

A new method to obtain large amounts of fresh water was devised by scientific coworkers at the laboratory for enrichment methods of mineral resources of the Mining Institute. These scientific candidates are G. Bochkarev, I. Popov, V. Lebedev and F. Baryshnikov. They established that in those microseconds when iron hydroxide forms it is hundreds of times more active than at the time when its formation process has already concluded. They proposed using iron hydroxide in just those microseconds.

Iron plates are placed into water purification tanks, one portion of which is negatively charged and another has a positive electrical charge. In all several volts of electric energy are applied to this. The generation of iron hydroxide begins.

Its particles actively begin to attract particles of suspended matter to themselves. This process of generation of iron hydroxide is continuous. The iron hydroxide particles having attracted contaminants to themselves are again covered with iron hydroxide and once again gather about themselves particles of various substances, microorganisms, etc. And so, in a matter of minutes, all contaminants are "captured." They leave the water having formed into gases. Then they are passed through coal filters. And the filters, usually incap-

able of stopping the smallest particles of contaminants suspended in water, hold them back easily when they are collected on iron hydroxide.

A liter of such practically clean water contains in all several thousandths of a gram of contaminants. In producing a cubic meter of it a thousand times less electric energy is used than with previous methods.

The scientists proposed introducing this method at our plant as the first in the country. Taking active part in getting it completed was the central plant laboratory headed by M. Malykh. After it had been perfected at the plant the method was given to 70 enterprises from various branches of the national economy, each of which in turn began disseminating it.

In this way the opportunity arose not only to save millions of rubles, but even to improve the quality of production which had decreased due to insufficient chemically treated fresh water.

The new method has been so effective that a number of countries have acquired patents for its use.

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GSO: 5000

## EFFORTS TO CHECK ENVIRONMENTAL DEGRADATION AT SHALE BASIN DESCRIBED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 Nov 76 p 4

[Article by Ya. Tolstikov: "How the Waste Heap Was Tamed"]

[Text] Waste heaps, otherwise known as refuse dumps, are a common sight in a mining district. There are also quite a few in the Estonskiy shale basin, in the vicinity of Kokhtla-Yarve. Although the rock is called "waste rock," (under the earth, the shale seams are interbedded with limestone strata), quite a bit of combustible rock remains in it: even mechanized enrichment methods, much less manual ones, do not enable us to get 100 percent of the fuel out of the mountain of rock. Moreover, it also contains quite a few sulfur compounds.

All this, and also the high pressure within the waste heaps (which reach heights of 60-70 meters) facilitates spontaneous combustion of the shale.

The dump of the "Kukruze" Mine, located next to housing for the miners, has made life especially unpleasant for them. The waste heaps smoke, like a volcano getting ready to erupt. Chemical means of fighting the fire and attempts to extinguish it by pumping water into it had not yielded results. Then specialists of the Estonslanets Association suggested that we begin subduing the fire from the top of the waste heap. First it was cooled by saturating it with water under pressure through injectors stuck into the body of the heap like needles; the top was then taken off a meter at a time using bulldozers. A concave basin, into which water from the mine works was continuously fed, was created 40 meters above the surface.

The "smoking" was stopped. Now, temperature monitors have been set up as watch "posts" at many waste heaps. If the temperature rises above a critical level, a "fire team" -- a group of specialists in "subduing" waste heaps -- drives out to the spot.

The Kokhtla-Yarve gorispolkom decided to plant the dumps with trees: pine, maple, poplar. This experiment has been tried elsewhere in the Estonskiy shale basin. Young trees and shrubs have taken root very well on ash heaps

of the Kiviylı Shale-Chemical Plant. The dumps have stopped "glowing." The worked out shale cuts are also being actively recultivated. Last year, pine saplings were planted on 240 hectares. Today, the area of replanted shale cuts is increasing by another 300 hectares. At the same time, specialists of the Estonslanets association are working on a method of mining shale without tailings. Using this method, the limestone will all remain in the ground.

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CSO: 5000

PERMISSIBLE AIRCRAFT NOISE LEVEL SET

Moscow IZVESTIYA in Russian 17 Dec 76 p 6

[Article: "The Standard Against Noise"]

[Text] For the first time in our country's history a state standard for "aviation noise" has been developed. There are permissible noise levels for inhabited areas and methods for monitoring them.

The originator of this new technical standard document is the State Scientific Research Institute for Civil Aviation. Participating in the establishment of this All-Union State Standard [GOST] were the research centers of the USSR Ministry of Health, the Ministry of the Aviation Industry and the USSR State Committee for Construction Affairs. This project was discussed at the All-Union Central Trade Union Council and at institutes of the USSR Academy of Medical Sciences.

Aviation has long been a common means of transportation. In the last five-year plan the airplanes and helicopters of Aeroflot, the administrator of the civil air fleet, carried more than 430 million passengers and upwards of 11 million tons of freight and mail. Aviation has great importance in agriculture. Every year about 90 million sown hectares are treated from the air.

Opportunities for Aeroflot are even greater in the present five-year plan. The aviation subdivisions are being replenished with new aircraft and many of the country's cities are getting modern airports. It is assumed that Aeroflot will carry more than 550 million passengers and more than 13 million tons of freight and mail.

Modern airliners are built for speed and comfort. At the same time there is noise. Recently several foreign countries have introduced regulations limiting aviation noise where airports are situated close to inhabited areas. Such is the purpose of the new standardization document approved by the USSR state standards organization, Gosstandart. It established maximum permissible aviation noise levels in newly planned inhabited regions close to large and small operational airports. The standard will be the governing document for specialists planning new air facilities near cities and towns.

The new GOST's indicators are comparable to required regulatory noise level standards for vicinities surrounding major international airports such as Kennedy in New York, Heathrow in London and Schiphol in Amsterdam. Our new standards are somewhat stronger than those at foreign airports. The GOST requires that during the day, from 0700-2300, noise does not exceed 85 decibels, and 75 decibels during the evening. These levels conform to domestic sanitary standards. Their expediency is corroborated by voluminous physiological and hygienic and sociological research.

In due course the International Organization for Standardization and the standing committee of the Council for Mutual Economic Aid were turned to for advice on problems of detecting and limiting aviation noise at airports. They developed a number of technical standardization documents categorized as recommendations. In practice the approved GOST corresponds to all international requirements and in a number of instances, contains even stricter limitations. In particular, it establishes the importance of maximum permissible sound levels over inhabited territory for day and night for every flyover by an airplane or helicopter.

The standard goes into effect January 1978.

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### ANTI-POLLUTION MEASURES IN MINSK DESCRIBED

Minsk SOVETSKAYA BELORUSSIYA in Russian 3 Dec 76 p 4

[Article by I. Yatsuk, hydrochemical laboratory chief, Minskaya Oblast' Inspectorate of the Belorussian SST Council of Ministers' State Committee for the Protection of Nature: "Wastes Into Revenues"]

[Text] Particular attention is being paid in the Tenth Five-Year Plan to questions of the development and introduction of technological processes permitting maximum use of production waste. Let us note that carrying out these obligatory requirements of the 25th CPSU Congress is of decisive importance both to the protection of our reservoirs and the entire environment from pollution.

During the Ninth Five-Year Plan, enterprises of Minskaya Oblast' and the city of Minsk did specific work on recovering wastes from production discharges. The economic impact of this was 800,000 rubles. The Borisovskiy Paper Mill, for example, uses two conical settling tanks to recover valuable wastes. They provide the enterprise with an economic impact of more than 18,000 rubles per year.

At the Kholopenichskiy Dairy and Cheese Plant, all whey obtained from processing milk goes to a lactose shop, where it is separated. The skimmed whey is then processed into milk sugar and the fat goes into the manufacture of [pod-syrnoye] butter. Whey processing provides the enterprise with more than 9,000 rubles profit annually.

The Minsk Margarine Plant saves more than 13 tons of fat annually with its three entrainment separators. A mixture of fat and free fatty acids is obtained at soap works (Gomel'skiy, Kaunasskiy) and hydrolytic plants (Bobruysk, Rechitsa).

Until recently, the Minsk Tractor Plant discharged upwards of 600 tons of petroleum products into the Svisloch' each year. Now, a special installation to remove the petroleum products has been built and is operating. Used oil is collected and sent on for regeneration. Pollution of the river has stopped.

At the same time, according to the estimates by economists, waste losses at enterprises of the oblast and of Minsk are more than 25,000 rubles annually. Many purification installations are overloaded. For example, fat separators of the Borisovskiy, Minskiy and Molodechnenskiy meat combines are 1.5- to two-fold below the required capacity. The work outlined in the Ninth Five-Year Plan for expanding purification installations at these enterprises was not done.

The efficiency of operation of purification installations at the "Rayevka" cardboard factory is inadequate.

The Lyubanskiy Starch Plant, which discharges more than 14,000 tons of starch per year into the river, is a major polluter of the Oressa. The same can be said of the Snovskiy Starch Plant. The planning and design bureau of the Ministry of the Meat and Dairy Industry has not outlined in its plans appropriate preliminary purification of waste waters from the Kopyl'skiy Milk and Cheese Plant, and they are discharged into and pollute the Mazha River. Organizational and technical steps have not been taken at the plant to recover production wastes. And it would be possible to adjust the use of whey on kolkhozes and sovkhozes of the region to use it as a feed seasoning agent for stock. This is also not being done at a number of other dairy industry enterprises. The Chervenskiy Dairy Plant, for example, discharged 2,803 tons of whey into the city sewer system in 1975 and the first half of this year. The Minsk Dairy Combine has thrown away 3,073 tons of whey in the same fashion during the last half year.

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CSO: 5000

ENVIRONMENTAL PROTECTION MEASURES IN KUYBYSHEV OUTLINED

Moscow MEDITSINSKAYA GAZETA in Russian 1 Dec 76 p 2

[Article by A. Rosovskiy, chairman of the gorispolkom, delegate to the 25th CPSU Congress (Kuybyshev): "Not Included in the Planning Estimates . . ."]

[Text] In recent years in Kuybyshev a gratifying and remarkable fact has been noted: The electorate is coming less and less frequently to the deputies of the city soviet with complaints about environmental factors that are unfavorable to the health and living and labor comfort. How is this explained?

Our city can be included among those where the work for public services and amenities is being carried out intensively and in an ever increasing volume. It is known that the level of public services and amenities is determined largely by the condition of the environment. In the city of Kuybyshev the discharge of unpurified wastes into bodies of water has been reduced to a minimum. During the years of the Ninth Five-Year Plan we constructed a powerful sewage system with biological purification of wastes.

More than 30 million rubles have been spent on the construction of general plant and local purification installations. There are now about 200 of them in the city. Large-capacity systems for recycled water supply are operating at 28 enterprises of various branches of industry and power engineering.

Protection of the atmosphere has become more intensive. Suffice it to say that during the past 2 years the dust content in the air has decreased by three times. All the main highways have been covered with asphalt. Highway bypasses and a new bridge over the Samara River have been constructed. Pollution of the air with exhaust fumes from automotive transportation and noise on intraurban highways have been greatly reduced.

A number of asphalt-concrete and other enterprises that give off dust and smoke have been closed or moved outside the city. Under the last five-year plan we eliminated 256 boilers and, of the 377 that remained, only 85 used rock coal and fuel oil. The Kuybyshevskaya GRES, the oldest, has been changed over mainly to gas fuel.

During the past 5 years we constructed or radically reconstructed 716 industrial dust- and gas-removing installations. I should like to make a comparison: 5 years ago there were 5 times fewer of these installations to improve the environment.

Thanks to the generous state allocations, subsidies of industrial enterprises and the constant and demanding attention of local party and soviet agencies, Kuybyshev is, for the most part, successfully fulfilling decrees of the party and government concerning the protection of nature.

But does this mean that the city has solved all problems of sanitary protection of the environment? No, unfortunately. And not only because the city of Kuybyshev, with a population of 1.2 million, stretching over almost 60 kilometers from end to end, is constantly growing and being built up or because its industrial potential is increasing and new technology is being put into production. Other factors cause greater concern. First among them is the lack of responsibility of the managers of a number of enterprises and departments and sometimes even a neglectful attitude toward the interests of the city's sanitary science. This can be confirmed by examples.

The new citywide sewage system was constructed with the shared participation of a number of large industrial enterprises of various ministries. This is in keeping with the scheme of things. Another task of theirs was to construct general plant purification installations and underground mains and also collectors for discharging wastes into the city sewage system. But far from all promptly met this indispensable requirement of the unified plan.

This is what happened, for example, in Krasnoglinskiy Rayon. Bypassing the Bezymyanskiy collector of the city sewage system, enterprises here still discharge wastes through the Orlovskiy ravine into the Samara River.

At one of the plants the purification installations were constructed 2 years ago and connected to the main collector along the banks of the Samara. But they do not work: There is still no separation of the networks on the territory of the enterprise. At the Ninth Bearing Shop, conversely, there are no purification installations. The deadline for hooking up to this same Bezymyanskiy collector was the beginning of this year, but the plant has still not clearly decided whether to construct new installations or to modernize old ones which are now suitable only for mechanical purification of wastes.

Here is an example of departmental obstinacy which turned into wastefulness. According to the plan (and the preliminary agreement), the Kuybyshev river port and enterprises of the Zavod imeni Maslennikov Association were to construct one collector to be hooked up to the city sewage system -- each paying its own share. Negotiations among the partners lasted for a long time. Finally, each constructed its own main line: over a considerable distance they were parallel, side by side.

A negligent attitude toward technology always produces poor results. At the petroleum processing plant they decided to replace the coagulant in the floatators: instead of aluminum sulphate, they wanted to use ferrous sulphate. Possibly this promised a certain economic or technological effect. But they did not think or consult with anyone about the other consequences of the technology. And here is the result: The strongly aggressive wastes that were discharged all at once destroyed the costly plant installation for biological purification of wastes. The plant continues to operate and the quality of its discharges disturbs everyone.

Such examples became the subject of conversation at many ispolkom meetings. In response there were stereotyped assurances that everything would be done if only another deadline could be set.

Measures for the protection of the environment are the logical completion to any industry and any technological process. Nobody disputes this principle, which has been raised to the rank of law in our country. But far from all on whom it depends maintain it in practice. Of course, it is necessary to have control over its observance and it is being adhered to, but. . .

The problems I am listing here are obviously significant for many industrial centers. They are under the jurisdiction of sanitation agencies. We have no reason to believe that specialists of city sanitary and epidemiological stations are not principled or demanding enough. But still measures and actions of sanitary supervision are not always effective.

Say the city sanitary and epidemiological station has given an order and set the deadline. Frequently these orders are not carried out for a long time. Fines, if they are imposed, do not produce the desired result. They cannot be large and they do not cause harm to the private budget of the party being punished. But in any case they do not make up for the damage caused to nature. And there are also cases such as this: The ispolkom of the city soviet made a decision instructing a number of enterprises to create the necessary sanitary protection zones. The attached list contained 29 specific enterprises. Seven years have passed since then, but only three (!) enterprises have carried out the order. In particular, a number of Kuybyshev enterprises under the jurisdiction of the RSFSR Ministry of Procurements are greatly in debt to the city in this regard: milling combines and a mixed feed plant. It is especially important for them to create sanitary protection zones.

What is the matter? It turns out that many of the enterprises for a number of years did not even include in their estimates expenditures on moving residences into protected zones or other measures either. Nobody disputed our decision, but far from all carried it out.

Here one should make a reservation. Enterprises do not always have the right to independently decide on the question of allotting the necessary

funds, sometimes significant ones, for sanitation measures. And main boards and ministries sometimes do not wish to deal with "local" conditions and requirements. By doing this, they sometimes consign to oblivion the most important communist principle of the protection of nature -- that this is a statewide matter. It seems to us that a rule should be established so that decisions of local agencies of soviet power concerning the protection of nature, especially the water and air basins, are obligatory not only for the enterprises, but also for the departments and ministries to which they belong.

The city cannot count on coincidence in the finances and material and technical possibilities of enterprises when speaking about sanitary protection of the environment and, in the final analysis, protection of the health of the people. And when commitments are made regarding this, they should be realistic and have the necessary support. Their implementation should be under the strict supervision of the general public at the enterprises themselves and measures should be included in the production plans, as is done in some places.

I shall share one secret dream with you. The ispolkom of the city soviet would not refuse to accept a kind of certified guarantee regarding this -- a guarantee of purity, authenticated by the signatures of managers of enterprises and their public organizations with a written confirmation from the corresponding ministries and departments to the effect that certain measures are fully supported by funds and materials and that there are quotas for contracting work. Then the very cause of sanitary protection of cities and control over the fulfillment of plans would, in our opinion, enter a qualitatively new stage.

In order to successfully carry out the Tenth Five-Year Plan, a five-year plan of effectiveness and quality, it is necessary constantly to have authentic state and party concern for the protection of nature and its riches, for the health and creative activity of man.

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CSO: 5000

## WATER-GASOLINE EMULSION FOR AUTOMOTIVE ENGINES

Baku VYSHKA in Russian 12 Dec 76 p 3

[Article by R. Akhmetov: "On Water and Gasoline"]

[Text] The first "Volga" and "Moskvich" cars running on a water-gasoline emulsion have appeared on the streets of Tashkent. Their engines operate stably under all load-change conditions. As the authors of the experiment, scientists of the Vehicle-Road Institute and the Academy of Sciences of Uzbekistan, thought, use of the new fuel reduces the content of harmful substances in exhaust gases by half.

Commenting on hearing this, Professor V. M. Ivanov of the Moscow Institute of Fossil Fuels, a well-known specialist on the development of fuel emulsions, says "It's probably unnecessary to talk about how urgent the problem of clean air in the major cities is. The primary source of air pollution remains the automobile. Scientists are therefore working to ensure that the "breathing" of gasoline transport is clean. One feasible way is to convert vehicles to operation on low-toxicity fuel. One such well-recommended fuel is liquefied natural gas (propane-butane). The exhaust of vehicles powered with this new fuel contains three- to four-fold less carbon monoxide (fumes). Moreover, gas is cheaper than gasoline and engines operating on it need fewer repairs."

More than 1,000 trucks whose gasoline tanks have been replaced by bright red liquefied gas tanks are already on the streets of Moscow. Experimental lots of liquefied-gas buses, passenger taxis and dump trucks have been manufactured.

Another effective way is to use a water-gasoline emulsion. It turns out to be rather hard to achieve: water and gasoline are mutually insoluble substances. How can they be mixed? After many experiments, a way was found -- the liquid was "pulverized," either with ultrasonics or by passing it through a special installation. In order to intensify the "adhesion" of the pulverized water droplets to the gasoline, a special petroleum derivative is added to the mixture. Soviet and foreign scientists have created many such additives.

Experiments have shown that the new fuel possesses a number of virtues, the primary of which is substantial reduction of air pollution. The minute water droplets are transformed into steam when they enter the engine cylinder and ignite instantaneously. Then there is a micro-explosion, resulting in atomization of the emulsion. Favorable conditions are created for even mixing of the fuel with oxygen and more complete combustion. Another virtue of the emulsion is gasoline economy. The optimum water content in the new fuel is 12-15 percent. Also of not inconsiderable importance is the fact that the engine operates quite a bit more reliably.

"In recent years," says V. M. Ivanov in conclusion, "research on the use of a water-gasoline emulsion has been conducted in VUZ's of a number of cities. Although good results have been obtained, work has not yet gone beyond the bench test stage. Tashkent scientists have succeeded in operating vehicles on the new fuel for the first time. It should be added that the fuel emulsion does not require reworking the engine design. This makes it possible to use the innovation in millions of automobiles.

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CSO: 5000

RHINE POLLUTION TREATIES DISCUSSED

Rotterdam NRC HANDELSBLAD in Dutch 1 Dec 76 p 7

[Article by F.C. de Ruiter: "Rhine Treaties: Small Steps Require A Long Time"]

[Text] For all those who are interested in the quality of Rhine water, Friday 3 December will be a joyful day. On that day, after many years of political squabbling, tug-of-war and hair splitting, two important treaties will finally be signed which are meant to reduce the discharge of chemical substances and waste salts into the Rhine, so that this river -- currently still the "European sewer" -- can be rid of its major filth.

But it is still too early for real cheering. Anybody who might think that this will quickly lead to a thorough clean-up would be sadly mistaken. The agreements are "too soft" for that, and they carry too many characteristics of the compromise which the difficult negotiations made unavoidable. In other words, it will be a matter of small steps and long time. A very long time probably, considering that, if nothing else, the parliaments of all the Rhine countries still have to ratify the treaties before they can become effective.

When the ministers of France, Germany, Switzerland, Luxembourg and the Netherlands -- for us it will be Westerterp and Vorrink -- and a representative of the European Commission sign the treaties in Bonn, they will only lay down the rules of the game. The game itself will still have to get started and it promises not to be an easy one. Anyone who is optimistic about the whole thing has no understanding of the interests which are involved. We are talking about imposing limitations on industries, and this is definitely not going to be accepted gracefully.

Stronger Medicine

Of the two treaties, the chemical agreement is without doubt the most important one, because the Rhine suffers most from the disposal of poisonous chemical substances. The treaty goes a bit further than the overall policy for surface waters within the European Community agreed upon in Brussels at the end of 1975. But this also represented the major point of contention over which Germany and the Netherlands stood directly opposite each other.

Is the EC regulation sufficient to clean up the Rhine or does this river demand a tougher approach? In other words, will the sick Rhine receive stronger medicine than the others? This was the question around which everything else revolved. Bonn was opposed to a stronger antipollution program for fear that environmental demands would impose sacrifices which would be too heavy for the factories along the Rhine and its tributaries -- approximately 70 percent of the total West German industry. This would worsen their competitive position towards, for example, French industry in the Rhone valley.

The Dutch government, on the other hand, stuck to special regulations for the Rhine, because the poisonous waste is liable to do more harm there than elsewhere. Nowhere else are so many million people and so many industries concentrated in a single river basin.

While the umpteenth fight was going on at the negotiation table in Paris, the German position seemed unalterable. But in the end -- after exchanging recriminations back and forth -- the Germans made a slight shift, which could be translated as a concession to the Netherlands (and France). Thus, the compromise was born.

We have previously written about this in terms of "a rather weak extract of the original Dutch wishes," but in any case it was better than nothing. Under the given conditions -- the German resistance to stringent environmental programs -- the Netherlands could hardly have expected much more.

#### Black List

According to the chemical agreement, which was reached and which will be signed on Friday, the disposal of two kinds of waste will have to be curtailed. The most dangerous ones, such as mercury, cadmium, cancer inducing substances, persistent mineral oils and organic halogen compounds, are on a black list. In the end, there should be an absolute ban on the disposal of those products in the whole Rhine basin, including the tributaries.

The International Rhine Commission, the official negotiating body for the Rhine countries, will be given the task of formulating emission standards for these "black" substances. The intention is gradually to make the standards more stringent until the point of "zero disposal" has been reached.

The first requirement will be to make an inventory of the disposals. This is a duty which the various governments have taken upon themselves. The Rhine Commission will only get data by stages (between two measuring points) and not by factory. This was one of the conditions set by the Germans. They wanted to avoid the possible leakage of certain manufacturing processes via those data to foreign countries. Thus, protection of national industry.

If the cleaning process -- with regard to the "black" substances -- were to be too slow, the Rhine Commission could step in and take supplementary action. This was a concession made by the German side, which lifted the treaty slightly above the level of the general EC regulation. The weak point lies in the fact that the Rhine Commission can only make unanimous recommendations. If one party balks, nothing will be done.

Another weak point in the treaty is that control of the disposal is left to the national authorities. This is not the best guarantee to obtain optimal results. It is never a good thing when the double task of execution and control rests in a single hand. In addition, the Rhine Commission could with its own measuring system keep a finger on the pulse.

All this also applies to the so-called grey list. This list includes substances (among others, a series of heavy metals) for which only limited disposal will be allowed. Alas, those harmful elements are not subject to common policy but, according to the treaty, they will be handled in the framework of national antipollution programs.

It will be up to the International Rhine Commission to compare those programs and to harmonize them. However, if one of the Rhine countries were to get out of step, the Commission would have no means of coercion. Problems can only be solved through discussion which tends to be a laborious business for the Commission.

And then there is the fact that the grey list only applies to the Rhine and its branches (for example, the Waal and the Guelders Ysel), but not to its tributaries. The Ruhr, the Moselle, the Main and the Neckar fall outside the scope of this regulation, and it is precisely there that many industries are to be found. Speaking of a "soft" agreement...

It also still remains unclear what to do about phosphates which promote the growth of algae and thus disturb the oxygen balance in the water. They were originally included in a beige list, which formed the third leg under the draft treaty. This beige list has now been incorporated into the grey list which should mean that the disposal of phosphates is being limited too.

They are, however, not mentioned in the final list. The list specifies "substances which have a negative effect on the oxygen balance, such as liquid ammonia and nitrates." Phosphates definitely belong here and the Netherlands wants to see them listed, but this again has met with German opposition. In short, it is still a matter for negotiation.

#### Salt Treaty

With regard to the second treaty which is to curtail salt disposal in the Rhine, we can be short. It is finally going to come about that France will store part of the waste salts from its potassium mines. This will be

done in three stages: first one-sixth, later two-sixths and finally three-sixths of the approximately 7.5 million tons which are still being discharged into the Rhine every year.

All the Rhine countries, except for Luxembourg which is only peripherally involved in the matter, will share the cost of this storage on the basis of an existing division system: 34 percent for the Netherlands, 30 percent each for France and Germany, and 6 percent for Switzerland. This, of course, is in conflict with the principle that the one who pollutes pays.

Recent difficulties have been resolved. France had estimated the costs of the first stage at 118 million French francs, but the budget later proved to be too tight. France found that the funds were not adequate and presented its Rhine partners with a new bill to the amount of 132 million French francs. As far as Germany and the Netherlands were concerned, this was asking too much: they did not want to pay any more than what had been agreed upon.

Later on they reconsidered on one condition: France was to start with the first stage immediately following the signing of the treaty. This is happening now. At first the French wanted to wait until the treaty had been ratified by the various parliaments.

The effective target date for both treaties is supposed to be 1 January 1978. But whether it can be done by then is another question. For example, in the Netherlands the Surface Water Pollution Act will have to be revised to match the treaty, and that will take a lot of time. In Germany the situation is even more complicated because the Lander within the Rhine basin have a say in the matter.

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DUTCH GOVERNMENT DISSATISFIED WITH RHINE POLLUTION TREATY

Amsterdam DE TELEGRAAF in Dutch 4 Dec 76 p 9

[Unattributed article: "Netherlands Unhappy About Rhine Treaty"]

[Text] Bonn, Saturday--The Dutch Government is unhappy about the Rhine Treaty concerning the reduction of salt pollution, which was signed yesterday in Bonn.

It considers the agreement to be only the first step in the right direction.

The Hague is grateful to the other states bordering the Rhine (West Germany, France, Luxemburg and Switzerland) for having signed it, but if the matter had rested only with the Dutch Government a totally different treaty would have been produced.

This was stated by Minister Westerterp (Traffic and Waterways) following the conclusion of the signing ceremony.

"We had hoped that France would already have reached a subterranean storage capacity of 60 kg waste salt per second," the minister commented. He expressed the hope that this level would be reached by 1980.

At that time, every second, 60 kg of waste salt from the potassium mines will be injected under high pressure into the ground instead of discharging it into the Rhine as has been the practice up to now.

Delay

The original agreement, reached at the 1972 Conference of Ministers in the Hague, stated that this would be the case by 1 January 1975. Thus, there is a five year delay.

Minister Westerterp stated that he is not happy with the fact that the Netherlands has to pay 34 percent (23 million guilders) of the total cost of the salt storage.

"But if we had not given in on this, there would still not be a treaty," said Westerterp.

In the opinion of the waterworks companies of the states bordering the Rhine, united in the IAWR [International Working Community of Waterworks in the Rhine River Basin], the treaty becomes meaningful only when effective short term measures are taken.

Consequently, as soon as possible the International Rhine Commission will have to formulate demands which will have to be met concerning the quality of the Rhine water. The same applies with regard to the disposal of waste materials.

As far as curbing the so-called "salt loading" of the Rhine by French potassium mines is concerned, the IAWR noted that it is first of all a question of reducing the total salt pollution by only 6 percent.

#### Agreement

In addition to the Rhine Treaty two other agreements were signed. One concerning the chemical pollution of the Rhine and one by which the EEC joins the International Rhine Commission. This Commission was set up in 1963 through the Treaty of Bern.

The treaty relating to chemical pollution of the Rhine was signed for the Netherlands by Minister Vorrink (Health and Environment) and the association agreement by the Dutch ambassador in Bonn, Baron van Lynden.

Immediately following the signing, Minister Westerterp handed a check for 40 million francs (23 million guilders) to French Minister Vincent Ansquer.

"That was the largest amount I ever wrote a check for," quipped the minister.

Of all the salt in the Rhine, 54 percent originates in France, 44 percent in West Germany and 4 percent in our country [figures as published].

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TURKEY

AIR POLLUTION GOES OVER SAFE LEVEL IN ANKARA

Selenium Level Rises

Istanbul CUMHURİYET in Turkish 27 Dec 76 pp 1, 9

[Text] Ankara--Selenium, an element 10 times more poisonous than arsenic, reportedly exists in large doses in Ankara's air.

The rising level of selenium was discovered by the Ankara Nuclear Research and Education Center in the course of its study of air pollution problems in Ankara. Dr Ilhan Olmez, chief of the center's Nuclear Chemistry Group, said that the presence of large amounts of selenium in the air was a direct result of lignite coal burned in the city. According to Dr Olmez, close to one half million ton of lignite was used in the capital in 1 year.

The survey by the center indicates a rapid deterioration of the air quality in Ankara from one year to another. Dr Olmez says that what is being done to control pollution is not enough.

Dr Olmez also gave the following information:

"In order to plan antipollution measures, initially one has to diagnose the type of pollutants in Ankara's air. It has not been done. Another major stumbling block is the absence of a scientific authority to coordinate anti-pollution efforts of various organizations. I believe, a simple filter device, which can be installed in the chimney or the furnace outlets of a central heating system, will contribute a great deal to the purification of Ankara's polluted air. Many countries have cut down industrial pollution by such simple methods. We have made theoretical studies at the Ankara Nuclear Research and Education Center, and we have the capacity to put our theories into practice, if anyone is interested."

Warning By Professional Groups

Istanbul CUMHURİYET in Turkish 22 Dec 76 pp 1, 9

[Text] Ankara--CUMHURİYET Bureau--Two professional groups have issued a warning that air pollution in Ankara is approaching an "acute" stage where it may

cause mass fatalities. The Society of Chemists and the Public Health Bureau of the Ankara Chamber of Physicians said that air pollution in Ankara is 37.5 times the level considered safe for human health. A statement issued jointly by the two groups says, there is no point conducting extensive research to determine whether the air is polluted, a comparative study of respiratory diseases incidents in Ankara and elsewhere would produce sufficient proof. The professional organizations charge that an inadequate sampling method was used intentionally to minimize the gravity of the situation, and disclose that a measurement taken on 15 November showed the sulfur dioxide level to be 2252/micrograms/cubic meter . According to the World Health Organization, the groups say, the sulfur dioxide level should not exceed 60/micrograms/cubicmeter , and they underline the fact that "the amount of pollutants in the city's air is 37.5 times the recommended level." They warn that pollution may soon reach "an acute level," which would cause a large number of deaths. The Society of Chemists and the Ankara Chamber of Physicians relate that an acute pollution of the air caused 4000 deaths in a week's time in London in 1952. They make the following recommendations to fight air pollution:

**Emergency Measures:** Population movements (zoning, clearing, limiting height of buildings); transportation planning (shift to mass transportation, such as metro, electric-powered vehicles instead of diesel or petroleum operated autos, importing low-sulfur petroleum, for example, from Iraq); education (education of the public, drivers, central heating operators, petroleum and diesel dealers).

**Planned Long-Range Measures:** Urban planning, legal countermeasures, rescheduling work hours, appropriation of funds for purification operations, emission control, fuel control, and forestation.

**Measures Against Acute Pollution:** Ban on the use of motor vehicles, turning of furnaces of central heating systems and masking.

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