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TRANSLATIONS ON ENVIRONMENTAL QUALITY

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WEST GERMANY

BRIEFS

ENVIRONMENTAL PROTECTION INSTITUTE--Nairobi, January 11, TASS--The U.N. environmental program has opened here its coordination and research institute for problems of regional seas, among which are the Mediterranean Sea, the Persian Gulf, the Caribbean Sea, the Gulf of Guinea, the seas of Southeast Asia, the Red Sea and the Pacific Ocean. The centre is to work out in detail, adopt and implement plans in the field of oceanology. The centre will engage in particular in collecting, standardizing, processing and distributing information as regards comparative exploration of various sea zones. [Text] [Moscow TASS in English 1435 GMT 11 Jan 78 LD]

CSO: 5000

BRIEFS

CEMA ENVIRONMENTAL PROTECTION PROTOCOL--Prague, Jan 9, TASS--A session of the CEMA council on questions of environmental protection has ended in the Czechoslovak capital with the signing of a protocol. Taking part in the session were delegations from the Bulgarian People's Republic, the Hungarian People's Republic, the GDR, the Mongolian People's Republic, the Polish People's Republic, the Socialist Republic of Romania, the USSR and the CSSR. Also present was a delegation from the Socialist Federal Republic of Yugoslavia. Specialists from the fraternal countries exchanged work experience, discussed prospects for further extension of mutual cooperation in the field of environmental protection and reviewed the possibilities of developing ties with international organizations. [Moscow TASS International Service in Russian 0703 GMT 9 Jan 78 LD]

CSO: 5000

BRIEFS

ENVIRONMENTAL MANAGEMENT TRAINING--The Kinshasa campus of the Faculty of Science announces that it established a "special diploma in environmental management training" under its supervision in the 1976-1977 academic year. The course covers a period of four semesters and is given at night. Its objective is to offer interdisciplinary training on environmental management to the students, with special emphasis in the case of Zaire. It also must be noted that only candidates holding a certificate, a doctorate or an engineering diploma (5 years) will be eligible, priority being reserved to those who have passed with distinction and received a commendation. The course for the second group will begin in early December 1977. Candidates who are interested can register at the registration office of the Kinshasa campus. [Text] [Kinshasa ELIMA in French 2 Dec 77 p 2] 7993

CSO: 5000

ENVIRONMENTAL PROTECTION IN TASHKENT

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 77 p 12

[Article by M. Yusupov, deputy chairman of the ispolkom of the Tashkent City Council of People's Deputies: "The Health of Tashkent"]

[Text] For Tashkent, as for any other industrial center, environmental protection is a very urgent problem. There is a large number of industrial enterprises in the capital of Uzbekistan. Many of them are located on the shores of canals which intersect the city and into which waste water flows.

The general plan for development of Tashkent and the projects of rayon planning for the Tashkent agglomeration (the city and its suburbs) provide for an improvement in the technology at industrial enterprises in order to provide the maximum reduction in harmful discharges into the atmosphere, to connect all the industrial, public, trade and other enterprises to the common municipal sewer system, to create protective green zones around the enterprises, to transfer some of the most harmful industries beyond the city boundaries, and so forth.

A lot has already been done in the city for protection of the air basin. Effective gas and dust collectors have been installed at the Tashkent furniture kombinat, the porcelain, paint and varnish plant, Tashsel'mash [Taskent Agricultural Machinery Plant] and other plants. A lot has been done for the gasification of heating and industrial units in private dwellings and boiler rooms.

The struggle against air pollution by automobile exhaust produces a considerable effect. In many motor services laboratories have been set up to control the carbon monoxide content in exhaust.

Among other measures one can name the organization in the city of continuous movement of motor transport and public welfare work. Now a municipal automated system of traffic control (ASUD-gorod) is being set up which will permit regulation of transport traffic and at the same time will promote refreshing of the air basin.

Just how much cleaner the air in Tashkent has recently become can be judged by the following fact. In the very center of the city, in the area of the Tashkent Hotel and the Navoya Theater the level of air pollution exceeded the maximum permissible concentrations still in 1974. Now harmful gas vapors are not found here.

One of our important concerns is protection of soils and reservoirs from contaminants. From year to year the output of the treatment facilities in the municipal sewer system increases. They achieve complete biological purification with disinfection of silt.

Connection of all the new enterprises to the municipal sewer system permitted cessation of the greater part of disposal into reservoirs. Only last year the following were connected to the municipal sewer system: plant of large-panel parts No 3, sewing-drapery association "Chevar," porcelain plant, tannery machine plant, repair and service shop No 1 of the administration of the municipal sewer system, and many dining rooms.

The network of treatment facilities at the enterprises is expanding. Construction has been completed on a system of facilities for treatment of sewage of the electroplating shop in the plant "Tashsel'mash". Analogous plants are being built at electromechanical and paint and varnish plants. Pollutiion of the Salar canal was reduced to a minimum by the operation of treatment facilities in vehicle fleet No 4 and service station No 141, by the reconstruction of treatment facilities in vehicle fleet No 3 and the end of sewage disposal by the industrial rubber plant.

We are focusing ever greater attention on the creation of closed cycles at enterprises which will not only permit pollution of reservoirs to be averted but also the water to be used more efficiently. Several enterprises converted to circulating water supply this year. One of the largest plants in the city, "Tashsel'mash", set up a water circulating system.

Great importance is attached to protection from pollution of the canals which intersect Tashkent from east to west, and to landscaping of the city. The canals Kara-Su, Salar, Ak-Tepe, Boz-Su and Ankhor were cleaned up and concreted. The embankment canals are being put into good order. As for the landscaping of Tashkent, now each of its inhabitants has over 43 square meters of green vegetation.

Of course, there are still many deficiencies in the work on environmental protection. Some enterprises are not completely fulfilling the programs for construction of treatment facilities and are not hurrying to convert to circulating water supply. These and other unsolved problems are the focus of attention of the councils, deputy commissions of the municipal Council of People's Deputies, and services involved in environmental protection.

9035
CSO: 5000

RIVER POLLUTION BY VITAMIN PLANT

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 77 p 12

[Remark by A. Kryakvina: "Why Does the River Need 'Vitamins'?"]

[Text] In the city of Shchelkov near Moscow there is a vitamin plant. The river Ponyri also flows right here. Unfortunately, the vitamin plant supplies the river with "vitamin supplements" in the form of production waste products.

"There are absolutely no impurities in the Ponyri," counters the director of the vitamin plant, A. Anshtakov.

"No, there are," asserts the deputy chairman of the ispolkom, V. Titarenko. "A check has shown. In the water chemical elements were found which are a part of the plant product. At the last meeting of the ispolkom we even appointed those who are responsible for cleaning up the Ponyri: the gorkomkhoz [city department of municipal services], the vitamin plant and the cotton plant."

"Our main task is the Plan," responds the director. "Nevertheless, we are thinking of neutralizing the water and of taking other measures."

This is not the first year the residents of Shchelkov have heard such promises, and not only from the vitamin plant. From time to time the city authorities, sanitary and epidemiological station, the cotton kombinat and vitamin plant argue with each other, prove and persuade, but there has not been an instance where they all gathered together and had a business-like, effective discussion of the urgent question: "How to free the Ponyri of 'vitamin supplements'?"

9035
CSO: 5500

PROTECTING ARMENIA'S WATER RESOURCES

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 77 p 12

[Article by M. Adonts, director Scientific Research Institute of Economics and Planning of Armenian SSR Gosplan, Dr of economic sciences, professor, and S. Musayelyan, senior scientist, Dr of technical sciences: "Clean Water"]

[Text] The total water resources of Armenia (with regard for underground waters) are 5.648 million cubic meters. The Scientific Research Institute of Economics and Planning of the republic Gosplan has compiled a long-term hydroeconomic balance. What is most striking in it is the rapid growth in the coefficient of water use.

With an increase in the use of water perceptible pollution of local sources also occurs. The main culprits are enterprises of the metallurgical and chemical industries which are responsible for over half of the sewage.

The state of cleanliness of rivers is disturbing. As is known, as far back as the thirties we set maximum permissible standards for the concentration of ingredients. The introduction of these standards played an important role. However, now the concern of environmental protection urgently requires the introduction also of such an index as the maximum permissible discharges (MPD).

This is of exceptional necessity for the planning of new enterprises. The experience of the operating enterprises is yet more evidence for the need for this measure. Judge for yourself. There are 1,800 plants discharging sewage in the republic. Unfortunately, only a part of the sewage is treated.

A special place in the republic is occupied by protection of the water in Lake Sevan. For the protection of Lake Sevan it is necessary to implement an entire set of measures. There is an urgent need to limit the growth of "polluting" branches of industry in its environs and to remove a whole number of enterprises with harmful production beyond the health resort zone. It is necessary to relocate, for example, the plant Elektrostekloizolyatsiya, a plant making reinforced concrete items, a kombinat making construction items, others into the Gagarin settlement.

It should be stated that for the current Five-Year Plan, the republic, like other regions of the country, has planned a large program of water protection measures. New systems of circulating water supply will be built at a number of industrial enterprises which will increase the amount of circulating water employed by 70 percent. In the future construction will be completed of the second phase of the aeration plant in Yerevan, of the main-line sewage collectors, Charentsavan-Yerevan and Sevan-Razdan with treatment facilities in the villages of Kakhsi, treatment facilities in Leinkan, Alaverdi, Kamo, Spitak, Echmiadzin, Aparan and Dzhermuk, as well as at a number of enterprises of the metallurgical and chemical industries.

PHOTO CAPTION

1. p 12. Ryazan'. Capacity of treatment facilities of the oil refinery imeni the Fiftieth Anniversary of the USSR--320,000 cubic meters of water per day. The high quality of treatment had a beneficial effect on the water composition in the Oka where many fish have appeared.

9035
CSO: 5500

STRINGENT NEW MEASURES TO PROTECT THE CASPIAN SEA

Kiev RABOCHAYA GAZETA in Russian 27 Dec 77 p 3

["Additional Measures to Protect the Caspian Sea From Pollution"]

[Text] In accordance with the decisions of the 25th CPSU Congress, extensive environmental protection measures are being implemented in our country, including those to maintain the purity of rivers, lakes and seas. The necessity and importance of carrying out these measures has been underscored in the new USSR constitution.

According to decrees of the CC CPSU and the USSR Council of Ministers adopted in recent years, major work is being conducted to prevent pollution of the Baltic, Black and Azov seas, the Severskiy Donyets and Chu rivers, and to guarantee the protection of Lake Baykal and other bodies of water.

In executing the decisions of the 25th party congress, the USSR Council of Ministers adopted a decree "On Additional Measures to Protect the Caspian Sea from Pollution."

It points out that in recent years there has been a decrease in the dumping of raw sewage and industrial waste into the Caspian Sea. This has been achieved as a result of construction of water conservation facilities and sewage treatment plants as well as the realization of other measures at enterprises and in inhabited areas situated in its basin. Such construction had been specified in decisions adopted earlier.

However, the measures that have been approved still fall short of providing the necessary cleanliness of the Caspian Sea basin water resources.

In connection with this, the USSR Council of Ministers has bound the councils of ministers of the RSFSR, the Kazakh, Georgian, Armenian, Turkmen and Azerbaydzhan republics jointly with corresponding ministries and departments to carry out a complex of measures by 1985 to guarantee the complete elimination of dumping raw municipal, domestic and industrial sewage as well as sewage water discarded by agricultural water consumers into rivers and other Caspian Sea basin water resources. The decree specifies measures for

the complete halt to dumping raw sewage that have to be accomplished in the cities, at major enterprises and organizations during the present 5-year plan.

In 1978-79 the Ministry of the Petroleum Industry must bring about a complex of measures that provide for work supervision in the exploration and extraction of gas and oil on a technological level that excludes the contamination of water by oil and the harmful influence on the sea's living resources.

The USSR Ministry of Industrial Construction and Azerbaydzhan SSR Council of Ministers have been charged with establishing a specialized organization for the construction of municipal sewage treatment plants. The Ministry of the Petroleum Industry has been ordered to set up a specialized subelement to dismantle nonutilized piers, metal footings and abutments in regions where gas and oil are extracted. And the Ministry of the Maritime Fleet is under obligation to create an emergency service for the elimination of major oil spills from ships.

USSR ministries and departments have been tasked with developing and putting into operation the production of equipment, devices, specialized ships and chemical reagents nontoxic to the sea's living resources to prevent pollution of the Caspian Sea during the exploration and exploitation of the sea's gas and oil deposits, as well as during the transport of oil and gas.

The USSR Ministry of Agriculture, the State Committee of the USSR Council of Ministers for the Lumber Industry, the USSR Ministry of Land Reclamation and Water Management, the USSR Ministry of Health and the councils of ministers of the republics indicated previously have been ordered to intensify control over observance of the established rules governing the use of toxic chemicals by enterprises, organizations and citizens, and for fulfilling water consumption demands for the purification of sewage water discarded by them into rivers and other Caspian Sea water resources.

A strict procedure has been established for conducting drilling and geological surveying and other work associated with the exploration and exploitation of the natural riches of the sea's bottom and the earth's interior.

With the aim of slowing down the falling level of the Caspian Sea and reducing evaporation from its water area, the USSR Ministry of Land Reclamation and Water Management jointly with the Ministry of the Chemical Industry and the USSR Ministry of Power Engineering and Electrification have been authorized to introduce proposals to the USSR Council of Ministers for the construction of a dam in the Kara-Bogaz-Gol Strait.

The USSR People's Control Committee has been entrusted with organizing systematic control to see that the ministries and departments carry out the measures outlined in the decrees.

8504
CSO: 5000

ENVIRONMENTAL PROTECTION IN BELORUSSIA

Moscow OKHRANA TRUDA I SOTSIAL'NOYE STRAKHOVANIYE in Russian No 11, Nov 77 p 11

[Article by S. Konstantinovich, deputy chairman of the presidium of the republic council of the Belorussian Society for the Protection of Nature: "Nature: To Protect and Increase It"]

[Text] For the Sake of Profit

In the autumn of 1974 at the time of the World Fair "EXPO-74," Soviet specialists visited the United States of America. The exhibit was devoted to the protection of the environment. The white tent of the American pavilion was crowned with the aphorism: "The land does not belong to man--man belongs to the land." But the principles of the capitalist system, the desire to extract maximum profits and the inability to develop a unified policy for protecting nature make it impossible for the Americans to resist the onslaught of industrial expansion.

It is no accident that displayed next to the pavilion was--a mountain of garbage. It symbolized 130 million tons of annual city wastes that require the construction of more and more new dumps. We saw with our own eyes the urgency of this problem when several days later we visited San Francisco Bay. On its shores which were previously known for their beauty there are more than three immense dumps and dozens of cemetaries for old automobiles.

Our delegation visited the plant for producing pipes in California--a large modern enterprise which produces colossal income. It can construct the most costly purification complexes. But we not only did not see these installations on the territory of the plant, but we also did not even see simple trees and bushes which make the air more healthful.

A Statewide Matter

In our country immense amounts of money are alloted for protecting the environment. In 1975 alone 1.8 billion rubles were alloted for special

measures for eliminating pollution of the environment. The socialist system of management makes it possible to utilize nature jointly, in a planned way and on a scientific basis.

As early as 1918 under the People's Commissariat of Education the RSFSR created a special agency that was responsible for the environment: the Committee for the Protection of Nature. During this period a number of decrees were adopted which envisioned the protection of the land, forests, fish resources and hunting lands. V. I. Lenin attached great importance to correct utilization of nature.

Questions of the protection of nature have now been further developed. The decrees and materials of the CPSU Central Committee, the USSR Supreme Soviet and the Soviet government determine the general line for the protection of nature in keeping with the political and economic tasks that are being resolved during the construction of a communist society.

The USSR Supreme Soviet has adopted and put into effect the Fundamentals of Legislation of the USSR and Union Republics concerning land and water resources, health protection and mineral resources. The Belorussian SSR, in keeping with these union laws, has developed land and water codes and a number of other summaries of laws.

Not only the state, but a whole network of public organizations have been enlisted in this important matter. Here in Belorussia our society for the protection of nature includes 3 million people. This is every third resident of the republic. We exercise control over the construction and operation of purification installations, enlist the population in practical measures for restoring forests and publicize a Leninist attitude toward natural resources. We do all this in close contact with state and management agencies, including the state committee of the Belorussian SSR Council of Ministers for the Protection of Nature and the republic trade union council.

One of our concerns is for the condition of water resources and the atmosphere. Before the adoption of the "Law on the Protection of Nature in the Belorussian SSR," the provisions in the republic could not be called good. Now we have 988 enterprises for mechanical and biological purification in operation. During the past five-year plan alone Belorussia has constructed about 350 purification installations; more than half with full biological purification.

The Earth Feeds Us

The earth, the basis of all economic activity, is an object of our special concern. Belorussia is doing extensive work for increasing the fertility of the soil, correctly applying fertilizers and toxic chemicals, carrying out land reclamation and fighting against wind and water erosion. An

important place belongs to recultivation, that is, restoration of the productive properties of land that has been disturbed in the process of utilization.

During the last decade alone our republic has put more than 100,000 hectares of land into a condition suitable for utilization in the national economy.

The practice of constructing industrial facilities on land that is unsuitable for agriculture deserves wholehearted approval. Thus, for example, the construction of buildings of the Polotsk chemical combine was planned for a marshy (after drainage, of course) territory. There are many examples like this in the republic. As a result, agriculture has received many hundreds of additional hectares of land.

We have experience in protecting the fertile layer of the soil. In particular, when constructing industrial and agricultural facilities, the fertile layer is removed, stacked and utilized subsequently when laying out squares and lawns. This work is being done well is Brest, Mogilev and Baranovichi.

We Are Restoring the Forests

The writer Leonid Leonov wrote about the fact that the forests usually share the fate of their people. This applies fully to Belorussia. From the end of the 19th century and up to middle 40's of the 20th century our forests underwent all possible kinds of destruction: from reckless and destructive exploitation of their wealth to the fatal invasion of two world wars.

Let us think in figures: during the time of the invasion of the Fascist hordes, every fourth resident and every third hectare of forest died in Belorussia.

The German oppressors, afraid of Belorussian partisans, barbarously cut down and set fire to forests along the road. By the end of the war the degree of forestation had decreased to 21.5 percent--the lowest in the entire history of the area.

Today about 20 percent of the forests are man-made in the full sense of the word--they have been created by the hands of foresters. Since that time we have been planting 15 percent more than we have been selling, repaying the "debts" that were incurred to the forests during the years of the war and the restoration of the national economy.

Belorussian workers have had to do a great deal of work here. Party, trade-union and komsomol organizations have skillfully directed the efforts of collectives toward instilling good behavior with respect to the environment. In schools, at enterprises and in businesses people are inspired with respect for the great laws of nature and they are made aware of the need to protect it.

It was precisely as a form of education that we came to have school forest trips where the pupils, under the leadership of a forester and the teacher, helped to clear the forests, check on their sanitary condition and protect them from fires.

The process of ecological education continues in VUZ's. The Belorussian Technological Institute has created a department for the protection of nature and all other training institutions give special courses on this subject.

Friendly Cooperation

In celebrating the 60th anniversary of Great October, our society for the protection of nature is competing with societies of neighboring republics--the Ukraine and Lithuania. Socialist competition is conducted for such indicators as the effectiveness of activity for the protection of nature, the condition of propaganda work and the number of people in the society. We conduct joint scientific conferences and seminars, exchange experience and speak in the sister republics on radio and television.

We have especially fruitful conducts with the Baltic republics. The creation of the western division of VASKhNIL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin] contributed a good deal to this. Having combined the efforts of scientists who deal with questions of water and wind erosion, in the near future we plan to hold an interrepublic conference devoted to this issue.

As for the embodiment of scientific ideas in practice, we were recently helped a great deal by our Latvian friends who manufactured a mechanism for planting seedlings. We have concluded an agreement for conducting scientific research with our Lithuanian neighbors who have a great deal of experience in studying the behavior of seedlings in a regulated environment.

We are not in debt either. Each year Belorussia delivers to its Ukrainian colleagues and to forestry workers from the Komi autonomous republic high-quality seeds of pine and spruce trees which are abundant in our area.

We have much work ahead of us. Belorussian scientists are evermore persistently arranging a changeover to wastefree production. The essence of it consists in the development of technological processes which would imitate natural processes to a maximum degree and make it possible to fully utilize substances that are harmful for the biosphere.

Only this way will we achieve the necessary harmony between man and his environment and natural resources will be truly inexhaustible.

11772
CSO: 5000

ENVIRONMENTAL PROTECTION IN THE MEAT, DAIRY INDUSTRIES: TREATMENT FACILITIES, CAPACITIES

Moscow MYASNAYA INDUSTRIYA SSSR in Russian No 10, Oct 77 pp 34-35

[Article by N. Ye. Sbitnev, Central Scientific and Technical Society and Administration of the RSFSR Ministry of the Meat and Dairy Industry: "More Attention for Environmental Protection"]

[Text] Under current conditions the problem of environmental protection has acquired extremely great importance and a number of international organizations are actively involved in solving it. They are devising legislative, administrative, economic, technological and other measures to combat pollution of the air and water basins and to promote a more efficient use of natural resources, optimization of the biosphere and a rational interaction between man and nature.

The Soviet Union attaches especially great importance to this question.

The 25th CPSU Congress viewed environmental protection and the use of natural resources as the most important all-state problems, without the solution of which the further intensive growth of industry, construction and agriculture is unthinkable.

In the Soviet Union, for the first time in the history of the state, the problem of environmental protection has acquired the force of a law. The USSR Constitution states that in the interests of the present and future generations the necessary measures are being taken in the USSR for the protection and for the scientifically sound, efficient use of the earth and its mineral resources, and of the plant and animal world, for the preservation of air and water purity, for the guarantee of natural resource reproduction and for the improvement of man's environment.

The citizens of the USSR must preserve nature and protect its resources. This is the most important component in the struggle to improve the economic efficacy of social production.

The Tenth Five-Year Plan, in accordance with the decisions of the 25th party congress, has provided for a broad program of measures for environmental protection, and the efficient use and reproduction of natural resources for which 11 billion rubles have been slated. Large amounts of capital are being set aside for the protection of rivers and lakes from pollution and for the construction of treatment facilities and sewage treatment plants. By 1980 it is planned to completely end the disposal of untreated or insufficiently treated domestic and industrial sewage in all cities of the Volga and Ural river basins.

The USSR and RSFSR Council of Ministers has adopted a number of decrees on measures for the further improvement of environmental protection and the efficient use of natural resources, for the protection of the Caspian, Black and Azov seas, Volga and Ural river basins, for the preservation of the Lake Baykal resources, etc.

By fulfilling the decree of the party and government the RSFSR Ministry of the Meat and Dairy Industry has done a great deal to strengthen environmental protection at the enterprises of the branch.

In the Tenth Five-Year Plan treatment facilities have been built and rebuilt at many of the operating meat reprocessing enterprises, and plants for sewage treatment have also been put into operation at the reconstructed facilities.

Good results in sewage treatment have been obtained by the Moscow (municipal and oblast), Leningrad, Kuybyshev, Ryazan', Chuvash ASSR and other production associations of the meat industry which do not have a single enterprise disposing untreated sewage into reservoirs. However, certain production associations of the Rosmyasoprom (Karelian ASSR, Omsk, Tyumen', Yakutsk and Penza) are not giving this question due regard.

In the first year of the Tenth Five-Year Plan the following purification facilities were put into operation with capacity (m^3 of sewage per day): 300 at the Ostankino meat reprocessing kombinat; 1,180 at the Krasnogvardeyskiy meat reprocessing plant; 2,000 at the Balashov meat kombinat (Saratov association); 12,000 at the Orsk and 2,200 at the Kaliningrad meat kombinats. In 1976 new meat kombinats were constructed and are operating in a complete system with treatment facilities in the cities of Ryazhsk, Lipetsk and Kamenka, and Timashev stanitsa. However,treatment facilities have not been put into operation of the following capacities (m^3 per day): 3,500 at the Chelyabinsk meat kombinat; 3,600 at the Tula; 2,600 at the Saransk (Mordovian association); 1,100 at the Barysh (Ul'yanovsk association) meat kombinats. A number of associations (for example, the Ul'yanovsk) are inadequately operating the constructed treatment facilities.

The problem of saving water is an urgent one, however, the specific water consumption at meat kombinats in the cities of Krasnoyarsk, Barnaul, Leningrad, Krasnodar and Volgograd fluctuates from 37 to 29 m^3 per unit of

output per day; respectively at the Engel's--54 m^3; Astrakhan'--74; at the Moscow--24 and Kuybyshev--19 m^3.

The branch institutes and planning organizations need to formulate recommendations on optimal patterns of operation for enterprises from the viewpoint of specific water consumption, and also to make a scientifically sound analysis of the quantity of sewage disposal since it is extremely unstable for the enterprises. There should be an increase in the number of branch plants which operate with a closed water circulation cycle; i.e., essentially without sewage disposal, since in the Ninth Five-Year Plan the percentage of circulating and resupply of water in the enterprises of the meat branch was only 15 percent.

The Lipetsk branch of the Volgograd head planning and design bureau [Rosmyasomolremproyekt] in accordance with the plan of scientific research and experimental designing of the RSFSR Minmyasomolprom [Ministry of the Meat and Dairy Industry] developed in 1976 recommendations for the work of treatment facilities at enterprises of the meat and dairy industry of varying capacities under different climate conditions.

The recommendations were made on the basis of an analysis of treatment facility operation at the active meat kombinats in the cities of Valuyki in the Belgorodskaya oblast, Lipetsk, Gor'kiy, Leningrad and Krasnodar, as well as on the basis of research results of the branch institutes. The recommendations provide for economical water consumption, restoration and improvement of its quality, an end to sewage disposal into reservoirs, the introduction of technological production systems without drainage, and the maximum recovery from sewage of valuable products which are subject to further utilization and reprocessing.

The volume of capital investments for environmental protection and efficient use of water resources that has been allotted the RSFSR Minmyasomolprom in the Tenth Five-Year Plan only for centralized sources is 61.39 million rubles, of which 38.3 million rubles is for the Rosmyasoprom.

In order to improve the planning, construction and operation of treatment facilities in 1976 the RSFSR Minmyasomolprom issued an order on measures for intensifying environmental protection by the industrial enterprises of the Russian Federation.

Environmental protection is the concern of each production group and all workers in industry.

The services involved at the enterprises with questions of environmental protection need to be more active and to find efficient and active forms of work, while the production associations of the Rosmyasoprom need to control and coordinate their work.

Environmental protection is an all-state task, and the stricter and more exacting the enterprises, production associations and ministries are towards it, the more successfully it will be solved.

9035
CSO: 5000

RECYCLING OF WASTES INTO ENERGY, RAW MATERIALS SAVES OIL

Copenhagen BERLINGSKE TIDENDE in Danish 23 Nov 77 p 2

[Text] The social-economic advantages of burning arrangements as compared to dumps are becoming more and more clear. Waste turns into thermal energy or raw materials for new products.

This favorable development is in the report which Mayor Kaj H. Burchardt tomorrow will present to the Vestforbraending partnership, which receives the garbage from 600,000 inhabitants in 14 municipalities in the western district of the capital area.

Saving 50,000 tons of Oil

Each of us produces approximately a half ton of garbage a year, and Vestforbraending will have an annual capacity of approximately 320,000 tons of garbage when they bring a fourth furnace unit into use in the fall.

After sorting, most of the waste winds up in the furnaces, and the heat produced corresponds to approximately 50,000 tons of oil. Or in other words, it corresponds to a saving in foreign exchange of 40 million kroner. Today only part of the waste is used for heating, but Vestforbraending has worked out plans for developing the remote heating system specifically in the Herlev area during the next five years. After that time it will be possible to utilize 80 percent of the heat from the waste. In addition to the social-economic advantages associated with lower oil imports, there are also environmental advantages involved.

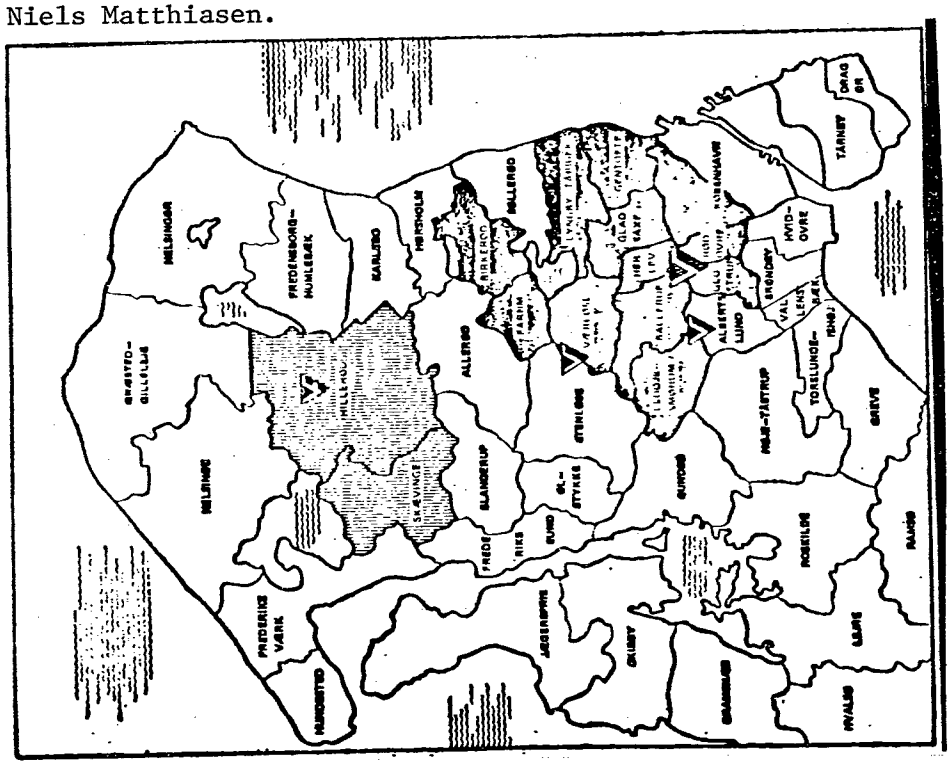
Efforts are being made to find a partial solution to the waste of thermal energy which takes place during the summer with attempts to produce a waste product which can be stored during the summer and used for fuel during the winter months.

But at the same time as waste is being used for heating, the burning institution is increasingly important as a producer of consumer goods. Just today a factory is being dedicated in Farum for the manufacture of tiles, 70 percent of which consists of cinder material, a product left over from

the combustion institution. The tiles, whose properties are no worse than those of common concrete tiles, can be produced in Farum at a rate of approximately 300,000 square meters annually. This kind of production requires approximately 25,000 tons of cinder material. There are 4 years of research work behind the production, and the new type of tile can already be seen on several squares and marketplaces. Cinders are also being used as a road bed during construction work in those 14 municipalities which are associated with Vestforbraending. Both application possibilities mean a lower consumption of gravel, which is gradually becoming more scarce.

And Scrap For Steel

Finally it may be mentioned that Vestforbraending is also producing large amounts of scrap. One-tenth is being used by a large industrial activity, but Mayor Kaj Burchardt mentions with regret that Frederiksverk Stalvalsevaerk (steel roller works) on a "more or less serious basis" has refused to accept scrap from Vestforbraending and Amagerforbraending. "The steel roller works has said the scrap cannot be used, but test smelting which Vestforbraending itself has carried out clearly shows," says Burchardt, "that the scrap is of a value matching a category which Fredriksvaerk Stalvalsevaerk has used and presumably will continue to use. Vestforbraending will now provide quality scrap, which the steel roller works on the basis of objective arguments should not refuse to find a use for. If there is to be a reasonable background for discussions about recycling, this problem should be solved as soon as possible." In general Vestforbraending declares that it is ready to operate as a recycling station, in reply to the proposals about introducing recycling by law, as has been announced by Environmental Minister Niels Matthiasen.



Vestforbraending receives waste from the approximately 600,000 inhabitants in 14 municipalities. On the map the 4 burning institutions are marked with black.

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PARLIAMENT MOVES TO CONTROL GENETICS RESEARCH

Copenhagen BERLINGSKE TIDENDE in Danish 17 Nov 77 p 12

[Text] Denmark will demand extensive security measures in connection with the development of research in artificial modification of inherited traits, for instance in microorganisms. In a report it recommends a committee under Parliament's Research Committee, and there is agreement both from the researchers' side and from the politicians' that the security must be effective and that it must prevent uncontrollable accidents as a consequence of contamination with bacteria, which during an accident, for instance, might give people cancer-producing inherited traits.

Parliament's Research Committee held a hearing about genetic manipulation in Christiansborg yesterday. Researchers in the field admonished people to come up with less fanciful reports on the dangers to humanity from genetic manipulations, but on the other hand they are not closing their eyes to the fact that the research which has been started is filled with risks.

Uncontrollable

Professor Ole Maaloe, Mocrobiological Institute, says: "Genetic manipulation consists of transferring a gene or an enzyme from a higher cell to a microorganism, whose inheritable properites are thereby changed. Today we simply cannot see which genes bacteria have taken up, and in future research we must try to find out what new properties the bacteria have picked up.

"The new properties may possibly be carcinogenic. As long as we are unable to control the risk, we must hold back somewhat. Those geneticists in the United States who invented the method for transferring inheritable traits warned the rest of the world openly against going too far. We must find out which guidelines must be established by law so that genetic manipulation will not lead to injuries and accidents."

Professor, Bent Harvald, Odense, says: "There are no limits to the fantasies one can get within the risici [translation unknown] with this form of research. Really frightening pictures are being presented. But if we are to look at real 'risici,' then it is the properties of these newly formed bacteria."

"Some of the bacteria's new inheritable properties may possibly turn out to consist of a greater power to multiply. They are growing over our heads, but so far it is only wretched and poorly growing bacteria that could be created in the laboratories. However, this does not deny that the researchers today are faced with dangerous bacteria.

"Especially resistant bacteria may possibly be produced accidentally through genetic manipulation, and the bacteria may possibly turn out to produce harmful substances."

Overdoses

"But it may also happen that the coli bacillus, which is the one most frequently used in research, will be able to produce insulin, and it occurs in such large amounts among humans that it will have an infecting and harmful effect. We also know many carcinogenic viruses whose uncontrolled properties might be transmitted to human inherited traits via bacteria which have been given the ability to produce the substances rapidly," said Dr. Bent Harvard.

In the field of plants it is feared that some type of plant may be given bacteria which would give the plant the ability to split off the nitrogen in the air and thus do without fertilizer. This type of a plant can spread out at the expense of other plants and upset the balance of nature.

However, researchers all over the world are convinced that the restrictive regulations which have already been developed by the National Institute of Health, and which most countries will follow, may gradually be modified as our knowledge increases.

Tests with carcinogenic viruses are prohibited. The same holds for tests with disease-producing bacteria which artificially have been given new inheritable traits. Today there are 500 projects in the United States in the riskless category, and the number is increasing. "The regulations of the American National Institute of Health are being revised," says Bent Harvald. "When the revision is published in a short time it will show that a series of measures will be made considerably milder."

Legislation

Proposed Danish legislation can roughly follow the American regulations, and one can, for instance, restrict the research to occupy itself with the otherwise peaceful coli bacteria.

Europe Science Foundation has appointed a task force with Professor Poul Riis as chairman. This group is recommending the same safety requirements, and it is proposing that a central control commission be established in each country, medical control of the personnel in the laboratories, courses for people working in the laboratories, and the obligation to report to the commission all unplanned events during the research work.

The commercial utilization of bacteria and microorganisms with artificially inherited traits was presented to the parliamentary research committee by Professor Lars Johansson, Novos Research Institute.

"When the research has reached further than today, there may be talk about the production of industrial microorganisms, which can be used as medicine in the pharmacological production, possibly in the form of insulin, and in the commercial industry in general. The raw material, which industry can only produce in small amounts, is expensive, but insulin-producing microorganisms can carry out the production faster and much cheaper. Synthetic materials can be produced by these bacteria. A substance which requires 500,000 sheep brains to produce can be produced by a genetically manipulated microorganism culture of 6 to 7 liters."

The fear that plants may spread uncontrollably may be replaced by the advantages of producing useful plants which can do without fertilizer in the form of nitrogen. The production of bacteria which can break down oil can be started and made inexpensive. Bacteria can be produced which will break down dangerous poisonous materials in the environment.

Balance

In the United States, research teams in the field have formed commercial companies, which are applying for advance patents on the research results, and when the patents are granted, the company sells licenses to industries which want to produce synthetic products, enzymes, medicines, etc., on the basis of genetically manipulated microorganisms.

To the scientists' reports to the research committee, the chairman of the Liberal Party, Poul Hartling said: "Researchers, industrialists, and politicians must be able to agree on safety rules when the natural mechanisms are being tampered with, and we must agree that we will not slow down scientific progress for the benefit of society by being too restrictive." He asked: "What do the researchers want from the legislation, and what are they afraid of?"

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EXPERT CITES RISKS IN INDUSTRIAL USE OF NUCLEAR POWER

Paris DEFENSE NATIONALE in French Nov 77 pp 17-42

[Article by Andre Gauvenet, Chief Managing Director of Safety at the Commissariat à l'Enérgie Atomique in France]

[Text] The prospects for using nuclear energy are a regular cause of heated disputes in the press, on radio and in public, so that it is very difficult for the observer to formulate an opinion based on objective data.

Moreover, do objective data exist? Is it not generally accepted that experts, sometimes even Nobel Prize winners, do not agree? If this is so, if the risks (and the advantages) of nuclear power are also completely uncertain, then, indeed, one must refrain from all development in this field. This is the line of argument presented in favor of proposals for "nuclear moratoriums," some are more or less direct, some more or less lasting.

In reality, the situation is completely different: whether it is a question of the advantages of nuclear energy or rather of its necessity, or whether it is a question of the risks which it involves, there are precise basic documents which are recognized by all specialists, whether they be supporters or opponents of this technique. Interpretations inevitably diverge when one goes beyond the basic ideas and especially when one enters the social or political spheres. Over and above interpretations, those who continue the dispute on pseudo-technical grounds generally are not true experts.

Any human activity has its disadvantages and risks, and these must be balanced against one another. International organizations are leaning more and more towards this way of looking at the situation, which tends to make our leaders more conscious of the choices they make. Of course, social, human and political factors must be included on the two scales

of the balance. It is understood that this is not an easy calculation to make, more especially since, having no homogeneous factors, there is generally no unit of common measure. It is up to the engineers, however, to present the most technical aspects of the matter in a comprehensible manner, and up to the politicians to estimate the value of these aspects and to add considerations other than those concerning the technique.

We will limit our discussion to the risks, which must be examined, not in themselves, but in comparison to other risks to which humanity and the environment are subject, namely those risks involved in energy production means. For example, it is essential to compare the harmful effects of nuclear plants to those of fuel oil plants, which are their direct competitors. This comparison is, of course, much easier than a complete study of "risks vs. advantages" mentioned above. In this case, we can, at least partially, use units of common measure.

A final important point: if one wants to evaluate all of the risks involved in a certain technique, this technique must be considered in its entirety, that is , beginning with its source (coal or uranium mine, oil well...), then the production center, and then the waste which must be disposed of. Also, harmful effects must be considered not only in respect to the population as a whole, but also in respect to the workers, whom some tend to forget and who are often the first affected by a technique.

We will try to evaluate the risks of nuclear power from these two points of view. After a short presentation of the nuclear cycle in its entirety, we will mention in succession:

1- The risks involved in the normal operation of plants
2- The problem of accidents
3- Certain specific risks, generally linked with normal operation, such as the existence of radioactive waste or the production of plutonium. Although they belong to the first category of risks, they have a different character, at least in appearance, they are a risk contemplated for the future rather than a current problem. Moreover, they are abounding, sometimes to the extreme, in psychological and political considerations.

The first two categories may be directly compared with similar problems presented by the other energy sources. Comparison is more difficult in the third category, which further justifies it being studied separately.

The Nuclear Cycle

Figure 1 shows what is called the nuclear cycle, from the mine to electricity and beyond. The main plants which we will discuss, other than the uranium mine itself and its related facilities, are the plants which use slug made from natural or enriched uranium and the reprocessing plants which take the irradiated fuel and separate the waste, the salvageable uranium and the plutonium produced. Uranium and plutonium may be recycled in the reactors.

We will hardly mention those plants which have few harmful effects such as those where fuel is manufactured and the isotope separation plants.

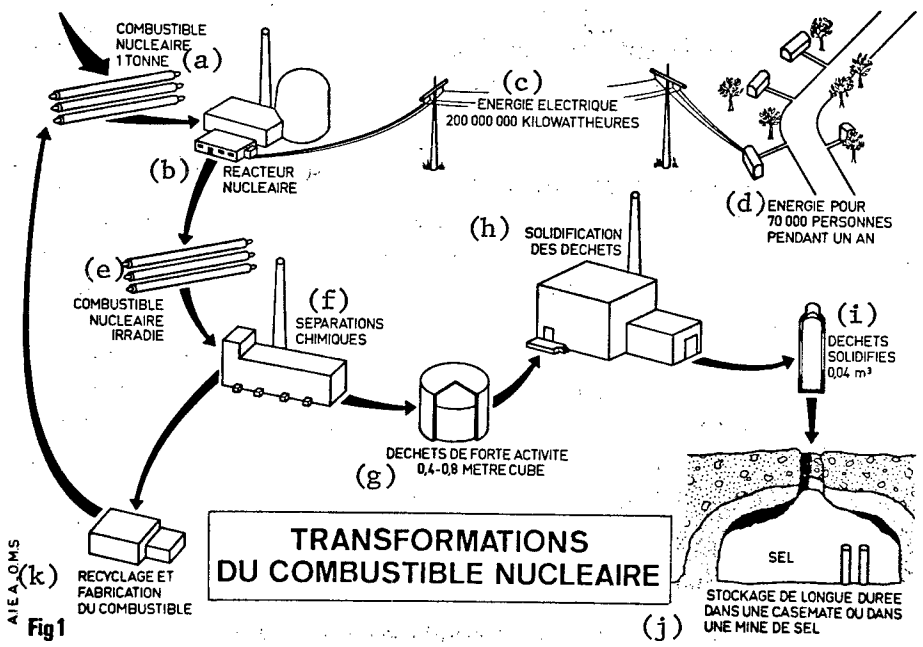

Figure 1. Nuclear Fuel Processing

Key:

a. Nuclear fuel (1 ton)
b. Nuclear reactor
c. Electrical energy (200,000,000 kilowatt-hours)
d. Energy for 70,000 people per year
e. Irradiated nuclear fuel
f. Chemical separation
g. High activity waste 0.4-0.8 cubic meter
h. Waste solidification
i. Solidified waste 0.04 cubic meter
j. Long term storage in a hot cave or in a salt mine
k. Recycling and manufacture of fuel

There are various types of nuclear plants. We will mainly discuss the light water reactors which use slightly enriched uranium and the fast breeder reactors which recycle plutonium and thus use uranium much more efficiently than the light water reactors. In time, breeder reactors will no doubt be indispensable. They will cause the energy reserves contained in uranium, which now rank below the petroleum resources (between 1/10 and 1/5), to reach a much higher rank (10 times the current petroleum reserves, since the use of uranium in rapid breeder reactors has improved by 50 percent).

Also, we must mention the transportation of radioactive materials: new fuels, irradiated fuels, waste, and plutonium which creates certain restraints.

Risks

Harmful Effects in Normal Operation

This mainly concerns radiation coming from nuclear plants either directly, or from the radioactive products which they emit.

Direct radiation is negligible, except for the workers who, in some cases, must take special precautions for protection. In respect to the population, the proper protection of nuclear plants and distance reduce radiation considerably.

On the other hand, the problem of radioactive effluents, liquids or gases, must be examined, for radioactive products which are discarded can, at least theoretically, be found far away from the plant in question. They are transported by the physical environment (atmosphere, rivers, seas) and by the living creatures which, in some cases, can concentrate them, and thus contaminate the food chains which end up with man.

In actual fact, these effluents amount to very little. Nuclear energy saves most of the radioactive elements which it produces in the form of waste which is almost always in a solid state. In all cases, very little is discarded, and disposal is carried out according to very strict regulations. Authorization is given after a detailed ecological study, so that it would be erroneous to say that these products can become concentrated without it being noticed. Actually, the possible passage of radioactivity from the source to man is systematically studied in theory and by experimentation. Sometimes there is concentration, and other times, on the other hand, there is dilution or deconcentration. All things considered, what is important is man and how much radioactivity he can receive.

One begins precisely with the maximum amount of radiation which is authorized as being safe for man and then one traces back to the source and limits it in such a way that the amount is not exceeded. In this way, all the phenomena of transfer through the biosphere are amply taken into consideration.

It should be noted that the nuclear industry has an extremely complete system of standards which the chemical industry has only begun to acquire. These standards, defined by an international committee which was created nearly 50 years ago, take into consideration not only the immediate effects of radiation, but also the possible long term effects.

The risk of cancer or genetic mutation has been the subject of detailed studies. What are sometimes called the uncertain or unknown factors in the biological action of radiation are actually the following: their action is well known in large doses, but concerning the small or very small doses (the only ones which concern the population), no effect has been revealed due to the smallness of the dose (if indeed it does exist) since it is covered up by the "background" of other causes (natural or not) which can produce the same pathological effects. There is a boundary which is almost impossible to cross, which may be applied to all harmful phenomena when they are studied in detail. As a matter of fact, the effects of radiation are much more well known than those of chemical products, natural or artificial, which generally have similar effects.

The standards have taken this "unknown" into account by choosing a very pessimistic hypothesis, supposing that the data obtained on the large doses may be extrapolated to find data for the small doses by a simple law of proportionality. We know that in most cases the effect must be located below the theoretical graph outlined in Figure 2.

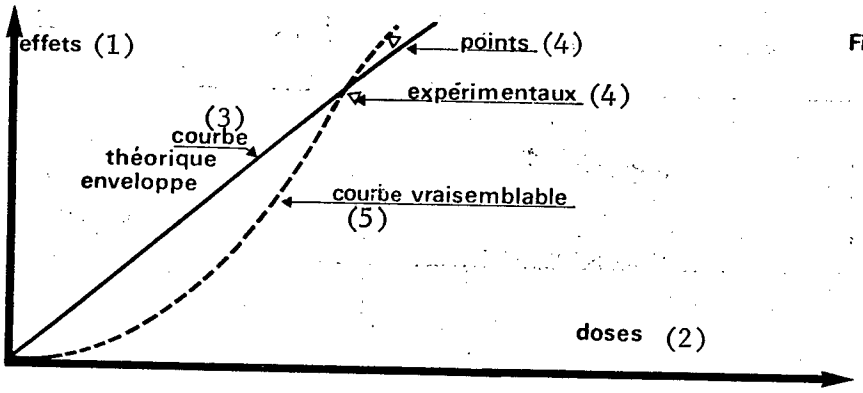

Figure 2

Key: 1. Effects
2. Doses or amounts
3. Theoretical curve
4. Experimental points
5. Probable curve

With some exceptions, the approach used in chemistry and pharmaceutics has been different up until now. In these fields, the hypotheses are far from pessimistic. It is generally agreed that if the experiments carried out on an animal or data obtained on man for a certain dose showed no visible effects, this dose was considered allowable. Radiation specialists do not agree with this way of thinking, which in their eyes lacks caution. Moreover, chemists and biologists are beginning to follow their approach.

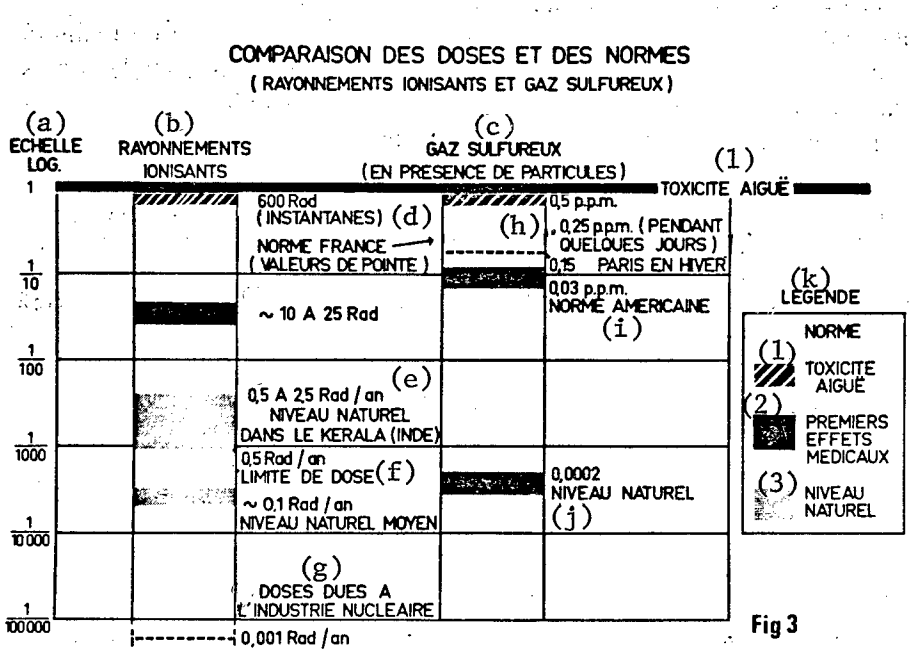

Figure 3. Comparison of Doses and Standards (Ionizing Radiation and Sulphurous Gas)

Key:

a. Scale
b. Ionizing radiation
c. Sulphurous gas (in the presence of particles)
d. 600 Rad. (instantaneous)
   Standard for France (peak values)
e. 0.5 A 2.5 Rad./ year - Natural level in the state of Kerala, India
f. 0.5 Rad./year - Maximum dose
   ~0.1 Rad./year - Average natural level
g. Doses due to nuclear industry
h. 0.25 ppm (during a few days)
   0.15 Paris in winter
i. 0.03 ppm American standard
j. 0.0002 - Natural level
k. Key: 1. Acute toxicity 2. First medical effects
   3. Natural level
1. Acute toxicity

For this reason, the standards used for radiation require safety factors of around 1000 between immediate toxicity and the authorized dose, whereas in chemistry and pharmaceutics, the safety factors are usually around 10. (Figure 3)

Another comparison must be made: between radiation resulting from nuclear energy and natural radiation which we are subjected to everywhere. The complete nuclear cycle emits doses, which are approximately 1 to a few percent of natural irradiation, to the populations near the nuclear plants. Natural radiation may itself vary on a wide scale when one goes from an alluvial plain (Paris) to granitic mountains (Brittany, for example). Compared with this variation, nuclear irradiation seems to fluctuate very little. Contrary to what is sometimes said, natural irradiation has the same characteristics as artificial irradiation. Thus, the comparison made is totally valid (see Figures 4 and 5).

All things considered, if one tries to make a comparative evaluation of the nuclear industry and other sources of energy, one realizes that for an equal amount of energy produced, nuclear energy is 100 times less polluting than fossile energy - coal or petroleum. Once again, this calculation is based on the standards as they exist today, which are less severe for chemical products than for radiation. Moreover, it must be pointed out that plants using coal give off natural radioactive effluents and that for certain of these plants, radiation emitted in the surrounding area is up to 10 times greater than that of an equivalent nuclear plant, without anyone showing concern up until now.

Only the natural gas plants pollute relatively little, but they produce, like all standard thermal plants, carbon dioxide which will one day have long term harmful effects, because its accumulation in the atmosphere will affect the climate. Nuclear energy does not produce carbon dioxide.

On the other hand, like all plants based on the use of a heat source, nuclear energy gives off heat, either into the water (direct cooling), or into the atmosphere (cooling towers). This is a general problem for all industries and even for all human activity. Current nuclear plants dissipate more heat than the traditional non-nuclear plants, but this will not be so with the reactor systems of the future (breeder reactors). The disposal of hot water into the rivers must be strictly regulated. That is why the new plants (no matter what type) use air coolants unless they are built on a coastline where the disposal of hot water will not cause any considerable harm, provided that certain precautions are taken.

Studies are underway - and some ideas have been implemented - to use the diffused heat in agriculture or in fish breeding.

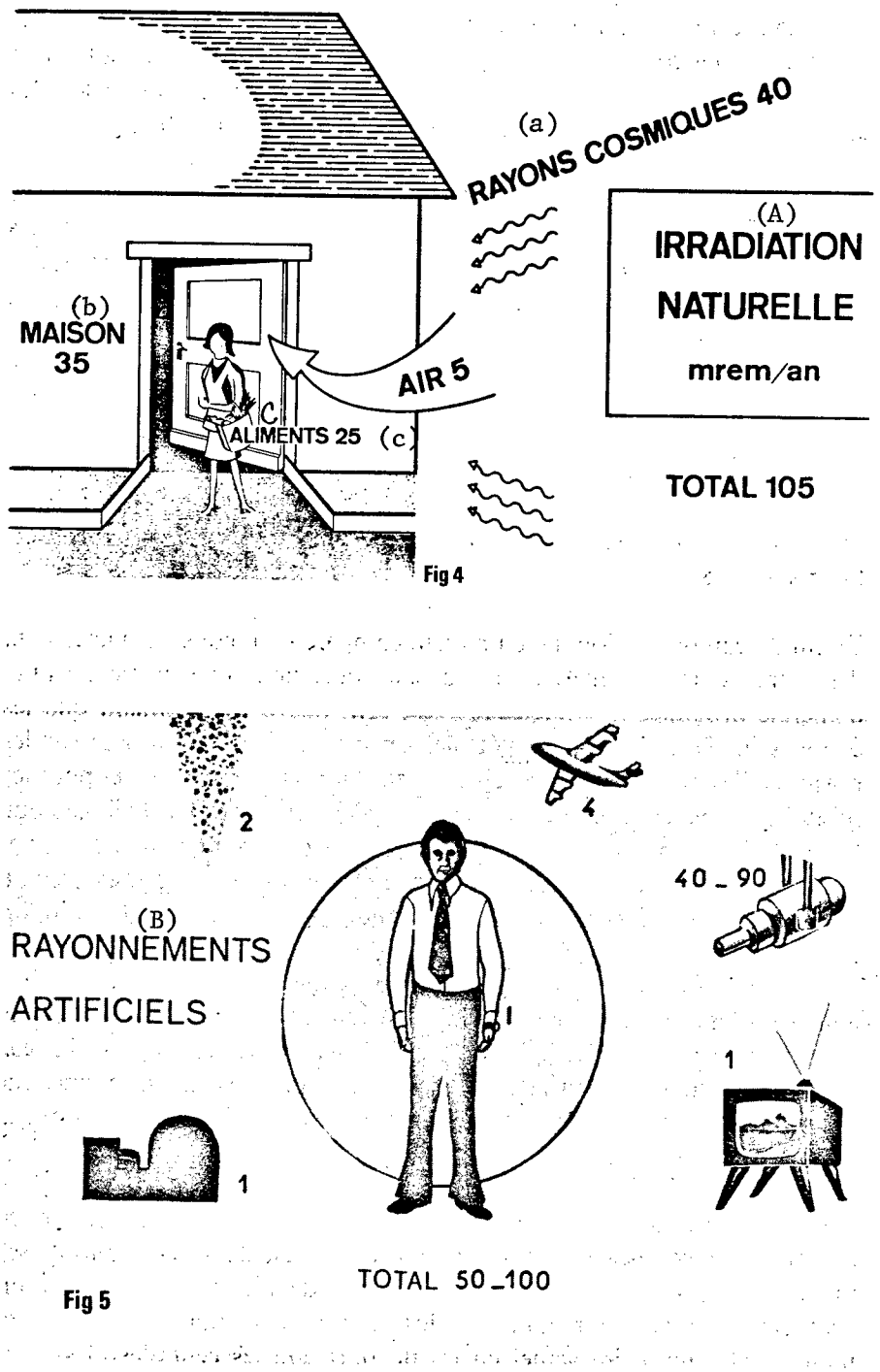

Figure 5

Key:

A. Natural Irradiation (mrem/yr.)
   a. Cosmic rays - 40
   b. House - 35
   c. Food - 25
B. Artificial Radiation

In summary, it is henceforth considered indisputable that nuclear energy is much less polluting than traditional thermal energy (coal or petroleum) at equal energy production levels. This favorable situation nevertheless requires close attention to certain products with long half-lives (tritium and krypton) which accumulate in the atmosphere and could pose a long-term problem. Studies on their absorption and storage are underway. These will be made mandatory even before the problem arises: the nuclear industry endeavors to anticipate the questions it raises, prevention being the best means of protection. (1)

The essential reason why one can act so effectively against pollution in the nuclear industry is due to uranium itself: its great potential energy density is incomparably higher than that of fossil fuels (2). This energy density, which in other respects is a disadvantage (we will discuss this later), has a great advantage as far as harmful effects during normal operation are concerned. The perceptible quantities of products emitted are much less (a few hundred grams per year) than for the traditional plants (approximately 100,000 tons per year of carbon dioxide, for example). Thus, the retention of radioactive products is much easier, more effective, and less costly. Because of this, builders may be forced to incorporate such aspects once industrial adjustments are complete.

Accident Risks

1. A nuclear reactor which has operated for some time contains a very high quantity of radioactivity in its core due to fission products which result from the chain reaction. If these products, which are rigidly enclosed in the reactor (the waste is minimum, as mentioned), were to escape outside the reactor, the environment would be seriously affected. The plants containing the nuclear reactors (and not the related plants) thus present a certain potential risk, but the important thing is to know whether this risk is well controlled.

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(1) This comparison, which is favorable to the nuclear industry, is valid for the entire nuclear cycle, in respect to the population as well as to the workers.

(2) In order to operate for one year (at 75 percent of its maximum power) a 1000 electric megawatt plant needs: 2 million tons of coal, or 1.6 million tons of oil, or 250 tons of natural uranium (pressurized water reactor), used in the form of 30 tons of 3 percent enriched uranium, or 5 tons of natural uranium (fast reactor) used in the form of uranium and plutonium.

There are, indeed, comparable risks in our civilization: we can imagine disastrous coincidences - one often cites the example of a huge transport plane crashing into a stadium during a big game. The consequences would be catastrophic. Such a possibly is ignored in realistic considerations since, no doubt, the chances are very slim that this should occur.

Of course, psychological factors are involved in the idea of risk. Some high risks are accepted, for example, the automobile accidents which kill or seriously injure tens of thousands of people each year in France. This acceptance is due, of course, to the benefits derived from using an automobile. The evaluation of risks and advantages is therefore consciously perceived. The problems of energy production must be dealt with in comparison with other risks, taking into account the benefits reaped. We will endeavor to do this, putting aside as much as possible the psychological factors which are to be considered by those responsible for the realm beyond objective evaluation.

The safety of nuclear reactors depends on a number of principles, and above all on the very rigorous prevention of accidents.

The fission products mentioned above, which create potential risks, are enclosed in leakproof containers which are encased in other containers like Russian dolls, Each container or "barrier" is closely watched. The slightest malfunction is corrected right away, On the other hand, if the soundness of a main "barrier" is endangered, the reactor is shut down.

Depending on the case (Figure 6), there are three or four barriers. The detection of a malfunction and the measures which must be taken must be carried out with great reliability. For this purpose, redundant systems are used whose components function according to different principles: the same cause of breakdown must not affect the various components of the redundant system at the same time. It is also necessary that any breakdown of a major security system leads to measures which reestablish safe conditions in the plant. This is the principle (failsafe system) which already intervenes in the old railroad signal systems: when the signals were activated by iron wires, if one of these wires was broken then the semaphore automatically indicated red, thus stopping traffic. This mechanism is widely used in more and more refined forms, combining all mechanical, electromagnetic, and electronic means.

This continual struggle against all imaginable causes of disturbance implies a precise and in-depth analysis of malfunctions and their consequences. This analysis covers much territory. It begins with the study of local defects and goes on to those accidents which could result from these defects. In the case of a nuclear reactor, the most dreaded accident would be the loss of a cooling system due to, for

example, the rupture of a fluid coolant intake circuit. The probability of such an occurrence and the related circumstances must be evaluated: a severe rupture is improbable. In fact, it would have to result from a small crack which became increasingly worse, hence there are quite strict regulations on the manufacture of channel systems, their control, and monitoring during the operation of the plant. These periodic checks tend to become constant monitoring. With these means of prevention, the probability of a channel system breaking is extremely slight.

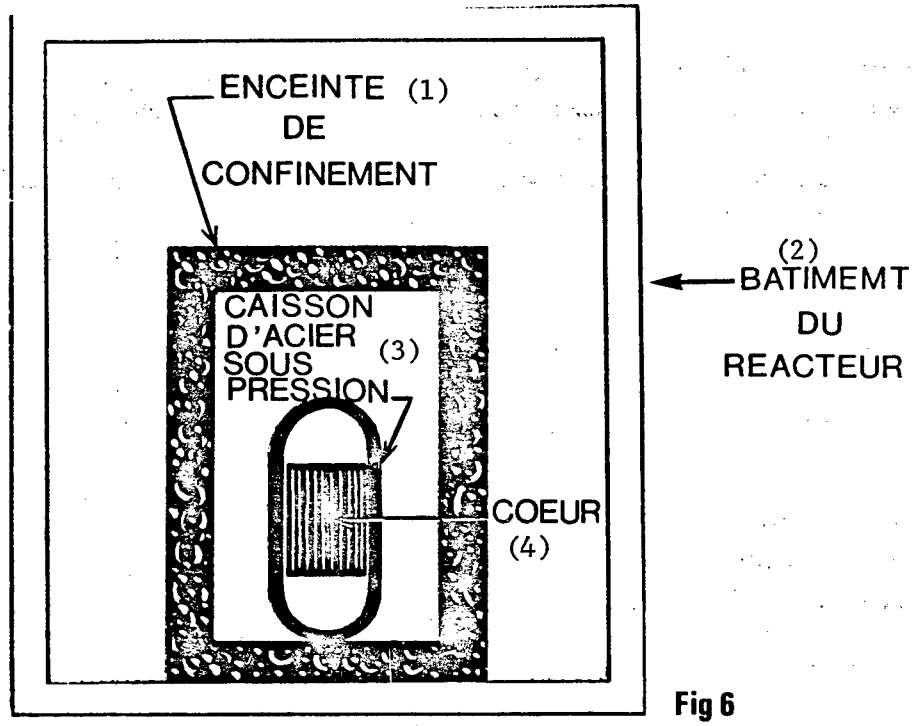

Figure 6

Key:

1. Containment vessel
2. Reactor structure
3. Pressurized steel reactor vessel
4. Core

Suppose, however, that despite all these precautions, a rupture did take place. The technicians take the situation in hand and quickly shut down the plant by pulling out the control rods (with redundance) and turn on an emergency cooling system, which itself has back-up systems, which must ensure the cooling of the core for as long as necessary after the shutdown. Indeed, the residual heat due to the radioactivity of the fission products must be discharged.

All risks are studied in this manner: risks of internal origin as well as those of external origin. For example, falling projectiles (airplane crashes) and earthquakes are systematically taken into account (3).

All of these systems, for the most part, work automatically, but they may be replaced by manpower. Some opponents state that a reactor cannot be safe unless it is technically perfect and the men who operate it are themselves perfect. But, they say, perfection is not of this world, so...

These affirmations do not at all take into account reality, which is completely different: the work of the designers and the safety analysts, on the contrary, depends on systematic doubt as to the quality of the apparatuses and the quality of the men (including their own quality, for they must question, for example, whether they have taken well into account all imaginable circumstances - an impossible task). Thus, additional "barriers" must be introduced which work even if an unexpected failure should arise.

The safety of a reactor depends on its industrial parts being manufactured and checked as well as possible, of course, but its defects must also be taken into account in a realistic and even pessimistic manner. Man himself is not considered to be very reliable, so everything depends not on the hypothetical perfection of man and the machine, but on the the correct use of imperfect human and material elements together in a harmonious way.

In addition, one must take into account that foul play is always possible, especially in a time when violence occurs daily and for quite different purposes. The safety of plants is studied with the view in mind that there may possibly be acts of aggression: the plants are even designed to make foul play as difficult as possible. A special chapter of the safety report, a chapter which certainly has not been widely distributed, is devoted to these problems. We will not enlarge on the subject, but will merely note that dangerous sabotage is indeed very difficult, not only because of the precautions taken, but also intrinsically, because the plant is, in a way, "self-defended" by its complexity and its concrete shields which are found all over the plant.

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(3) For example, the plant must be able to withstand the most severe earthquake ever recorded in the area without shutting down. Safety operations must remain intact during an earthquake which measures high on the Richter scale.

Acts of aggression do in fact occur, but in the sites which up until now have had little protection. Moreover, there have been no serious effects on the plants themselves.

2. The technical analyses which were just discussed would be insufficient if the rigorous authorization and inspection procedures of the nuclear plants along with effective organization were not established. Indeed, the studies which lead to the establishment of a safety report must be mandatory and systematic, there must be communication between the analysts and the builder, and all the local or national services concerned must be consulted.

In France, this procedure is regulated by a legislation of so-called "basic nuclear facilities" which include plants as well as factories and waste storage areas. Without going into detail, let us say that this procedure is centralized. It activates groups or committees established either at the interministerial level or at the level of the Minister of Industry (specialized headquarters, standing committees). These are active organizations or advisory ones. The "Commissariat à l'energie atomique" [Atomic Energy Commission, in France] supplies the majority of technical support for safety examinations.

Authorization is given, after public investigation, by a decree signed by the Prime Minister. An interministerial committee is consulted. Moreover, the Health Minister, a member of this committee, has, in short, the power of veto.

The inspection is organized at the level of the Ministers of Industry and Health. It is twofold, dealing, on the one hand, with the plants, and, on the other hand, with the radioactive waste.

3. What do the results show? The method explained above was completed in England, and then in the United States, by probability calculations on the accident risks. This method used and perfected the best safety and reliability analysis systems used in aeronautics and defence, among others. In the United States, a group directed by Professor Rasmussen of M I T was given the task of answering the question asked universally by the public: we really want to believe that the technicians take many precautions, but can the outcome be calculated? What are the chances that a serious accident would occur, and how extensive would such an accident be?

Rasmussenn completely "probabilized" the risk studies for the first time, and he compared the potential accidents in the nuclear industry to the consequences of natural events and human activity. Statistics show what natural events and human activity have done, whereas, no major accident has ever

occurred in the nuclear industry: this certain advantage of nuclear energy generally stands in the way of this study, since, under these circumstances, it hinders the comparisons.

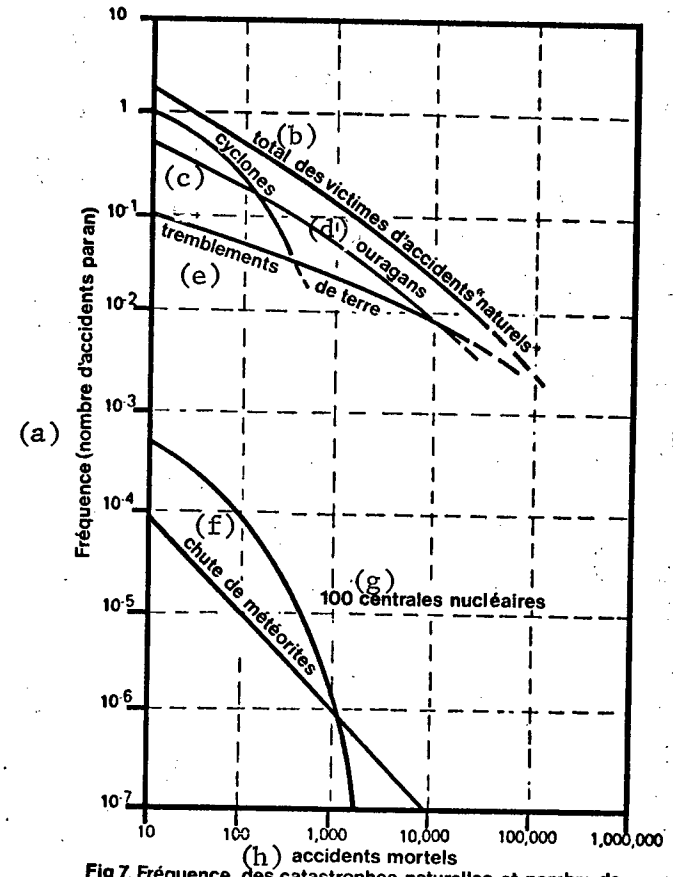

Fig 7. Fréquence des catastrophes naturelles et nombre de pertes

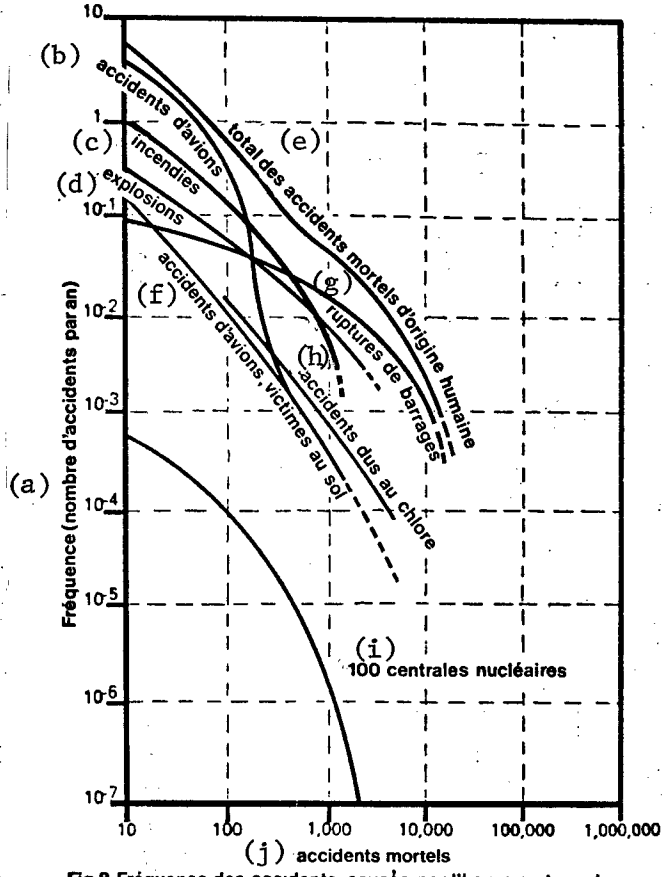

Fig 8. Fréquence des accidents causés par l'homme et nombre de pertes

Risks linked with the industrial use of nuclear energy

Figure 7. Frequency of natural catastrophes and number of losses

Key:
a. Frequency (number of accidents per year)
b. Total victims of natural accidents
c. Cyclones
d. Hurricanes
e. Earthquakes
f. Meteorite showers
g. 100 nuclear plants
h. Fatal accidents

Figure 8. Frequency of accidents caused by man and number of losses

Key:
a. Frequency (number of accidents per year)
b. Airplane accidents
c. Fires
d. Explosions
e. Total fatal accidents caused by man
f. Airplane accidents, victims on the ground
g. Dam ruptures
h. Accidents due to chlorine
i. 100 nuclear plants
j. Fatal accidents

The curves outlined by Rasmussen - of necessity theoretical - are revealing (Figures 7 and 8). One hundred high power nuclear reactors cooled by light water, operating in the United States, constitute a much smaller risk (1000 times smaller) than all of the risks suffered by man. Only the probability of serious accidents caused by showers of large meteorites (certainly a very slight probability) can compare to the probability of nuclear accidents.

At first, these results were questioned, but the "Rasmussen report" was published only after a complete analysis of the objections raised, following the project's dissemination.

This report is, of course, theoretical, but the calculations were made from realistic "failure rates" of the components, taken from actual experience. The overall results inevitably involve some error, let us say give or take 10 units, but the safety margin, in relation to the other causes of accidents, is such that taking into account the most pessimistic error would not change the meaning of the conclusions.

Moreover, even though these nuclear plants have actually undergone some occasional major incidents, as all industrial plants, the safety systems listed above have always operated properly so that the population has never suffered. This applies to some 200 plants operating at the current time (around 70 of which are high-powered) as well as to submarine reactors. This experiment totals around 1000 cumulative years of industrial plant operation, to which are added 1000 to 2000 cumulative years of submarine reactor operation.

The safety of the workers is also satisfactory. The accidents recorded are of conventional nature, such as falls or electrocutions, but the overall accident rate is one of the lowest in industry. (It is comparable to that of the clothing industry).

There is one final question which is especially current: From the viewpoint of safety, are there "good" plants (such as the "confirmed" gas and light water plants) and "bad" plants such as the breeder reactors (the Phoenix or Super-Phoenix)? In other words, is the Super-Phoenix especially dangerous, enough to be an unacceptable risk for the surrounding population?

Later we will return to the problem of plutonium, another segment of the report. Raising the problem of accidental risk alone, we will say that that the safety studies made on the breeder reactors, with the same strictness as with the light water plants, revealed no "defect" in these plants which would make them unacceptable. Of course, the presence of sodium as a coolant presents special problems due to its inflammability in air or water, but the preventive measures taken and the defense mechanisms set up have proven to be very effective.

Have we not the 10 years of experience in operating the Rhapsody and 4 years with the Phoenix?

On the other hand, although sodium presents serious drawbacks, it offers a substantial advantage, that of not being under pressure. For it is the water pressure, in the cases when this fluid is used which cause special risks if a channel system should rupture. There is no comparison.

There are other differences which arise between the two types of reactors, in one way or another, but the conclusion is clear: The safety criteria used for one or the other reactor system are the same: some people object to what they call an excess of precautions taken by the breeder reactor specialists. The preventive measures and apparatuses serving as defense mechanisms in the event of an accident are in all respects comparable. There is no reason to say that the safety of the breeder reactors is inferior to that of the water reactors.

In conclusion, although it is correct that reactors present potential risks for the environment and the population, the measures taken on the technical and administrative levels allow them to be considered as especially safe industrial apparatuses in actual use.

Special Risks: Waste, Plutonium

1. The harmful effects due to waste and plutonium are practically nonexistant at the present time, but in the eyes of the population, they represent high potential risks, of diversified nature (including the political level) which are lasting (involving the far-off future, therefore the future generations).

This concern also involves waste treatment and its storage, which is difficult to accept, and the transportation of radioactive materials.

First of all, let us quickly settle the problem of transportation: in the case of an element of high radiotoxicity, the precautions taken are such that a transportation accident has never had, nor will never have in the future, extensive radioactive effects on the public. To think that the transport containers used in these cases (Type B) must withstand successively, without leaking, an 8 meter fall onto a slab of concrete, contact with sharp objects, followed by a 1000 degree fire for a half an hour. It would be desirable to make the transportation of other dangerous materials subject to similar regulations.

However, the transportation of these radioactive materials presents the problem of conventional accidents, without radioactive

effects, because it is done more and more often, and heavy equipment is often used (sometimes, when irradiated fuel is involved, large convoys are used). For these reasons, road transportation must be replaced, as often as possible, by railroad transportation.

2. Let us now approach the essential problems: Is there a policy for radioactive waste? Do we have valid solutions to the problems which it presents?

In fact, a distinction must be made between two rather distinct categories of waste: the low-level waste and the high activity waste. In each case, there are two subcategories according to whether they have a short or long life.

The low-level waste which has a short life presents few problems, except on the psychological level. It can be stored above ground, provided that a number of precautions are taken to isolate it from the surrounding environment. When it has ceased to be radioactive, after a period of time which varies from a few years to a few dozen years, the problem is solved: the site need no longer be restricted. This will be the case for Infratome, near La Hague, which is currently the only permanent site in operation in France.

There are large quantities to be stored, however, they are less than the amount of waste produced by coal plants. Two storage centers for low-level nuclear waste (including the center already established), each measuring a few dozen hectares, will be sufficient up until the end of the century.

What deserves our closest attention, are the low or high activity wastes which remain radioactive for long periods of time. High activity waste always contains "long-lived" products so that it presents both risks.

What are high activity wastes? They are fission products which are carefully enclosed within the reactor in nuclear fuels, which are then separated and isolated in reprocessing plants where residual uranium and plutonium are recovered.

Fission products generally have relatively short half-lives (4), varying from about a few seconds to a few days or a few dozen years (approximately 30 years for strontium and cesium). These products would become inactive rather rapidly by radioactive decay if they did not contain elements with much

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(4) The half-life of a radioactive element is the length of time necessary for the element's level of activity to decrease by one half.

longer half-lives. These elements are called transuranic elements because they are found after uranium in the periodic table. They are relatively few in number: plutonium in minute quantities, americium, and curium, but all have half-lives ranging from a few hundred to a few thousand years.

It must be pointed out that the group of "transuranic fission products" (for simplification we will call them "fission products" or F.P.) contain around 99.9 percent of the activity contained in slug.

What do we do with these products? What do we plan to do with them in the future? Will they be a burden on our distant descendants? The policy which is followed consists of three phases:

Phase One: In the reprocessing plant, the F.P. appear in liquid form. They are kept (in France and in England) on the plant premises in stainless steel vessels having double walls, where they are cooled by coils. Possible leakage through the first wall would be immediately detected and the liquid would be transferred into vessels which are normally kept empty: the procedure is very safe. It has never caused any difficulties. There are no harmful effects on the population.

However, the storage of a very radioactive and corrosive liquid presents problems: the life of these vessels is estimated at about 50 years.

Phase Two: The F.P. must be solidified. Moreover, this was recommended by the International Atomic Energy Agency. In France, a vitrification process has been perfected. A pilot plant has been operating for 6 months in Marcoule, and a permanent plant is being opened. The liquids are expected to be solidified after storage in cooling vessels for a period of approximately 5 years.

Sheets of glass are produced by vitrification, which are easily stored, always on location, in concrete wells. This storage requires cooling for a period of only a few years. The glass has very low solubility, so that it alone makes an excellent barrier against the leakage of radioactivity to the outside. A leakproof container and the concrete well are two other barriers.

The major problem is the stability of the glass subject to its own radioactivity. This stability is being actively studied. The tests which have already been carried out allow one to affirm that the glass will remain stable (in other words, it will not crystalize, and thus risk breaking) for several hundred years. This is the exact amount of time needed for the fission products to decay (excluding the

transuranic elements).

It thus can be said that the problem of storing F.P. in solid form is resolved, provided that there is some monitoring over a period of a few hundred years.

Phase Three: The transuranic elements, however, require a much longer storage period. Constant monitoring over the generations, under unknown historical conditions, cannot be ensured.

Unmonitored storage can be conceived, in the future, in inaccessible places. Besides possibly sending it into space, the projects which have been most thoroughly studied are storage in geological formations, for example in salt (a solution chosen in Germany), granite or clay. Storage of this type could be done on land or under the sea (5).

Another solution, which is also being studied, and which is especially attractive, would consist of separating the transuranic elements in order to either store them separately (their volume is then very slight), or to irradiate them in a nuclear reactor. They would be then transformed by fission into products with short lives. This would work best with fast breeder reactors: the neutrons which "burn" the plutonium can also burn the other transuranic elements having similar properties.

Chemical separation is currently feasible in the laboratory. Its industrialization is difficult and costly, but studies are continuing.

In addition, the problem which fission products present must be well defined: their volume is very slight: per person supplied in electricity from a nuclear plant per year, they represent 2 or 3 grams of glass, or for the entire French program, in the year 2000, a cumulative volume of around 3000 cubic meters, which is not very much.

On the other hand, the harmful radioactive effects of the transuranic elements (alone after separation or simply after the decay of the fission products) was compared to that of uranium ore from which they are created. Their radiotoxicity equals 1/10th that of the ore in the case of water reactors. It is equal to that of ore in the fast reactor systems.

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(5) In the latter case, these products would not simply be submerged, but they would be buried in a well bored in the ocean floor.

If, therefore (in theory) transuranic elements were placed in a mine in the exact spot where the ore had been extracted, occupying the same volume when combined with an inert product such as clay, the harmful effects on the environment would be less or the same as the natural harmful effects. Thus, the extent of the problem must not be exaggerated.

Slightly radioactive products containing elements with long half-lives will probably be stored in geological formations. It may be presumed that their low toxicity makes the problem easier to solve.

In conclusion, contrary to commonly expressed opinions, highly radioactive waste is the subject of systematic studies which have allowed a processing and storage program to be set up in three phases. Only the final phase is still in its experimental stage, but it need not be implemented right away. It would not be desirable today to implement a permanent solution to storage, when new methods may appear following the studies in progress. Also, it has been decided that during the experimental period, the storage systems which have been set up must be reversible.

Generally speaking, the policy concerning waste consists of avoiding their leakage, namely by recycling the products so that, for example, small quantities of transuranic elements do not become mixed with low-level waste, and thus the amount of low-level waste containing elements with long half-lives is decreased as much as possible.

As much as possible, we must deal with solids rather than liquids; hence a systematic policy of waste solidification which does not apply only to highly active waste.

Lastly, it is necessary to keep excellent records of all waste products. In connection with this, it must be pointed out that the nuclear industry is not the only one which produces radioactive waste. After the use of artificial radioelements, which is quite widespread in hospitals, laboratories, and industry, there are "used elements" which must be stored. The total radioactivity of these products is much less than that of nuclear industry waste, but when the latter are subject to systematic control, the radioelements are much more dispersed, and thus much more difficult to keep track of. This aspect of the problem must not be overlooked.

3. Plutonium is currently the object of great fear. It is true that it is a dangerous element. But other nonradioactive substances present comparable risks. The plutonium supplies as they exist in several countries (civil or military stocks) present practically no risk to the population due to the simple regulations adopted. The risks taken in terms of health

are, in any case, certainly less than the potential risks due to current toxic products which are often quite widespread and poorly monitored.

Plutonium is dangerous when inhaled, but much less so when consumed. Thus, its dispersion in the form of aerosols must be avoided. Usually it is stored in the form of calcinated oxides. Its dissemination is inconcevable except during its preparation (local dissemination) or in the event of an accident.

It is the workers in the plants who are exposed much more than the population. However, the precautions taken lead to a satisfactory situation as far as doses received are concerned.

Any reactor contains plutonium as a result of its normal operation. In the case of an accident, which is very improbable, the plutonium would become mixed with the fission products, which must be avoided through measures which have been described. The breeder reactors contain more plutonium than the other reactors, but the difference is not very considerable. From this point of view, the existence of breeder reactors does not, therefore, create a very different problem.

Moreover, if one is concerned about the plutonium stocks, isn't the breeder reactor the means of reabsorbing the stocks,since it constitutes the most rational use of this metal?

To conclude, we will bring out the two fears associated with plutonium, which are beyond the purely technical realm: some plutonium could be stolen and used either to poison the atmosphere of a town, or to build an explosive device by an independent or military group. The latter case is the risk of nuclear proliferation (weapons are implied) which tends to become a psychological and political problem of major concern.

The risk of theft is reduced thanks to the precautions taken. It is essential to know that if a theft should take place despite all precautions, administration of a killer aerosol, by dispersion in a fire, for example, is not easy to do. In fact, it is not very dangerous except locally, for the perpetrator and the people in the surrounding area. The atmosphere of a town would in no case be contaminated significantly in this way.

A rudimentary explosive could, of course, be built by an independent, but with great problems in implementation (for handling plutonium is not easy). The effect of such a device would certainly be more serious, while remaining approximately of standard intensity for an explosion, than the simple production of an aerosol by fire. The

protections adopted against the embezzlement of materials are considerable and can prevent such an occurrence. The American physicist Theodore Taylor, who himself raised this question, gave the latter solution.

Detection means have become very precise, and physical protection in the storage and transport of fissionable materials extremely sophisticated. Under these conditions, extortion would have to be at the root of a hypothetical theft. If records of these materials are well kept - and they must be - fraud would be quickly detected.

In this connection, one often speaks of the supposed thefts of fissionable material which might have taken place in the United States or in Great Britain. These are in fact uncertainties due to "losses" of material during the transformations which it undergoes. This can also be the result of errors in cumulative measurements. The "lost" products, when they exist, are actually in the waste.

This means that records must be made in substantial time, so that a discontinuity corresponding to a theft may be detected immediately.

The real problem of plutonium is the risk of arms proliferation on the international level. This is beyond the scope of an article which is limited to discussing the harmful radioactive effects of the nuclear industry.

We will be content with making a few basic remarks:

Nuclear weapons may be developed from highly enriched uranium as well as plutonium. Uranium is much easier to handle than plutonium. This destroys the argument that the introduction of breeder reactors, which leads to the systematic extraction of plutonium from irradiated fuel, would be intolerable. Simple means of enriching uranium are now known (ultracentrifugation) which allow highly enriched uranium to be obtained with relative ease (6).

There are technical means which tend to considerably diminish the risks of proliferation. To mention only plutonium, it can be pointed out that if fuel manufacturing plants are placed near reprocessing plants, the transporting of "pure" materials would be avoided: the fuel sent to fast reactors contains a mixture of natural uranium and plutonium which makes it almost unsuitable for military use. One would have to have a plutonium extraction plant exactly as in the case where one would want to use plutonium produced by a

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(6) See C. Fréjaques, D. Gourisse and J.C. Guais: "Uranium Enrichment: the French Chemical Process" in Defense Nationale, October 1977.

water reactor.

Consequently, the construction and operation of these plants must be strictly controlled. The International Atomic Energy Agency has an inspection service which is carried out whenever any plant or factory is constructed. Other measures may be added to these controls. Strict prohibition of reprocessing is not the solution: it could lead to clandestine operations.

Nuclear proliferation is not necessarily linked to the existence of a civil nuclear industry. None of the six nations which have developed military nuclear programs has used a nuclear plant to obtain its fissionable material. None have violated the international control agreements.

The risk of nuclear proliferation has existed since man discovered fission, and this knowledge is irreversible. The basic material, natural uranium, exists all over the world and cannot be controlled. Of course, technical measures must be taken to control the use of fissionable materials and to prevent their embezzlement. But the basic problem is political. Harsh prohibition is not a valid solution.

Conclusions

We can henceforth draw some conclusions about the risks presented by the nuclear industry.

The harmful effects which it causes during normal operation are much less than those of traditional coal and fuel oil plants. From this standpoint, the replacement of traditional plants by nuclear plants would be desirable even without an increase in energy production.

The potential accident risk is high, but the safety methods used decrease the actual risk to a level much lower than that of other human activities.

Generally speaking, let us observe in this connection that in most cases these are not spectacualr accidents (subjects of films and scandalous articles) which count the most in the safety and health of man. They are most of all the harmful effects which occur daily, the constant and almost invisible impairments to health or individual accidents. Nuclear energy proves to be quite favorable in this way.

Although the harmful effects during normal operation are the major concern of the workers and the population, that does not mean that the possiblilty of accidents, which is

currently much feared, should be overlooked. We say "currently", because although the present situation is good, we must in the future maintain tight controls and the methods used, and beware of laxness which comes with routine if one is not careful.

The problem of waste is also well solved at present. The studies undertaken are preparing for the future.

Plutonium is not a demoniac product, but certainly it must be handled cautiously. It is a professional problem much more than a risk to the population. The mainly political problem of nuclear proliferation is a real problem, but it affects all fissionable materials and not just plutonium. It is far from being linked only to the development of civil nuclear energy.

If, in comparison with these risks (acceptable since they are much less that those which man is usually subject to) one evaluates the advantages of nuclear energy which, for the next 20 or 30 years, is the only source of energy which can give us true independence, can one really hesitate as to whether it should be used?

8895
CSO: 5000

GOVERNMENT TO WAGE CAMPAIGN AGAINST OIL POLLUTION

Oslo AFTENPOSTEN in Norwegian 1 Dec 77 p 15

/Article by Georg Parmann: "Keep Skerries Clean:--Fighting Oil Pollution Main Task in 1978"/

/Text/ For the time being there is no talk of deescalating the "Keep Skerries Clean" campaign. This was brought out at the council meeting which ended last Wednesday. The council was in complete agreement that the main task in 1978 should be fighting oil pollution in the skerries.

"The campaign "Keep Skerries Clean" is entering its fifth year. We aim to dissolve this committee as soon as ongoing efforts can be established in this area. There are many unfinished tasks ahead of us and the skerries are being used more and more, which will make us needed for some time " council chairman Jacob Henriksen tells AFTENPOSTEN.

We think there has been a marked improvement in the use of the skerries since we began the campaign 4 years ago. In the beginning our efforts were primarily directed toward surface pollution. Significant improvements have been made in this area, in spite of the fact that the skerries are being used a great deal more. We have taken an important new step in this connection by introducing new regulations which prohibit ships from dumping waste into Norwegian waters, effective January 1978.

Oil pollution, which is the main theme of the 1978 campaign, is just one of the things we have not done enough about. We are not just concerned about oil spills from tankers and the like, but the many small drops from various activities. Small boat owners changing motor oil and waste from inland plants, for example, can create pollution. These many small sources represent a considerable pollution threat.

The campaign has gradually become more than an attempt to clean up waste. We have become an environmental protection organization in the strictest sense and the skerries are our concern. This means we are also interested in the growing erosion of the skerries and its consequences. For this reason we are fully supporting the recently proposed plan to preserve the seabirds in Oslofiord.

We are also trying to develop educational materials that can be used in the schools. This wide-spread desire was also expressed at the council meeting, says Henriksen.

Environmental protection inspector Magnar Norderhaug presented a tenative plan for the preservation of seabirds in Oslofiord. AFTENPOSTEN discussed this plan in detail earlier. Norderhaug was able to report that the plan has gained support in a number of places. The Ministry of Environmental Protection is now soliciting opinions on the plan and, based on the support from counties, organizations and individuals, we are encouraged to continue the work, says Norderhaug.

Deputy Per Hysing-Dahl was elected chairman of the "Keep Skerries Clean" Council, succeeding professor Olav Gjarevoll who declined reelection. Sylvi Struksnes, assistant editor for Norway's Environmental Protection League, was elected new vice chairman of the council.

8952
CSO: 5000

'BRAVO' SPILL CAUSES DRILLING DELAY IN NORTH

Oslo AFTENPOSTEN in Norwegian 2 Dec 77 p 24

/Article by Bjorn H Tretvoll: "No Drilling in North Till 1980"/

/Text/ Drilling for oil north of the 62nd parallel will be delayed until 1980 at the earliest. The reason is that the Ministry of Industry refuses to submit the announced report dealing with safety measures in connection with oil activities in the north until Parliament has had a chance to deal with the analysis of the Bravo accident, which will be submitted early next year.

It is doubtful that Parliament can decide the question of exploratory drilling north of the 62nd parallel until fall 1978. This will hardly be in time to begin drilling in 1979, even if Parliament gives an all clear.

The Ministry of Industry's information secretary Trygve Tamburstuen tells AFTENPOSTEN that Parliament cannot submit the analysis of the Bravo accident until February/March next year. The analysis will be based on the report that has been submitted by the investigating commission, together with a report which is now being compiled by the action board. Parliament will hardly be able to discuss this analysis until April/May.

According to what AFTENPOSTEN has learned, the report which deals with safety measures in connection with oil activities north of the 62nd parallel will hardly become available until some time after Parliament has had an opportunity to discuss the Bravo analysis. Most likely, the report will not be submitted until the very end of the 1978 spring session or early in the fall session.

Therefore, Parliament will not be able to decide the question of drilling north of the 62nd parallel until the 1978 fall session. It has been suggested that from the time Parliament passes a resolution to start drilling it will take almost another year to make the necessary preparations before the actual drilling can begin.

8952
CSO: 5000

ENVIRONMENTAL REPORT SAYS NOISE IS OSLO'S BIGGEST PROBLEM

Oslo ARBEIDERBLADET in Norwegian 14 Dec 77 p 14

[Article by Kare J. Andersen]

> [Text] Oslo's environment is good, but there are two areas in which a warning is in order. Firstly, there is traffic noise. Noise is without doubt the environmental pollution that affects the most people in Oslo. Over 24,000 houses with more than 50,000 people are so located that they should be protected against traffic noise. Air pollution is another problem for the capital. Here Oslo is particularly exposed because of its topographical position. The town is located in a valley, and the polluted air often hangs over it.
>
> This information appears in a report, Status 77, by Oslo's Health Department for Nature and Environmental Protection.

The report contains the first overview of Oslo's natural resources and the major pollutants in the environment. The origin of Status 77 is a City Council resolution of December 1974, which asked for a complete report on Oslo's environment and on the environment's interaction with human health and well-being. The report will now be presented to the directors and the City Council.

The person mostly responsible for work on Status 77 is chief engineer Pal Vartdal, who is at the Health Department for Nature and Environmental Protection.

"Does Oslo have a good environment to offer its citizens, Pal Vartdal?"

"On the whole the citizens of Oslo are lucky. However, there are two areas that we should focus on. In the first place there is traffic noise. Noise pollution is the one that affects the most people here in the city. Noise has in many ways been ignored as an environmental problem. The reason could be that it is difficult to measure the problems that noise creates for many different people."

Air Pollution in Oslo

Air pollution is another problem for the city. Its topographical position makes Oslo especially vulnerable to air pollution. What happens, especially in the winter, is that the temperature is higher in the uppermost layers of the atmosphere. We can see that the temperature is often higher in winter on Tryvann than on Blinden. When this happens, the warmer air sits like a lid over the city. The contaminants remain under the lid. In the summer the polluted air is blown away during the night, but in the wintertime many days can pass without any vertical air mixing. If we are to deal with the problem, we must attack the cause of the air pollution. We cannot do much about the weather, says chief engineer Pal Vartdal.

Noise--Oslo's Biggest Environmental Disturbance

Noise, which is often defined as undesirable sound, is an environmental disturbance that affects a lot of people every day in Oslo. A noise chart of the city indicates that there are over 24,000 residences so located that moves should be taken to protect them against traffic noise.

In Sweden an indoor noise level of 40 decibels (dbs) (A) is considered the lower limit to justify action aimed at improving the situation. This is equivalent to an outside noise level of 65 dbs (A).

The noise chart for Oslo shows that there are a total of 24,100 residences which have an outdoor noise level of 65 dbs (A). Of those 1,800 are exposed to a noise level of between 75 and 80 dbs (A). Among the hardest hit streets are: Mosseveien, Store Ringvei, Waldemar Thranesgt. Bispegata and Radhusgata.

Seven Watercourses inside Oslo

The report also takes a general look at the city's water supply. Today the city gets its drinking water from Langlia, Mariadalsvannet, Alunsjoen, Noklevann and Elvaga. Water consumption is about 200 liters per person

a day. The city's drinking water resources will cover demand until the year 2000, provided work to plug leaks on the pipe system continues.

The report indicates that there are seven major waterways in Oslo: Lysakerelva, Merradalsbekken, Hoffselva, Frognerelva, Akerselva, Loelva and Ljanselva.

Investigations show that all the waterways are heavily polluted at the mouth of the fjord. This is caused directly by sewage outlets and an old sewer system. Almost the entire Merradalsbekken and large parts of Loelva are very polluted. In Akerselva conditions have improved during the last couple of years. Bogstadvannet is in part significantly polluted and is moreover threatened by overgrowth. Ostersjovann and Gjersrudtjern are also heavily polluted.

The report confirms that the waterways and major lakes close to the city must be investigated and protected further. The work to sanitize city and private outlets must continue as well.

8743
CSO: 5000

DISCOVERY OF LEAD IN WINE SPARKS INTEREST IN TESTING

Oslo AFTENPOSTEN (afternoon edition) in Norwegian 16 Dec 77 p 22

[Text] Red wine analysis is not one of the big assignments of the Central Institute for Industrial Research. But the investigation of lead content in homemade wine has attracted so much attention that the institute must work hard to finish its million projects for Norwegian industry. But man does not live by industry alone, as we know.

The red wine example shows that the Central Institute's tasks come in all sizes. And although exploratory projects for the oil platforms in the Statfjord A field cost a thousand times more than small projects, as the administrative director, Kjell Roderburg is fond of mentioning, the latter ones are much more numerous. While the institute works on between 200 and 300 major projects a year, there are 10 times more small projects, from red wine analysis and coffee taste tests to well-water analysis for individuals. Anyone can come in with his problem all wrapped up and ask to have it solved, as long as the task is within the capacity of the institute and the client is willing to foot the bill.

"What is the institute's field of action?"

"Our field of action can be divided into four main categories: data system development, electronics, materials research and industrial chemistry. Most small projects are within the field of chemical analysis," says director Roderburg.

"One could theoretically come in with a bottle of well-water from one's summer cabin and have it analyzed by you?"

"Not only theoretically; we perform many such small tasks every year, including water analysis."

320 Employees

The Central Institute for Industrial Research, or SI as it calls itself for short, was established in 1950 by the Norwegian Technical Research Council of Natural History, which is under the Industry Department. The institute gets 44 percent of its funds through support projects from it, while 56 percent is from projects for commerce, official institutions or individuals. Today SI employs 320 people.

Among the most interesting projects lately we can mention that researchers from SI saved Oslo millions of kroner in investments for a ventilation tunnel for foul air from the Bekke Company's cleaning plant. By combining the gas with enough clean air, it could be released right there without disturbing passersby. In this case the researchers' noses were used as one of the research tools. In other instances taste buds are the most reliable instruments, as in coffee tasting experiments.

We should not think that the researchers at SI sit around most of the time tasting coffee or red wine during working hours. The technical-chemical analysis technique of the institute is well respected. Or as Roderburg says: the flow of assignments indicates that clients regard us as competent to handle the tasks that they give us.

The Criminal Police Department is among those who use SI for difficult analysis projects. When the clothes of a defendant are vacuum-cleaned for particles that are analyzed and compared to particles from the place in question, it is often SI that does the analysis.

"Turning back to the red wine case, the Wine Monopoly has indicated that the charges against the wine are not relevant. Has SI undertaken research that is not in keeping with the good name and reputation of the institute?"

"Our part in the project consists of the analysis of the wine itself. The assignment was given to us by the magazine KJEMI, through its editor, and it was the client who chose and decided what kind of a test the material under analysis was put through. We have not taken a stand on whether this is relevant or not. I do not think that any other authority can dispute the accuracy of the analyses," director Roderburg says.

8743
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MEASURES NEEDED FOR GOLDEN HORN RECOVERY REVIEWED

Istanbul MILLIYET in Turkish 29 Dec 77 p 2

[Article by Prof Dr Semih Tezcan, member of the Bogazici University teaching staff, in the column "Thinking Men's Thoughts": "Let Us Rescue the Golden Horn and Vicinity!"]

[Text] The General Directorate of Railway, Sea Port, and Airport Construction of the Ministry of Public Works, in accordance with the protocol that went into effect in April 1975, assigned to the Bogazici [Bosporus] University the task of preparing a master plan for Istanbul's Golden Horn. The plan encompasses studies that come under the headings of dredging, shore rehabilitation, overflow, transportation, and settlement, with a view to rescue the Golden Horn from the current conditions caused by pollution and disorderly settlements, and to clean up, revitalize, and improve the area.

The Bogazici University completed the Golden Horn Master Plan in June 1977, and submitted it to the Ministry of Public Works.

During the preparation of the plan, a survey was conducted among the 700 business establishments along the Golden Horn and its streams. The survey yielded extensive data on the nature of services supplied by these establishments, the surface area occupied by the business establishment and the floorspace of the building, personnel, water and electricity needs, waste material produced, and transportation and development prospects of the area. The situation at the Golden Horn and its shores, historic and cultural centers were photographed from the ground and from the air. Historic, cultural, and tourist attractions situated around the Golden Horn, which will have to be protected, cleaned, and restored, were enumerated.

What Are the Goals?

The primary goals of the Bogazici University's Golden Horn Master Plan can be summarized as follows:

1. A majority of the business establishments, storage facilities, warehouses, ship dismantling yards, lumberyards, the Vegetable and Fruit Market, and the

Slaughterhouse will be relocated in the predesignated new sites within the Istanbul metropolitan area, thereby returning the shores of the Golden Horn to the people of Istanbul. The Greater Istanbul Regulatory Plan Bureau has put aside nearly 6 million square meters of land around Istanbul as settlement areas and organized industry regions. No more than 2 million square meters of this area will be needed to relocate the Golden Horn establishments. The Silahtaraga Power Station, which burns imported coal and is a major air polluter, will be either dismantled completely, or relocated elsewhere, when the Orhangazi, Can, and Soma thermal stations go into service.

2. The section of the sea between Balat and Eyup will be dredged to make the waterway suitable for sea transportation.

3. The section of the Golden Horn between Eyup and Silahtaraga will be filled to create a 70-hectare area which will be turned into a regional national park.

4. The waters of the Golden Horn between Eyup and Silahtaraga will be divided into two lanes to separate traffic into opposite directions.

5. The shores of the Golden Horn will be renovated with screens and walls; landing facilities will be built to accomodate marine craft.

6. Precautions will be taken against floods and erosion. Banks of the streams will be forested.

7. A major artery and two roads with controlled lanes will be constructed on the coastal strips along the sides of the Golden Horn.

8. An underground tube will be constructed below the roads on both coastal strips to house water, sewerage, PTT [Post, Telephone, and Telegraph Directorate], and electric power facilities.

9. Religious, historic, and cultural nuclei--a total of 40 works of art, 8 from the Byzantine and 32 from the Ottoman eras-- will be rendered easily accessible and restored.

10. The area around the Eyup Sultan compound will be cleared, the buildings will be transformed into a religious, tourist, and cultural center.

How Will It Be Done?

Achievement of these goals requires the accomplishment of the following:

1. The Golden Horn Master Plan must be adopted and approved by interested ministries, the government, the State Planning Organization, the High Planning Council, and the municipalities of Istanbul and vicinity.

2. An "Istanbul Metropolitan Service Association," with special powers and status, and with financial and administrative autonomy, must be formed to implement the Golden Horn Master Plan and other projects involving Istanbul.

3. An "Istanbul Recovery Bank" must be founded to handle monetary problems and to attend to the planning and implementation of special purpose financing projects.

4. Expropriation expenses and investments will come to 1.6 billion liras in 12 years. Three financial sources can be considered:

a) An average of 150 million liras can be appropriated annually from the 250-billion-lira general budget.

b) Close to 1/2 million families living in Istanbul can contribute annually as little as 300 liras to a special fund.

c) A 2-million-square meter section of the Treasurey-owned land at the Istanbul organized industry areas can be set aside for the establishments at the Golden Horn, and the land can be sold to whoever wishes to relocate there. A fund even larger than necessary can be assembled by tapping all three of these sources. Furthermore, after the Golden Horn business establishments and industries are relocated at the designated area, any land left over will be a source of additional revenue for the Istanbul municipality.

Proposals in the Golden Horn Master Plan cover a 12-year period between 1978 and 1989. Scheduled work for that period fall into five major groups. They are (a) land reform, (b) legal and organizational work, (c) project preparation,and (d) development and housing, all of which cost 1.6 billion liras.

Businesses which will be allowed to remain in the Golden Horn area should be the type that does not cause any pollution whatsoever, requires a small number of trained workers, and is capital intensive. Garment, tourist, and handiwork industries fall under this category. We have witnessed that industries which pollute and use a large number of untrained workers have a negative effect on settlements in the Golden Horn area. Consequently, when we are selecting and defining industrial areas, we must, in view of the special circumstances at the Golden Horn, be ready to offer incentives to encourage and facilitate relocation.

A "Metropolitan Service Association," servicing the entire Istanbul metropolitan area, will be able to make plans, decisions, and moves compatible with the city's characteristics, ensuring harmony and coherence among the decisions of over 30 municipalities in Istanbul, and lend a hand to small municipalities unable to carry out their planning and development functions for the lack of personnel and finances. An association of this type, whose powers and functions will be defined by law, can put an end to the disorganized growth, which results from the unaccordinated activities of municipal administrations unaware of each other's plans.

The Ministry of Interior's proposal on this matter was submitted to the National Assembly, but was voided by the 5 June 1977 general elections. The Metropolitan Service Association should be an organization born of a need to emphasize local views and local representation, while remaining under the

jurisdiction of the central government. However, as described in the Ministry of Interior's proposal, the central government's representatives will have the upper hand in the association. This should be changed, the authority of the central government's representatives should be limited. Otherwise, the desired cooperation will never meterialize, questions will never be settled.

A New Bank

The growing dependence of municipalities on assistance from the central government, and the disorganized government aid through the Bank of Provinces [Iller Bankasi] have taken the implementation of urban development plans out of the hands of municipalities. If the proposed Matropolitan Service Association is formed, the revenue from the urban services it will perform, or have performed in its name by other organizations, and the fund from the bonds it will issue can be collected in the proposed Regional Recovery Bank. There are plans to assign to the bank also a share of whatever is allotted to special provincial administrations and municipalities from real estate taxes. The revenue from the capital gains taxes on real property and special assessment taxes--a byproduct of urban development plans--can be channelled also to the bank.

Under the current system, these funds are transferred to local administrations through the Bank of Provinces. The way the bank is set up, however, it can work only with local administrations, it cannot cooperate with state agencies or other organizations that can build infrastructural facilities. By the virtue of its national character, its approach to problems is adequate, but only technically speaking, financially, it is very weak.

The planned "Istanbul Regional Recovery Bank," as soon as it is formally set up, should make the Golden Horn project the nucleus of Istanbul's urban development. It should be able to use private and public financial resources to put the Golden Horn Master Plan into effect and should have authority to use these resources to contract private or public organizations. The bank should also be able to monitor the services rendered by these organizations, whether they are departments of the central government and ministries or not. Only with an operational independence of this type can the bank work effectively towards the goals of developing the Gold Horn, hence, Istanbul.

The Land Office was established to open opportunities for the state to acquire land for public benefit. The law that established the Land Office also enabled the agency to plan land use. In the Golden Horn area, the Land Office is the key agency in terms of land acquisition. In an enterprise of such wide scope, however, the agency should have wide enough land acquisition powers to deal with extensive urbanization movements. Financially speaking, the Land Office must have the state's support and sufficient funds of its own to perform the tasks assigned to it. Despite its limited financial capacity, the Land Office played an effective role in the public acquisition of land in Dudullu and Cerkezkoy where the expropriated land is now an industrial

area. There is no reason why the Land Office can't do it again, this time for the contemplated relocation of the industries at the Golden Horn.

The Reconstruction Law No 6788 (6785), in essence, is in the form of a guideline, a piece of legislature that states general objectives. It cannot be expected to answer fully the environmental problems among the issues involved in the Golden Horn project. The problems there are multifaceted and unique. The law in question is not conducive to a meticulous approach to the Golden Horn, or Istanbul, which require careful attention to historic, social, and cultural dimensions.

The most effective action in this case would be to acquire the key areas--the Golden Horn, for one--by either expropriation or relocation, and then, after improving the area's infrastructure, to open it to controlled settlement. Such an approach will also create a pilot area for the urban development operation in Istanbul.

Article 42 of the Reconstruction Law authorizes municipalities to consolidate, and then rezone, the land covered by regional development plans. The Golden Horn Master Plan, and the proposals therein, should be adopted as a regional development plan, and the Istanbul Municipal Administration, under the authority granted to it by Article 42 of the Reconstruction Law, should begin to reorganize the land at the Golden Horn. Later, when the Metropolitan Service Association is formed, the work already underway, and the municipality's authority, can be transferred to the association. The planned transfer does not have to deter the municipality from beginning the operations now.

The Istanbul Municipality should be granted authority, by an amendment to the Reconstruction Law, to supervise the Golden Horn operations of state organizations which will participate in the reconstruction project.

The Greater Istanbul Regulatory Plan Bureau, the only metropolitan organization which makes plans in the light of local needs, is essentially a consultative body. It cannot undertake renovative formulation and implementation activities because its approach must comply with the dictates of the Reconstruction Law. Instead of working out short-term plans, action or implementation projects, it takes the course of preparing long-range master plans.

There is a Planning Council, which includes among its membership the Istanbul mayor and government representatives. Metropolitan areas are answerable to the Interministerial Coordination Board for Reconstruction. The Greater Istanbul Regulatory Plan Bureau [chief] is the secretary of the Planning Council. There is also a Consultative Board which assists the Greater Istanbul Regulatory Plan Bureau in technical matters. None of these bodies, however, have been able to perform their functions properly. Their activities have not gone beyond infrequent and unproductive meetings.

In the light of this fact, these planning groups must be reevaluated. Their membership must include individuals representing the city's people so that

the Greater Istanbul Regulatory Plan Bureau will be responsible to local administrations and local people as much as it is to the Ministry of Reconstruction and Housing of the central government.

Real Estate Tax

The real estate tax on land, building plots, and buildings is the most suitable source of revenue for the financing of infrastructural construction. The real estate tax is collected by the central government, but a portion of the receipts is transferred to municipalities through the Bank of Provinces.

Several changes should be made in the [real estate tax] law to create a fund for the envisaged settlement at the Golden Horn, and to bring incentives and deterrents [to the settlement activity]. Areas in conflict with the form of land use specified in the Golden Horn Master Plan can be determined by studying real estate tax declarations and land use inventories. Additional tax can be assessed in such cases. The receipts can be deposited to a "Golden Horn Development Fund." The tax rate in the case of land and buildings at new industrial areas where Golden Horn industries will be relocated can be reduced on an individual basis--by evaluating each tax payer's declaration individually. It should make the new areas attractive to industrialists.

[The government] has to cooperate with planning organizations to coordinate the application of this multirate tax system. Using different tax rates for different areas and different types of land use will make the real estate tax an incentive, a motivation in land use.

What About Squatter Settlements?

The biggest flaw in the application of the Squatter Settlements Law is the issuance to the squatter, after a certain period of time, the deed to the plot of land where his house stands. An uncontrolled, unplanned housing policy produced the squatter settlements problem and election-related concessions inflated it into its current frightening size. Land speculation has become rampant, we have lost sight of the goals [of the law?].

In the case of the squatter settlements in the Golden Horn area, the deed of the land must not ever be transferred from public to private hands. The law must prevent this practice. In addition to taking this preventive step, we must be prepared to move the residents of squatter settlements to modern, sanitary homes in areas with a fully constructed infrastructure.

The weakest aspect of the current Public Hygiene Law is the difficulties it causes in the relocation of industries. These difficulties stem from the way the law classifies industrial operations. The classification under the Public Hygiene Law is inconsistent with the provisions of the Reconstruction Law. The Public Hygiene Law should be amended on the basis of the Reconstruction Law.

Furthermore, to discourage would-be violators, provisions must be added [to the Public Hygiene Law] forcing the violator to correct the situation, or face a loss of permit to continue operations. Monetary fines must be increased, according to the severity of the infraction, to much higher levels, so that they will be taken seriously.

The Water Products Law lays down the basic rules for the ecological protection of national waters, but the guidelines for the implementation of the law are inadequate, and also erroneous. That is why, today, 5 years after the law took effect, pollution of the seas and inland waters continues.

A New Environment

Proposals on the development and settlement of the Golden Horn area are as follows:

1. The shoreline between Galata and Unkapani will be cleaned up by removing the storage facilities and manufacturing plants. A recreational and commercial harbor will be developed. There will be tourist facilities, and a number of lodging and commercial buildings. The area in question is like a basin, and at the moment, the land on both of its banks is in use only during the 8-hour business day. It remains unused, empty of activity outside business hours. That is to say, there is no balance in terms of urban use. This area, which encompasses very valuable land, will be used heavily, but rationally.

2. The section between the Unkapani Bridge and Eyup has been cleared of traffic and developed into "a protective zone" around historic and religious nuclei. The Eyup area in particular, which includes historic works, examples of religious and civil architecture, will be developed as a tourist and cultural center. Permission may be granted along the coastal sectors to facilities and service buildings to meet the needs of the people living in the vicinity and for small lodging facilities for visitors.

3. The area, which was left vacant after the entrance to the road was changed, and now serves as a buffer zone around the Eyup Sultan compound, may be used for commercial activity and bureau services. The Fatih Mosque and its grounds, the Kaariye [Museum], and the Sultan Selim Mosque and its grounds, which are situated on plateaus overlooking the Golden Horn, form historic focal points and will be connected to the shore with vertical accesses.

4. The Cibali-Balat-Fener religious center, and the Ayakapi-Ayvansaray unit will be rehabilitated, equipment and infrastructure will be installed with care and in a manner that they will not alter the historic characteristics of the centers. On the eastern bank, Kasimpasa--the only area touching the Golden Horn--will receive special attention. On the same bank, the area around the legs of the Golden Horn Bridge will be preserved as a green area. Haskoy and Sutluce shores will be cleared of warehouses, thereby restoring sanitary conditions to the settlements there. The Golden Horn area will be

generally cleared of industry, only garment, handiwork, and similar industries, which do not create environmental problems or organic polluters, will be allowed to remain.

5. A 70-hectare area which will be created by filling the sea between Eyup and Silahtaraga will become "The Eyup Regional National Park," which will be a welcome addition to Istanbul. It will be the most spacious green area in Istanbul which, outside the palace gardens and several private wooded areas,as the Belgrade Woods, does not have many green areas. The park will have tree-covered picnic areas, sports, recreation, and amusement facilities, all of which are expected to give to it a regional park character. To make the park look more attractive, the waters of the [Golden Horn] streams will be allowed to run through a canal on both sides [of the park]. Museum-type arrangements to demonstrate traditional Turkish life are under consideration also.

6. Forestation and greening are the primary operations in land development efforts. These operations will continue during the master plan period and beyond. The purpose in the initial phase will be to prevent erosion. Later, they will be undertaken, generally, to complement architectural and city projects.

Because of the emphasis on parks and recreational facilities in the Golden Horn Master Plan, this phase of the development carries special significance. To the extent that architectural development operations permit, organization of the Eyup Regional National Park and the Eyup Religious Center will be completed during this phase. Operations to bring out into the open and restore other cultural and tourist attractions and historic works will take place in this phase also.

7. Controlled settlement will begin only after healthy conditions are restored to the Golden Horn, and it is returned to the people. Once the shores are evacuated and rehabilitated, the Golden Horn will become one of Turkey's most important public centers for trade, culture, and recreation, available to the entire urban population.

Cost Is 1,6 Billion

The Golden Horn Master Plan will entail an intense work schedule for a period of 12 years between 1978 and 1989. It will cost nearly 1.6 billion Turkish liras at 1977 prices, and will demand close cooperation among interested organizations.

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ROAD-BUILDING THREATENS RURAL AREAS

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[Text] Another idyll in rural German seems doomed: Plans have been mooted for a motorway in Sauerland, which would brutally bisect the Rothaargebirge Nature Park. Citizens initiatives are being constituted to prevent this despoliation of nature at its best.

The tourist prospectus of the small Sauerland community of Kirchhundem holds out great promises: "Embedded in the area of two nature parks, the Rothaargebirge and Ebbegebirge, lies the community of Kirchhundem in a landscape which counts among the most beautiful in Sauerland. Its extended tranquil forests and lovely grassy valleys guarantee the visitor quiet, relaxation and recreation--off the beaten track, yet easily accessible."

However, the idyllic peace and quiet promised the harassed visitor may soon be a thing of the past: To be built in the 1980's is the motorway section from Olpe in Sauerland to Bad Hersfeld in Hessen. In the most recent contingency plan of the Ministry for Transport it was designated "priority Ib" and "possibly greater demand."

According to Bonn plans the "BAB 4" [federal motorway] is to be constructed at an elevation ranging from 400 meters to 630 meters and will connect the economically strong west with the structurally weak east of the Federal Republic. In the area of Sauerland's Kirchhundem community a 48 km long road section (first planned as far back as 1933) will bisect the center of the Rothaargebirge Nature Park with its numerous water and wild life reserves.

There is a good deal of concern in many villages of the "region of 1,000 mountains." Especially two hamlets in the Kirchhundem community protest the "concrete track across the Rothaar ridge." Wirme and Brachthausen villages with a total of 900 residents are spearheading a citizens movement (albeit so far a rather timid one) against the road through the tourist region.

The citizens of the two villages (some 90 percent of whom oppose the planned motorway section) are particularly bitter because their elected CDU

officials are lending strong support to the new motorway. School principal Bernhard Pauly of Wirme, a spokesman for the citizens initiative, considers the interests of Wirme and Brachthausen people poorly represented in the community council: "They are all hellbent on the construction of BAB 4. But they do not have the faintest idea of what is in store for them."

The opponents of the motorway have concerned themselves with the project since 1973. The motorway is supposed to bring the Sauerland "structural improvements" and the communities a lot of revenue. The embattled citizens are debating road construction agencies, community councils, Bundestag deputies, conservationists, scientists and attorneys. At meetings the critics ("we are not sneaky"--school principal Pauly) argue "in a very matter of fact manner" as confirmed by the local press; they try also to offer feasible alternatives to the despoliation of nature.

The farmers,foresters, teachers, lathe operators, engineers and shoemakers hope for backing from Federal Minister for Transport Kurt Gscheidle. In the periodical STRASSE UND AUTOBAHN [Highway and Motorway] of March 1976 the minister wrote: "If one motorway cannot remove a structural weakness, another one or two more (can) hardly be expected to do better. Moreover, two-lane roads of the proper construction are often just as suitable for developing and linking such areas because traffic there is usually quite light."

Much Noise and Few Jobs

In fact the construction of a motorway does not by any means provide the expected economic upswing in structurally weak rural areas. One example is furnished by the Overath region, along the Cologne-Olpe motorway: It is obvious now that there is a lot more traffic and noise, but that no new industries have moved in. Instead workers have made use of the rapid connection to the conurbations: They have become long distance commuters.

Wirme's Bernhard Pauly describes the mood "in the land of 1,000 mountains." "Many people who do not live on top of the planned road sometimes say that one should be in favor of the motorway. But as soon as I ask why, they are unable to give a reason because they have just succumbed to the suggestion: Motorway equals prosperity, motorway improves the quality of life. They cannot spell out what in fact they imagine that to mean."

In the battle against the political decisionmakers the initiative has in the meantime earned respectful notice. Some members of the communicy council were unable to hide their surprise at the villagers sound knowledge: "They are better informed than we are" (CDU group chairman Martin Heller).

The residents receive moral support and advice from the Essen Land Association of Citizens Initiatives for Environmental Control (LBU). They put forward the argument that, according to earlier experiences, motorway construction is followed by the establishment only of branch factories. These

same branch factories are liable to be the first to close down in a recession. One lathe operator comments: "At that time all those jobs go up in smoke again."

Destroy First, Repair Later?

Heinrich Koelsch, railroad employee from the neighboring community of Welschen Ennest, appeals to the motorway planners just to leave "blank spaces" without motorways on their map sections. He thinks that "the oil contracts will be exhausted in the foreseeable future. Then we will once again drive vehicles fueled by wood distilling apparatus or batteries, and we will no longer need motorways. But in the meantime the scenery will have been ruined for ever."

The 1974 commentary of the Westphalia-Lippe Chamber of Agriculture discloses how the motorway will "fit" into the scenery. The result of the reflections of the forestry authorities: "Considerable reservations" about the motorway. "As an alternative for the achievement of the economic development of the region it is proposed to suitably extend the existing highways. Certainly this will be more difficult than driving a new road through the tranquil forests and a more or less unpopulated area."

The people of the Sauerland are reputed to be stubborn. "One should not act according to the slogan: Destroy first, repair later. We demand an environmental impact report now"--says school principal Pauly.

The general planning agency in Bonn's Ministry of Transport says that no such environmental impact report is budgeted within the scope of the legally prescribed "cost-profit analysis." Public pressure did manage to obtain such a report in the case of the planned north-south section of the A 31 from Emden to Siegburg. There the question whether or not construction is to proceed must wait on a decision based on the impact report (cost: about DM1 million) to be submitted by independent experts.

The residents of the threatened heartland of the Rothaargebirge draw hope from remarks made by North Rhine-Westphalia Minister Riemer ("our road network is sufficiently dense") and the attitude of Dieter Deneke, North Rhine-Westphalia Minister for Food, Agriculture and Forestry. In a letter dated early November Deneke wrote to local assembly deputy Theo Heimes (SPD) regarding the expansion of the Rothaargebirge Nature Park: "...the saturation with recreational facilities...reinforces my opinion in future to emphasize environmental control measures to improve the scenery and conserve natural resources." On 4 June 1974, in a speech in Oberhausen, the minister appealed for prudent planning: "If road construction goes on as it does now, we will in future be able to drive very well indeed, but we will not be able to live."

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