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Environmental Issues

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Environmental Issues

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Baltic States To Attend Environmental Conference in Sweden

*LD3007124190 Helsinki Domestic Service in Finnish
1000 GMT 30 Jul 90*

[Text] Swedish Premier Ingvar Carlsson and Polish Premier Tadeusz Mazowiecki have invited the coastal states of the Baltic Sea to a meeting discussing the environmental problems of the sea. The meeting will be held in Sweden in the first few days of September. According to the Swedish foreign ministry, about 10 countries will take part in the meeting, many of which will take part at prime minister level. Environment Minister Kaj Barlund will take part in the meeting for Finland.

Japan Promotes Plan To Halt Spread of Sahara Desert

*90WN0206 London AFRICA ANALYSIS in English
22 Jun 90 p 9*

[Text] Tokyo—A Japanese survey mission will leave here for Niger on 10 July to research the first phase of a 6-year, \$6.5m, experimental pilot programme to halt the southward march of the Sahara Desert. The programme is part of a proposed 30-year scheme costing an estimated \$10bn, which would aim to construct a 'greenery defence belt' extending 3500 km from Lake Chad to the Senegal River.

The ambitious plan, unveiled last Friday by the Japanese Ministry of Agriculture, Forestry and Fisheries, involves diverting water from the River Niger and the probable construction of vast underground dams. As well as halting the advance of the desert, the plan aims to greatly increase food production throughout the Sahel region.

The ministry will oversee the pilot programme, which will also study the feasibility of underground dams, as well as testing the possibility of paddy field farming in the region. According to United Nations statistics, some 30m people in the Sahel face the constant threat of drought as the Sahara continues to move south.

Part of the Japanese plan is to use diverted water to irrigate land and nourish new forests which should, in turn, increase the rainfall in the region. Countries which stand to benefit include Niger, Chad, Mali, Guinea, Nigeria and Burkina Faso. Because of the scale of the proposal, Japan will be formally inviting the United States, the European Community and various United Nations agencies to participate.

Hungary, Austria Hold Environmental Talks

*LD3107202290 Budapest MTI in English 1914 GMT
31 Jul 90*

[Text] Vienna, July 31 (MTI)—The legal and financial obstacles in the way of creating the joint Austrian-Hungarian national park in the vicinity of the Ferto Lake

have been lifted by the Austrian partner, thus the relevant basic agreement is expected to be concluded in September. This was announced on Tuesday, at the end of the short negotiations between Sandor K. Keresztes, Hungarian minister of environmental protection, and Marilies Flemming, Austrian minister of environment.

The Austrian minister ensured Austrian governmental support to the Hungarian motion to set up a Hungarian-Austrian-Czechoslovak environmental protection committee. The minister also said Austria will join the environmental protection cooperation emerging in the countries along the Danube on Hungarian initiative.

In answer to a question by MTI, Mr. Keresztes said Hungary will shortly be able to utilize the assistance promised in the framework of the Phare programme to set up the park.

At the talks on Tuesday, the Austrian minister informed Mr. Keresztes that Austria will send its representatives to the environmental protection conference of the countries along the Danube, scheduled to be held in October. At the Dublin summit of the European communities, where representatives of several East European countries were present as invited guests, Hungary proposed cooperation to protect the ecosystem of the Danube and the Danube region, and to conclude an agreement that would provide the legal frameworks for this cooperation.

An important subject discussed at the Hungarian-Austrian environmental talks was how the unfavourable environmental effects of the planned Budapest-Vienna World Expo could be averted. Therefore, the Hungarian negotiating delegation included Etele Barath, the government commissioner of the World Expo.

CSFR's Calfa, Austria's Vranitzky Discuss Ecology Issues

*LD3107211990 Prague CTK in English 1929 GMT
31 Jul 90*

[Excerpt] Venice July 31 (CTK correspondent)—A two-day meeting of Italy, Austria, Yugoslavia, Hungary and Czechoslovakia which form the "Pentagonal initiative" opened here today with Czechoslovakia being represented by Premier Marian Calfa.

The first day's program included premiers' bilateral meetings, a working meeting of the five countries' foreign ministers, and contacts with representatives of Italy's industrial and trade circles.

Marian Calfa had the most important talks with Austrian Chancellor Franz Vranitzky, dominated by energy and ecological questions. Both statesmen agreed that the Austrian group of experts will have an equal status as those of Czechoslovakia and the West German firm Siemens in assessing the safety of the operation of the nuclear power plant at Jaslovské Bohunice due to start on August 7. The Czechoslovak Government will respect the experts' final decision.

Marian Calfa and Franz Vranitzky also agreed that it is necessary to interlink their countries' highway networks, which would improve the ecological situation. In this connection they also spoke about the importance of modernization of the railway network. Both countries will continue to strive for setting up joint protected areas along the borders, especially in the Danube and Dyje Rivers' basins.

Czechoslovak Premier Marian Calfa also held talks with Michel Pedeschi, director general of the IRI Holding Company, one of the biggest in Italy. Calfa called on Italian businessmen to establish contacts right with the Czech and Slovak national governments in seeking cooperation in Czechoslovakia.

He also spoke about possible expansion of the Pentagonal cooperation in building a modern railway route from Prague via Austria to Italy.

The IRI representative showed great interest in cooperation with Czechoslovakia in the sphere of nuclear power plants safety, especially introduction of a high-quality monitoring system. The Czechoslovak premier stressed the importance of nuclear energy for solving the ecological situation in North Bohemia, which is disastrous due to thermal power plants. [passage omitted]

CSFR's Vavrousek on Vienna Talks on Nuclear Plant

*LD3107201290 Prague CTK in English 1910 GMT
31 Jul 90*

[Text] Prague July 31 (CTK)—the Czechoslovak side assured Austrian partners that great attention has been devoted to ensuring the safety of Czechoslovak nuclear

power plants and thus also of the country's and all neighbouring states' population, Minister-Chairman of the Czechoslovak Committee for the Environment Josef Vavrousek told CTK here today.

Speaking about the talks of Czechoslovak and Austrian representatives in Vienna on July 30, 1990 about safety of both units of the V-1 nuclear power plant in Jaslovské Bohunice, West Slovakia, he stressed that the Czechoslovak and Austrian representatives confirmed their interest in deepening good-neighbour relations, adding that a number of concrete technical and organizational measures have been taken in the past years to ensure nuclear power safety.

Czechoslovak representatives stressed at the talks that the decision on whether the operation of the V-1 units will continue, be reduced or suspended will be taken by the Czechoslovak Government on the basis of the stand of state inspection of the Czechoslovak Atomic Energy Commission. It will strictly respect objective and scientific viewpoints, Josef Vavrousek said, adding that the two sides' representatives agreed upon participation of experts nominated by the Austrian Government in the planned expertises [i.e. inspections and evaluations].

Czechoslovak representatives briefed their Austrian partners on a long-term program of the International Atomic Energy Agency concerning the safety of older nuclear power plant units. The first discussions on its contents and organizations will be held on September 10, 1990.

The Austrian side accepted all information with satisfaction and appreciated the openness of Czechoslovakia in the solution of these issues, he stressed.

Official Describes Efforts To Protect Environment

OW3007123090 Beijing XINHUA Domestic Service
in Chinese 0514 GMT 21 Jul 90

[By reporters Zhao Yuqing (6392 3768 1987) and Zhu Youdi (2612 1635 2769)]

[Text] Changchun, 21 Jul (XINHUA)—China has made rapid progress in establishing natural protection zones in recent years. At present, more than 600 natural protection zones have been established throughout the country, which cover more than 3 percent of the entire land area of the country. The number of state natural protection zones has increased from seven to 56 since 1979. Jin Jianming, deputy director of the State Environment Protection Bureau, made the above statement at the national meeting on protecting natural areas in Changchun City.

Our country's seven natural environment protection zones, namely Dinghu San, Changbai San, Wolong, Fanjing San, Wuyi San, Xilin Gol and Shennongjia, have joined the protection zone network of the "World Biological Circle." China has made progress in increasing the types of protection zones. The past practice of having only a single category and of unreasonable distribution of protection zones has been improved. In addition to the many forest and ecotype protection zones, China has now established a number of geological, topographical, historical, and cultural relics protection zones as well as grasslands, desert, swamp, and marine protection zones. Jin Jianming said: In the past 10 years, the State Environment Protection Bureau has spent 9 million yuan to protect those natural environmental zones. The number of protection zones established and administered by various environment protection departments now exceeds 100. Besides, China has established several hundred scenic areas which should be protected, including forest parks, of which 84 are key scenic and historical relics sites of the state.

Jin Jianming said: On the basis of extensive investigation, the State Environment Protection Bureau has organized a number of experts to compile a "red book" on

rare and endangered animals and plants of the country, which has aroused the attention of the society. In order to save those endangered species, the State Environment Protection Bureau has spent 6 million yuan to set up the Nanyuan Park for David's Deer in Beijing, the Zhangye Lanma Chicken Breeding Farm in Gansu, the Tongling White Suckling Pigs [bai qi tun 4101 7662 6270] Raising and Protection Farm in Anhui, and other rare and endangered animal preservation centers. In addition, it has set up nurseries of lily magnolia, gold camellia, and wild wintersweet in Guangdong, Guangxi, and Hubei and established rare and endangered plants' preservation centers in Yunnan, Henan, Zhejiang, Jiangxi, Liaoning, and Jiangsu.

It was learned that forestry, agricultural, and oceanographic departments have also appropriated special funds to set up a number of breeding centers for rare species. As of the end of 1988, 227 breeding farms for wild animals and 255 preservation bases for wild plants had been set up throughout the country. At present, most of the animals and plants which should be protected according to a list announced by the state have been moved to appropriate places for protection; some endangered species have increased their numbers. China has contributed to the protection and diversification of animals and plants.

Jin Jianming pointed out: At present, our country still has a great deal of work to do in moving rare and endangered animals and plants to other localities for protection and in protecting the diversification of animals and plants. In protecting animals, we have paid attention only to protecting a small number of precious and large animals and increasing their numbers. Our efforts are inadequate in protecting certain small animals, birds, and fish, and we have not paid close attention to protecting invertebrates. In protecting plants, we have paid attention to trees but have not paid good attention to shrubs and herbs. Our plans for moving and preserving rare species are still not perfect, and we must also speed up the formation of a national network for protecting various species.

INTER-ASIAN

ASEAN Ministers 'Concerned' About Environment Threats*BK2807140990 Hong Kong AFP in English 1314 GMT 28 Jul 90*

[Text] Jakarta, July 28 (AFP)—Southeast Asian leaders said Saturday they were increasingly concerned over threats to the global environment but could not ignore the linkage between environment and development.

In meetings here with their major trading partners, foreign ministers of the Association of Southeast Asian Nations (ASEAN) underscored the need for a transfer of technology which would help them preserve the environment while continuing to develop.

Foreign Minister Abu Hassan Omar of Malaysia, which has been hit by European calls for a ban on tropical timber imports, said such "simplistic solutions which are essentially punitive in nature" did no good in the long run.

Urging consultations instead, he said: "In the meantime, countries should not be in haste to adopt policies which undermine our commitment to promote and enhance the environment."

Other delegates said the concern should not be to apportion blame for problems, but to resolve them through effective action.

Technology for preserving the environment was a central focus of ASEAN proposals for specific cooperation projects with Australia, which has earmarked funds for an action program, delegates said.

Proposals under consideration covered technologies for modern industrial effluent treatment and water resources management, as well as an in-depth study of human activities on the productivity of the Mangrove ecosystem.

Delegates said environmental issues were broached in several separate dialogue sessions between the ASEAN states—Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand—and dialogue partners Australia, Canada, the European Community, Japan, New Zealand and the United States.

Japanese Foreign Minister Taro Nakayama said Japan and ASEAN would hold an environmental expert meeting this autumn to promote greater cooperation on these "new and crucial problems."

Canadian Foreign Minister Joe Clark said his country would shortly conclude a memorandum of understanding with ASEAN on the second phase of a program on management of living marine resources worth some 11 million dollars.

The United States and Indonesia Friday signed a 25 million dollar agreement on natural resources management designed to help Indonesia sustain growth while managing natural resources such as forests.

Environment Expected To Dominate Pacific Forum Agenda*BK2907131890 Melbourne Overseas Service in English 0500 GMT 29 Jul 90*

[Text] The Australian prime minister, Mr. Bob Hawke, has joined other regional leaders in Vanuatu to the annual meeting of the 15-nation South Pacific Forum. Radio Australia's South Pacific correspondent, Jemimah Gareth, reports from Port Vila that environmental issues will dominate the meeting. Gareth says the United States Army's plan to incinerate chemical weapons on Johnston Atoll is likely to generate the most heated debate.

Island nations downwind to Johnston Atoll are concerned about its impact on their marine resources. Mr. Hawke supports the burn and had said he will seek a compromise at the forum. After his arrival the Australian prime minister joined other heads of government for a day of informal and private talks. Other environmental issues on the agenda include driftnet fishing, the greenhouse effect, and the new South Pacific Environmental Protection Convention.

New Zealand, Australian PM's Note South Pacific Forum Ecology Issues*BK2907135190 Hong Kong AFP in English 1245 GMT 29 Jul 90*

[By Michael Field]

[Text] Vila, July 29 (AFP)—U.S. plans to burn off chemical weapons on Johnston Atoll south of Hawaii will divide South Pacific nations meeting here this week, New Zealand Prime Minister Geoffrey Palmer said Sunday.

He predicted that the leaders of 15 independent countries in the South Pacific Forum, due to begin formal sessions Tuesday [31 July], would not reach a consensus on the issue.

"The debate on Johnston Island will be a very important and significant one," Mr. Palmer said after a pre-forum, informal retreat for the leaders, who gathered early to celebrate Vanuatu's 10th anniversary of independence Monday.

Mr. Palmer said some Pacific nations wanted no chemical weapons destroyed on the Micronesian island and some favoured destroying only the stocks already stored there by the United States.

Australia and New Zealand appeared to view the weapons' destruction as good for the world, if not for the South Pacific.

Meanwhile, Australian Prime Minister Bob Hawke ruled out any go-between role for his government in resolving the issue, but he said Australia could "provide information that (Pacific nations) have a limited potential to obtain."

Mr. Hawke said he would present forum leaders with scientific assessments that showed the U.S. chemical weapons incinerator at Johnston Atoll had adequate environmental safeguards.

Mr. Palmer said he regretted that the United States last week began moving nerve gas stocks from West Germany for their destruction in the South Pacific.

"I don't think it is a slap in the face for the forum but there could have been greater consultation," he said.

Mr. Palmer said the atmosphere at the informal retreat, the first in three years, was "cooperative and very friendly."

Mr. Hawke said he expected that the forum, in addition to the chemical weapons issue, would discuss developments in French-ruled New Caledonia.

"We must make sure we get a common position for the United Nations," he said.

Representatives from six additional countries with interests in the region were also to attend the forum. They were Britain, Canada, China, France, Japan and the United States.

On the question of Nauru's bid in the international court of justice for 72 million Australian dollars (56 million U.S.) compensation for environmental damage from pre-independence phosphate mining, Mr. Hawke said the tiny island state was entitled to sue Australia.

"But the only people who will prosper in these situations are the lawyers," he warned.

Mr. Hawke said Australia had an obligation to help Nauru as part of its general approach to the Pacific but had no further obligation.

Australia Urged To Take 'Low Profile' on Johnston Island CW Issue

*BK3007082290 Melbourne Overseas Service in English
0500 GMT 30 Jul 90*

[Text] The confidential briefing paper prepared in the lead-up to the South Pacific Forum says Australia should aim to take a low profile on the controversial chemical weapons burn-off on Johnston Atoll and to give the prime minister, Mr. Hawke, maximum impact at the Port Vila summit.

From Port Vila, South Pacific correspondent Jemimah Gareth says Australia is the only Pacific nation to give Washington's incineration plans its backing. The confidential cable said that, providing proper environmental

safeguards were observed, Australia supported the incineration of those weapons already on Johnston Atoll and the United States weapons stocks now located in West Germany at the Pacific burn site.

The document said Australia aimed to maintain a low profile in the run-up to the forum so that the Australian position could be put by the prime minister with maximum effect. The cable said Australia was concerned that if the West German gas was not destroyed soon, it could undermine international efforts for a worldwide ban on chemical weapons.

Last night, New Zealand's prime minister, Mr. Geoffrey Palmer, said New Zealand opposed the transportation of weapons from elsewhere but supported the destruction of weapons already on the Atoll, since the facilities were very good.

The United States plans to incinerate six percent of its deadly nerve gas on Johnston Atoll, southwest of Hawaii, an amount which includes all its stocks now in West Germany.

New Zealand Study Approves Johnston Island Weapons Burnoff

*BK3007120490 Hong Kong AFP in English 1132 GMT
30 Jul 90*

[By Michael Field]

[Text] Vila, July 30 (AFP)—The destruction of U.S. chemical weapons on a Pacific island south of Hawaii will not harm humans or the environment, a New Zealand scientific study released here Monday said.

But the environmental group Greenpeace immediately disputed the study, which was based on data provided by the United States.

The group flew a University of London toxicologist here to Vanuatu with a 66-page study to convince leaders of the 15-nation South Pacific Forum, due to open Tuesday, to halt the destruction of the toxic chemicals.

The burnoff of the chemical weapons, now being moved to Johnston Island Atoll from their cold war storage bins in West Germany, was expected to dominate environmental debate at the forum.

Australia and New Zealand have taken a pro-burnoff stance. But Vanuatu Prime Minister Walter Lini said that even though he had not yet formed an opinion, some of Johnston Island's neighbours might not go along with U.S. wishes.

Greenpeace has "substantial concerns" about the way the chemicals are to be destroyed and favours a different method, said toxicologist Dr. Paul Johnston.

"It's an unproven technology," he said.

The study was released by New Zealand Prime Minister Geoffrey Palmer. It was compiled by the Department of

Scientific and Industrial Research (DSIR) with data provided by the United States.

"DSIR believes that operations at the atoll will be as safe as the claims state, and that environmental effects will be limited to those resulting from residence of a few additional army personnel on the atoll," the study said.

"The technology described and the measures adopted to ensure safe operation reflect a determination to achieve the best possible result without regard to cost or effect," it said. "The disposal facility represents a sincere concern for human safety and environmental protection."

The DSIR said there was insufficient time for detailed discussions with the United States, and that the weapons' destruction should go ahead as planned.

Concerning the procedures for moving the gases from West Germany, the study said that if precautions were adhered to "the chance for mishaps will be negligible."

It said the process at Johnston Island has many safety interlocks that would ensure prompt and orderly shut-down in the event of equipment problems, and was "virtually immune to human error."

But Dr. Johnston said Greenpeace was concerned that vapours could leak from containment buildings, and that other countries—such as Australia and the Soviet Union—would begin to use Johnston Island as a dumping ground for their own chemical weapons stockpiles.

Australian Prime Minister Bob Hawke said he has a study supporting the New Zealand conclusion, which will be released shortly.

Greenpeace's Pacific campaigner Bunny McDiarmid said the organization could take direct action to stop the weapons' destruction.

But she said it would not be directed at the ships of the facilities themselves because it "would be too dangerous."

"If we take direct action it will be in a form not usually associated with Greenpeace," she said.

Johnston Island has been a storage site for U.S. chemical weapons, including the Vietnam War defoliant Agent Orange, for 40 years.

Joint Operation of Malacca Strait Pollution Monitoring Aircraft

BK3107113290 Jakarta ANTARA in English 0927 GMT 31 Jul 90

[Text] Kuala Lumpur, July 31 (OANA-ANTARA)—Indonesia, Malaysia, and Singapore will operate an aircraft with modern equipment as water environmental controller especially for detecting tankers which often dispose of industrial wastes which are certain to cause pollution in Malacca Strait and the South China Sea.

The Ministry of Science, Technology, and Environment of Malaysia has said here recently that the plane was equipped with a radar and a photograph with infra-red ray [as received] so that it could operate at nights, the time when the tankers dispose of the wastes.

The governments of the three countries were reported to finance the cost of the operation of the plane which was granted by the International Maritime Organization, it said.

According to the ministry, the plane would be operated from an air base here under the responsibility of the Maritime Command Centre.

The participants of a recent environment ministerial meeting in Subang of Selangor State expressed their concerns over the increasing pollution in Malacca Strait and the South China Sea.

According to the participants, the waters were potential to be polluted [as received] as the areas were crowded with tankers transporting energy materials.

At the end of June, tens of thousands of fish were reported to have died of the pollution in the waters.

Meanwhile, the three countries at the end of July had a joint exercise involving 400 personnel to handle the problem of oil spills in the waters of Malacca Strait.

INTRABLOC

Bulgarian Green Party Demonstrates at Romanian Embassy

AU2907192790 Sofia DUMA in Bulgarian 24 Jul 90 p 2

[Lyubomir Rozenshtayn report: "Appeal Submitted by the Green Party"]

[Text] The Green Party supports all actions of the Ruse citizens and calls upon all organizations within the country to join in various forms of protest—including radical ones—if the poisoning of the atmosphere in Ruse should persist. The responsibility shall rest with the two governments which remain passive.

This appeal adopted by the Green Party was submitted last night to the Romanian ambassador in Sofia by the party's Chairman Aleksandur Karakachanov.

The appeal was first read to members and supporters of the Green Party who demonstrated in front of the Romanian Embassy in Sofia.

The ambassador reportedly reassured Mr. Karakachanov that he agrees to hear the opinion of an independent international experts' commission on the subject.

CZECHOSLOVAKIA

Federal Environment Committee Established

LD3107170390 Prague CTK in English 1543 GMT 31 Jul 90

[Text] Prague July 31 (CTK)—The State Commission for Scientific and Technological Development and Investments, which was established in the fifties, ended its activity today and a new Federal Committee for the Environment started its work.

The committee is the central body of the State Administration of the Czech and Slovak Federal Republic for the environment. The committee has already elaborated a concept of state ecological policy and ways of its realization and coordinates the state information system on the environment with international agreements.

The Federal Committee for the Environment coordinates the fulfilment of tasks in the sphere of territorial planning and building, the consequences of which touch the two national republics and the interests of neighbouring states, and coordinates international cooperation within jurisdiction of the two republics.

State nuclear safety control is subordinate to the federal committee.

Commission Holds First Session on V-1 Nuclear Plant

LD3107200490 Prague CTK in English 1902 GMT 31 Jul 90

[Text] Prague July 31 (CTK)—The Czechoslovak commission for a comprehensive assessment of the safety of the V-1 nuclear power plant at Jaslovské Bohunice, West Slovakia, held its first session here today.

Taking part were 15 top experts on various nuclear safety-related spheres, appearing as specialists with personal responsibility, not as representatives of their institutions.

The commission decided to set up six working groups on assessment of the overall concept of the V-1 type nuclear power plant, its resistance to potential seismic activity, condition of the reactor vessel and the primary circuit, condition of other technical equipment of the plant, condition of the measurement, regulation and control equipment, ability of the staff to react to common and extraordinary events, assessment of the plant's systems and measures to minimize the negative consequences of a possible accident.

Preliminary results of the commission's work will be published by the end of August and the results of the second stage by the end of this year when a proposal on the further course of action will be made.

The commission was set up on the basis of a resolution adopted by the Czechoslovak Government on July 26 when it discussed the future of the Jaslovské Bohunice plant, giving the green light to its further operation at least until three expertises [i.e. inspections and evaluations] have been carried out, i.e. by the end of next November.

The expertises will be conducted by the West German company Siemens, the International Atomic Energy Agency (IAEA) and the European Community.

The expertises have been prompted by Austria's demand for an immediate shutdown of the plant.

In its statement of July 26, the Czechoslovak government said that "despite preliminary findings that the condition of the V-1 plant is not fully satisfactory, it is not necessary to stop its operation", and recalled that the operation is regulated by the principles of a special regime approved and monitored by the state inspection for nuclear safety of the Czechoslovak Atomic energy Commission.

Czech Minister Questions Further Nuclear Power Development

AU0108083190 Prague MLADA FRONTA in Czech 25 Jul 90 p 3

[Interview with Bedrich Moldan, minister of the environment of the Czech Republic, by MLADA FRONTA]

correspondent Josef Tucek; place and date not given: "Bet on an Alternate Path"—passage in boldface is introduction.]

[Text] In case of major breakdown at the Czechoslovak nuclear power plant in Temelin, Vienna and Linz would have to be evacuated immediately. Marchfeld, the granary of eastern Austria, as well as the fruit-growing area of Wachau would be contaminated by radioactivity for millennia, and on moonless nights now phosphorescent fish would swim in the Danube. That is the apocalyptic vision published in the Austrian newspaper KURIER. This daily brought the issue to a head, but the reason for its attitude is rooted in the Austrian negative standpoint on Czechoslovak nuclear power production. In a national referendum, the Austrians rejected their own nuclear power project years ago. Therefore, they are even more uneasy about the situation in Czechoslovakia and, as a result, they cry out against our nuclear power plants. The Chernobyl disaster demonstrated to them clearly that radioactive clouds resulting from meltdowns do not respect state borders.

The Czechoslovak power industry's forward planning, however, includes the use of nuclear power for the future. And what does Bedrich Moldan, minister of the environment of the Czech Republic, say to that?

[Tucek] The defenders of nuclear power projects in Czechoslovakia often claim that we have no other alternative but to count on nuclear power. What is your comment?

[Moldan] I would not be so blunt as to say that. At present, approximately one-fifth of all our electric power is already produced in nuclear power plants. Therefore, economically I believe it is impossible to give up nuclear power now. In my opinion, however, we should not build any more nuclear power plants. I believe that it would suffice to bring into production only the units under construction at Temelin and Mochovce, and use them for some twenty, twenty-five years, but no longer. That would provide us with the time to develop some alternative sources.

[Tucek] What alternative sources do you have in mind?

[Moldan] Among the alternative sources I am thinking of are fossil fuels, particularly [natural] gas, of which there is sufficient quantity in Europe. Of course, it is not necessary to tie oneself to the Soviet Union for its purchase. It is not a political, but an economic question, because very soon we will be paying world prices in dollars to the Soviet Union like we do to everyone else. It will be necessary to find, in accordance with market principles, the most expedient supplier for reciprocal supplies and the like. I believe that this is acceptable on a temporary basis. The real alternative sources are not sufficiently developed because their development has not been funded as well as it should have been. In comparison to the investments in nuclear research (which by the way no one can figure out because the numbers are classified and cannot be separated from

military research) the amount of money spent, for instance, on the development of solar collectors is only a minute fraction. For the future, I personally believe in solar energy. Moreover, the research in this field progresses very fast.

[Tucek] The advocates of nuclear power often employ the credo—if Temelin is not completed, northern Bohemia will continue to die. How would you respond to that?

[Moldan] It is necessary to realize that Temelin will not be completed immediately. The first stage will have only a 200-megawatt capacity, and that certainly does not solve the entire Czechoslovak power problem. You know, if I had today the 40 billion [korunas] planned for Temelin—and everybody knows that it will cost more—then I would try to much more effectively help northern Bohemia. I would immediately purchase desulphurizing equipment from the West Germans. I would assign Vitkovice the task of building better mining machines so that the worst quality coal would not have to be mined. And I would spend at least one-third of that sum for energy-saving programs so we do not have to produce so much of it. While, in the meantime, the north Bohemian smokestacks will have to work that much more for Temelin because construction will take lots of energy.... By the way, I am convinced that the fundamental argument against nuclear power, namely the economic one, has not yet been fully understood. Do not forget that the investment in nuclear power is not just the actual cost of building the plant and the production costs, but the cost of the plant's eventual removal and the long-term storage of the burnt fuel as well. Nuclear engineers assure us that there is no problem that cannot be dealt with on a technical basis. In other words, that they are completely capable of building safe nuclear power plants. Fine, but at what cost? If one must invest more than is reasonable, then the whole thing does not make sense. Take the example of the United States. After the breakdown at the Three Mile Island Nuclear Power Plant, no new plant has been ordered for that location. The necessary safety equipment is so expensive that it would not pay for any power company to get involved.

[Tucek] By depending on solar power, for instance, do we not take the risk that one day we will sit in the dark under extinguished light bulbs?

[Moldan] Many countries, for instance, Austria among our neighbors, have chosen the nonnuclear way. Sweden has also decided that it will keep only existing nuclear plants and those only for the term of their normal productive life. These countries do not possess many more exploitable resources than we do. But they believe that they will manage to find alternatives—safer and also more expedient than nuclear power. For us, at this time, I am convinced that the question of resources is not the most important one. First of all, we must determine how much energy we actually need. After all, in comparison

with production in the developed countries, the expense of power is one-and-a-half to two times higher in Czechoslovakia.

[Tucek] The Czechoslovak power-production concept so far does not foresee a marked decrease in energy consumption, and it does not expect any limitation in nuclear power plant construction either. So who will decide on our nuclear or nonnuclear future?

[Moldan] This decision will have an impact even on the lives of the coming generations. After all, the highly radioactive waste reaches a half-life of many thousand years. And, in time, such waste will probably be stored in our country as well. In my opinion, neither a body of experts nor a government can decide on something as serious as this. The decision must be made by people. Since the possibility of holding a referendum does not exist in Czechoslovakia, I am convinced that this problem must be submitted to the parliament. However, I would not want the deputies to make decisions for purely emotional reasons. Before it is time to make a decision, they should become acquainted with all the implications of nuclear power.

[Tucek] That will not be simple. One has not been allowed to know anything about the subject for a long time.

[Moldan] True, information was suppressed and distorted in Czechoslovakia for 40 years. In the West, discussion on the subject has lasted for 40 years. It has not even opened yet in the deeper sense of the word in Czechoslovakia; so far there is nothing to be discussed—there are no research reports, only some unilateral propagandistic material either supporting or opposing the nuclear power. It is necessary to finally have a real debate—a confrontation of opinions—so people will eventually be able to make a decision based on objective information and comprehensive analyses.

POLAND

Federation of Greens Holds Second Congress

LD3007195390 Warsaw PAP in English 1750 GMT
30 Jul 90

[Text] Lublin, July 30—The second congress of the Federation of the Greens ended its five-day debates at Dabrowka near Lubartow in the Lublin Voivodship. The congress debated from July 25 to 29 and about 150 Greens, including foreign guests and activists of almost all ecological organizations and movements in Poland, took part.

The gathering adopted resolutions on results of the Chernobyl disaster, introducing ecological education, and resolutions against importing poisonous wastes and banned pesticides from the West.

The congress took decisions on steps against building a water dam on the Dunajec River and the nuclear power

plant in Zarnowiec. It also adopted a stand on starting work on ecological vision of Poland's development.

Silesian Authorities Seek Reallotment of Environmental Cleanup Funding

90WN0181A Katowice TRYBUNA ROBOTNICZA
in Polish 19 Jun 90 p 3

[Interview with Jan Chmielowski, advisor to the chairman, Silesia-Dabrowski NSZZ Solidarity Regional Administration by Tomasz Zienkiewicz; place and date not given: "Well-Known Diagnosis, Insufficient Treatment"]

[Text] [Zienkiewicz] The Regional Administration has recently been expressing its discontent with the activities of the environmental protection department.

[Chmielowski] That is true! And this discontent began to arise after the last visit of the head of that department, B. Kaminski, to Silesia.

[Zienkiewicz] This fact caused the Regional Administration to decide to obtain a written answer on this question.

[Chmielowski] At the end of May and the beginning of June of this year, we addressed a letter to Premier Mazowiecki which contained a request for a presentation to us of a way to divide the foreign resources for environmental protection. Minister Kaminski sent replies to us.

[Zienkiewicz] Again in the form of generalities?

[Chmielowski] His answer—of course—contained many concrete details, but most commonly these did not concern the questions that we were the most interested in. In addition, much of the information sent to us by Minister Kaminski aroused reservations in us. We found out from the letter that, among other things, we are to buy modern, expensive equipment in the West to furnish the monitoring stations. This means that instead of engaging in energetic activities aimed at improving the state of the natural environment, we will still be concentrating on research to define the level of environmental contamination. And yet we know perfectly well what ails us. Thus, the main effort should be, in my opinion, to move toward treatment, and not toward diagnosis and the further elaboration of details regarding the data that we have at our disposal. The next matter which inspires disquiet in us is the principle of regionalization of tasks in the field of environmental protection, which Minister Kaminski prefers. We see here a certain contradiction, because this principle of regionalization is at variance with the fact that resources remain at the disposal of the center. Minister Kaminski proposes also to call into existence a huge Silesia-Krakow region of concentrated ecological efforts. However, we are of the opinion that Upper Silesia—the most ecologically contaminated region not only in the country, but in the entire world—deserves separate, special treatment.

[Zienkiewicz] Are conjectures being made that the resources for environmental protection are not divided fairly?

[Chmielowski] We will be able to give an answer to that question when we have at our disposal (for which we are strenuously striving) detailed data. For the time being, we are basing our judgements on scanty press information, which is disturbing for us, in as much as one too often hears of the allotment to this or that region of excessive sums for environmental protection, but too seldom do we hear that such sums got to Upper Silesia. Of course, we realize that this is a problem affecting Poland generally; we know that other regions have their own needs in this area. However, we believe it is high time for the central authorities to realize in full that the ecological situation of our region is exceptionally dramatic. Each year on average 900 more persons die here than in other parts of the country; the infant mortality index amounts to 30 deaths per 1,000 births here (in Bytom it even reaches 50), whereas in other regions of the country this index does not exceed 19 deaths and still exhibits downward tendencies. At the same time, instead of radical steps serving to change this situation, it is proposed to us that Silesia start up a factory to produce air-protection equipment. This is a valuable initiative, but the production of this equipment does not itself change the situation.

[Zienkiewicz] What are the further intentions of the Silesia-Dabrowski Regional Administration on the above-mentioned question?

[Chmielowski] We intend to inform Premier Mazowiecki about the existing conflict. We also do not exclude that we will undertake activities aimed at recalling Minister Kaminski from the position he occupies.

[Zienkiewicz] Thank you for the interview.

YUGOSLAVIA

Waterworks Closure Causes Emergency in Prilep

LD3107164690 Belgrade TANJUG in English
1556 GMT 31 Jul 90

[Text] Prilep, July 31 (TANJUG)—The Yugoslav city of Prilep has been proclaimed a disaster area and the Republican Presidency will most probably declare a state of emergency after the regional waterworks dried up Monday midnight.

The water shortage today completely paralyzed this southern Macedonian city. Childcare day centers have been closed down and the local hospital has been forced to halt even the most urgent laboratory analyses and operations. The city's firms have also stayed shut.

The local waterworks has been shut down during repairs at the "Oslomej" Thermo-Electric Power Plant. Demands are already being heard for finding those responsible for this unscrupulous move both among the plant's management and the republican government.

The Yugoslav Republic of Macedonia has suffered from water shortages since the start of the summer. High temperatures and low river levels have almost completely dried up irrigation canals, thus threatening agricultural production on 170,000 hectares.

Many Macedonian towns are rationing drinking water and plants, whose production depends on the regular supply of water, have reduced production levels.

DOMINICAN REPUBLIC

Presidential Decree Mandates Reforestation

90WN0187A Santo Domingo LISTIN DIARIO
in Spanish 2 Jul 90 pp 1, 16

[Text] Yesterday President Joaquin Balaguer ordered a series of measures aimed at repopulating the country's forests, particularly in areas containing the headwaters of rivers, streams, and springs, as well as their banks, over an area of 30 meters measured from each shoreline.

He also stipulated that private owners of land on which water sources originate or flow are obliged to reforest the pertinent area. For this purpose they may request advice from the Forestry Directorate.

Following is the complete text of the presidential decree issued yesterday:

Number: 221-90

"Whereas, in order to save our principal watersheds from the danger of extinction that they face as a result of several factors, primarily deforestation, it is vitally important to implement legal provisions currently in effect, as well as to execute measures aimed at repopulating our woods;

Having observed the recommendations from the General Forestry Director;

Exercising the authority conferred upon me by Article 55 of the Constitution of the Republic, I decree:

Article 1. The General Forestry Directorate is instructed to adopt whatever measures are necessary for the immediate implementation of the following provisions:

a) Article 49, paragraphs b), c), and d), of Law No. 5856, of 2 April 1962, on Forest Conservation and Fruit Trees, which prohibit clearing, felling, burning, and cultivating on the banks of all rivers, streams, and springs, on a strip 30 meters wide on each side; and,

b) Law No. 632, of 28 May 1977, which prohibits the cutting or felling of trees or shrubs over an area of half a km. around the headwaters of rivers and streams that supply the watersheds throughout the entire country.

Article 2. Reforestation is ordered for all headwaters of rivers, streams, and springs, as well as their banks, over an area of 30 meters measured from each shoreline.

Article 3. Private owners of land on which water sources originate or flow are obligated to reforest the pertinent area; and, for this purpose, they may request technical advice from the General Forestry Directorate.

Article 4. These provisions must be implemented with the assistance and technical advice of the General Forestry Directorate by all departments of the state's public

administration and autonomous agencies that own or manage land through which river sources cross or originate.

Article 5. The General Forestry Directorate is instructed to create and train a corps of special guards whose principal mission will be to protect the wooded areas known as 'cloud forests' throughout the entire national territory.

Article 6. The expenses relating to the execution of these provisions will be met charged to the General Forestry Directorate budget, with additional contributions from the Office of the President of the Republic.

Article 7. The General Forestry Directorate is assigned to oversee faithful compliance with this decree, being obligated to submit a report to the Executive Branch every three (3) months on the progress made in implementing these measures.

Article 8. The Armed Forces, the National Police, and other departments of the state's public administration and autonomous institutions must provide all the necessary cooperation to the General Forestry Directorate for the execution and implementation of these provisions.

Article 9. Violations of this decree will be punished with the penalties stipulated in the aforementioned Laws Nos. 5856 and 632, of 2 April 1962 and 28 May 1977, respectively.

Issued in Santo Domingo de Guzman, National District, Capital of the Dominican Republic, today, one (1) July nineteen hundred ninety (1990), 147th year of Independence and 127th year of the Restoration.

Joaquin Balaguer."

Forestry Service Plans National Survey

90WN0187B Santo Domingo EL SIGLO in Spanish
3 Jul 90 p 2

[Text] To implement Decree 221-90, issued the day before yesterday by President Joaquin Balaguer, technicians from the General Forestry Directorate will begin touring all of the country's rivers, "meter by meter," to determine with mathematical precision the properties on which deforestation has occurred.

The agency's director, Colonel Pedro Candelier, said that, while traversing each river's deforested areas, note will be taken of the owners' names. A meeting will be called with them, and they will be given a deadline for reforesting each of the areas that they have deforested.

Col. Candelier explained: "We intend to tour all the rivers, from the headwaters to the end. We will give the owners of land through which any water source crosses, deadlines to begin reforestation, and if they they don't meet those deadlines they'll have to deal with the justice system."

Decree 221-90 obligates owners of land on which water sources originate or pass to reforest an area of 30 meters from each shoreline.

The forestry director told reporters from EL SIGLO that meetings have already begun with those assigned to districts and subdistricts, in order to immediately begin a kind of diagnosis of the situation in areas close to the rivers.

The official described the decree as moral support from President Balaguer to clearly establish the fact that the problem of deforestation will be handled with all the forcefulness required, and that any act committed against natural resources will be opposed personally by the chief executive.

The military officer declared: "The greatest concern of the Forestry Directorate is the rivers, and it is a concern that the entire country should have. That is why the decree was issued, so that there would be no pleading of ignorance when the measures are implemented; because this is a country in which there is too much pleading of ignorance."

Col. Candelier warned authorities in public institutions, legislative officials, and other prominent individuals that may be affected by the measure that there will be no privileges of any kind.

Candelier remarked: "We intend to begin with the state lands, to set an example. This includes the case of the State Sugar Council [CEA]. There are many rivers flowing through the land that it owns, and we have already notified it that the state must begin by setting the example. That is what we'll do; we have to put our own house in order, and then require this of others."

He added: "The CEA has already promised to begin reforesting the deforested areas, and everyone will have to obey this decree, because I'll see that it is obeyed. You

and the people can be certain that this decree will be obeyed, that it isn't just another decree that they have issued. The forestry laws here will be obeyed."

When asked about the possibility that the Forestry Directorate might supply plants to owners of land to be reforested, the official replied that they will have to produce their own plants.

He commented: "Everyone did the damage; so, everyone must cooperate. We'll provide technical assistance and contribute other types of aid, but the Forestry Directorate lacks the resources for producing all of the plants they may demand. Let them plant avocados and other fruits, but they must do the planting."

When asked about funding limitations affecting the Forestry Directorate, Candelier said that President Balaguer intends to improve the situation, "because he has always had a great concern for the forest problem."

Moreover, the forestry director claimed that, during his one month in office alone, he has reduced the indiscriminate felling of trees to zero.

Candelier observed: "We have attained the main objective, which was to stop the felling of trees. That has been achieved 100 percent. We have flown over all the areas, and since I took office not one tree has been cut down."

He also claimed to deplore the views of critics who see only the repressive aspects of the measures that the Forestry Directorate has had to execute, "to rouse a patient who is seriously ill."

He remarked: "One is obligated to repress acts in violation of the law, and I'm doing my duty, whatever the price may be. Someone felling a tree could be the highest ranking official, and come here. Because we are the ones who must set the example, the country will find out about it. The names of the violators will be published, whoever they are, so long as I'm here."

INTERNATIONAL AFFAIRS

Jordanian Minister on Water Resources, Israel's 'Encroachments'

JN1907170990 Amman AL-RA'Y in Arabic 17 Jul 90
p 2

[Excerpts] Amman—PETRA—Water and Irrigation Minister Dawud Khalaf has said that the annual amount of surface water in Jordan is 755 million cubic meters, of which 218 are flood waters, and 477 flow in valleys. Some of the latter can be brought under control through the building of dams and irrigation projects.

Speaking to Jordan Television within the "Economic Jordan" program the day before yesterday, the minister said ground waters are distributed among 13 basins. These are either renewable, fed from rain water, or nonrenewable such as the al-Disah waters that have accumulated in the water layers over the years. The minister noted that 280 million cubic meters are pumped from these subterranean waters annually and that 330 million cubic meters are being exhausted in underground wells. Thus, the water consumed is much more than the water that feeds the basins annually. [passage omitted]

The minister said: We are preparing a plan for 1991, which the prime minister has called the water harvesting year. The plan envisages the establishment of 10 dams and reservoirs in al-Azarq, al-Karak, Wadi al-Hanin [name as published], Ma'an, al-Mafraq, al-Jafr, and Wadi Ma'an. The Agriculture Ministry is building al-Ghawshah dam in al-Hamad basin with an annual capacity of 10 million cubic meters. This project requires four years to implement but will provide a new source for the ground water wells and water for livestock and will help start agricultural projects to serve local residents.

The minister said that if we carry out this plan and build al-Wahdah Dam over the next four or five years, we will be able to provide Jordan with the water it needs.

He said the intermediate plan will take care of the water problem until the year 2000 and that we have to prepare ourselves for the next decade. This, he said, requires considering plans to draw water from outside Jordan or to pump deep, underground water, which is a very costly process—more than one Jordanian dinar for each cubic meter. Another method is to treat waste water and use it for agricultural purposes.

Speaking about Israel's encroachments on the water of the West Bank, the minister said that it began in the early fifties when Israel exploited the al-'Awja' River waters, which provide 230 million cubic meters; the Gaza ground waters, from which Israel is pumping 200 million cubic meters; and 660 cubic meters from the upper portion of the River Jordan. The Jordan waters are used to fill Lake Tiberias. Only high salinity water reaches Jordanian territory.

The minister said that Israel recently began diverting al-Litani River waters in southern Lebanon and is expected to pump from the river 400 cubic meters a year. Israel, he said, plans to use this water in the Negev. He added that the total amount of water Israel has stolen amounts to 1.3 billion cubic meters annually.

He said the consumption of the average Palestinian in the West Bank does not exceed 25 percent of what the Israeli citizen consumes and that the Israeli citizens consume about 75 percent of the water in the West Bank and Gaza Strip.

Asked about the al-Wahdah Dam, the minister said that the blueprints and the invitations for tenders are ready. The financiers want environmental studies and say the issue of diverting the waters should be discussed. Therefore, talks with the financing sources are still deadlocked.

The minister said: Right now we are seeking new financing sources in the Arab and Islamic states to finance our projects, and the Planning Ministry has already exchanged letters with them. He said that the al-Wahdah Dam will hold 250 million cubic meters, half of which can be used for household consumption and the other half in agriculture, adding that without this project the agricultural projects in the northern rift valley region will not be carried out.

Iraqi Scores Israeli Water Resource Development Activities

JN1307134890 Baghdad AL-QADISIYAH in Arabic
10 Jul 90 p 2

["Behind the Events Column" by 'Ali Hasan Karim: "The New Zionist Scheme"]

[Text] In ancient times, the Israelites fought with the Palestinians to build by force two wells in their land. Today, threats of war are gathering not over political gains, but over water issues throughout the region. This has created disturbances and problems in relations between countries in the region and has pushed some of them into violating their agreements in accordance with their immediate needs in the struggle over limited water resources.

Thus, the Zionist entity has succeeded in improving its relations with countries located at the sources of water on the one hand, and in setting up an alliance with Ethiopia to exploit water resources more effectively on the other. This is in addition to creating regional struggles and fabricating crises, as happened over the waters of the Nile, Euphrates, and Yarmuk.

With the influx of Soviet immigrants and the increased consumption of water which that requires, apart from other agricultural and industrial requirements, the Zionist entity will face, near the year 2000, a crisis of decreasing amounts of water beneath the coastal rock strata when the situation will become difficult in terms

of its water resources. This has led the Zionist government to cling to the occupied territories, since they contain 40 percent of fresh water resources, and to ban the drilling of subterranean wells that affect water resources in the region.

In addition, the Zionist entity has resorted to exploiting 95 percent of spring water in the West Bank and to rationing water to Palestinians at less than 1967 levels. For example, the occupation authorities have given only five permits to Palestinians to drill new wells, whereas the Zionists have drilled approximately 40 wells in the same period. They have given Jewish settlers huge amounts of water compared to the Palestinians. They also pay a lower price than Palestinians, because the Zionist government pays the difference from its own pocket.

Zionist greed now has designs on Arab rivers. They have diverted both the Jordan and Yarmuk Rivers at the expense of their flow into Jordanian and Syrian territory, and they have diverted the waters of the Hasbani and Litani Rivers into the Galilee region. They are also setting up long-term schemes to control water resources and to throw the region into a maelstrom of struggle over water as it secures its future water needs. This issue requires an aware and united stand against the dangers of this greed in order to reach appropriate agreements in light of the latest changes.

Egyptian Minister Calls for ACC Environmental Projects

NC1107153590 Cairo MENA in Arabic 1345 GMT 11 Jul 90

[Text] Amman, 11 Jul (MENA)—Dr. 'Atif 'Ubayd, minister of state for administrative development and environmental affairs, has stated that there is great potential for cooperation within the Arab Cooperation Council [ACC] in the sphere of environmental protection.

In an exclusive statement to the MENA correspondent in Amman, he said today that among the most important areas for such cooperation are improving environmental conditions, protecting the environment and especially the coasts from pollution, halting encroachment on agricultural land, purifying water, and establishing green belts. He added that the ACC member countries have much expertise in these fields and could share this expertise among themselves.

He said that the ACC countries must start to manufacture equipment for environmental protection and water and air purification themselves instead of importing such equipment from abroad, particularly as this is still a new industry and the ACC countries have the necessary resources.

Dr. 'Ubayd said that international organizations and the developed countries are currently giving financial support to environmental projects regardless of the sites of these projects, because the threat to the environment is

not limited to a specific area, noting that, for example, tree felling in Africa affects the weather in Europe.

The minister added that projects ready to be implemented must be drawn up in order to benefit from the international environmental projects and the ACC countries must cooperate in preparing integrated projects in the field of environmental protection and presenting these projects to international organizations to receive funding.

He stressed the need for the ACC countries to search for water resources and rationalize the use of these resources and protect them from pollution. He noted that three of the ACC countries border the Red Sea and the ACC countries must work and coordinate their activities to protect it from pollution. He added that international agreements to protect this sea from pollution have been signed.

Dr. 'Ubayd attended the meetings of the ACC ministers of local government and municipal and environmental affairs which ended in Amman today.

EGYPT

Green Party Leader Says Party Has 15,000 Members

JN2807142790 Cairo AL-AKHBAR in Arabic 26 Jul 90 p 3

[Excerpt] During a meeting at the Akhbar al-Yawm Publishing House between the Green Party leaders and journalists from the newspaper AL-AKHBAR, Kamal Kirah, secretary general of the Green Party, stated that the party has decided to fight the next People's Assembly elections. He also said the party has begun to choose candidates to fight the elections, and added that the party has 15,000 members all over the country. [passage omitted]

ISRAEL

High Pollution Levels Recorded in Ashdod Area

90WN0121A Tel Aviv HA'ARETZ in Hebrew 25 Apr 90 p B2

[Article by Eli El'ad]

[Text] A significant increase in air pollution, irregular incidents involving hazardous materials, and the presence of toxic substances in well water—these are the important findings of the recently completed 1989-90 annual report of the Association of Cities for Environmental Quality of the Ashdod-Yavneh Region. According to the data, the number of environmental problems in the area increased fourfold.

This region, which includes Ashdod, Gan Yavne, Binay 'Aysh, the Nahal Soreq local councils, Gederot, and

Barner, is considered especially problematic—second only to the Haifa area—in terms of air pollution.

Seven Monitoring Stations

In 1989, 81 deviations from the stringent national standard (780 micrograms per cubic meter of air) for the most problematic air pollutant in Israel, sulphur dioxide, were recorded in the Ashdod area (compared to 22 deviations in 1988).

Unlike the Haifa area, where the refineries and the Electric Company are almost equally responsible for air pollution discharges, in Ashdod, the smokestacks of the Electric Company's Eshkol power stations site, Israel's largest heavy oil power site (to be distinguished from a coal power site), discharge about 90 percent of the sulphur gas emissions that pollute the breathing passages of residents in the Ashdod area. The refineries, on the other hand, discharge only about 10 percent of all sulphur emissions in the area.

The automatic monitoring system in the area includes five stations and a computerized control center. Another station, whose acquisition was approved, will be built this year in the city of Ashdod to replace an obsolete station.

Last year, the seven new monitoring stations were connected to the monitoring system of the Ashdod Association of Cities. They began to operate in the vicinity of the new coal power station south of Ashqelon, in another step toward activating a national monitoring system.

There was a sharp increase in the number of deviations resulting in sulphur dioxide pollution, despite only a 4.9-percent increase in the amount of sulphur dioxide discharged by polluting factories during the year, and despite a 314-percent increase in low-sulphur fuel consumption compared to the previous year. The increase in the number of deviations is attributed to meteorological conditions that caused the widespread dispersal of pollutants. According to the report, the warning system (the intermittent control system operated by the Meteorological Service) "does not predict the meteorological situation as it should despite all the improvements introduced to it."

Procrastination by the Ports Authority

The report indicates that, although pressure was exerted on the Electric Company, the increase in power station chimneys in Ashdod was not expedited last year. These chimneys are considered a primary, immediate, means to prevent pollution. The delay was caused mainly by procrastination on the part of the Ports Authority, the owner of the area where a chimney should be built.

In order to tighten supervision over the power station and to receive additional data currently not available to the Association of Cities, the Electric Company was asked to facilitate the direct linkage of the association's

computer to the power station's computer. The linkage is supposed to be implemented this year.

A decline was recorded in the amount of sulphur oxides discharged by the chimneys of Ashdod's refineries due to the installation of different devices.

Last year, factories near the refineries complained that their workers were experiencing headaches and dizziness. Checks revealed that the pollution levels were high, but did not deviate from levels customary in the area. They further showed that the extremely intense odors originating in the refineries are liable to cause these phenomena.

A New Problem—Coal

A new environmental problem is developing in Ashdod with the start-up of the second national coal unloading project (the first is in Hadera). Until now, about 300,000 tons of coal have been transported without resulting in air pollution. In the future, 2.9 million tons of coal will be transported in Ashdod via a 3-km conveyor to a reserve with a 600,000-ton capacity. From there, the coal will be transported to the power station and to factories by train and truck.

The Association of Cities recommends the introduction of a reverse intermittent control system: Instead of informing the Electric Company and the refineries when they must shift to low-sulphur fuel, it will inform them when they can shift to regular fuel. This recommendation deserves serious treatment.

Another environmental topic troubling residents of the Ashdod area concerns hazardous materials. Nine incidents involving hazardous materials occurred in the area last year. In some of them, persons were injured. Three incidents are connected in one way or another with the Agan Kemikalim [Agan Chemicals] pesticides plant. Four others occurred in the area of Ashdod Port, which is a sort of extraterritorial area (similar to the concession areas of Haifa's refineries and Ben-Gurion Airport in Lod) that is subject to the virtually exclusive responsibility of the Ports Authority.

In March 1989, the association initiated a tour of the port, following which the Environmental Quality Ministry's advisor for hazardous materials, Prof Itamar Vilner, recommended that the port concentrate containers holding hazardous materials separately, away from other containers, in an area with easy access. The separation was not carried out for a long time despite repeated requests. Only after a series of leaks from bromine and aluminum base metal containers, did the Ports Authority begin to understand the gravity of the situation. It improved cooperation with members of the association, and even suggested that Ashdod Port join the association. Recently, Prof Vilner's recommendations were also carried out, including his recommendation to separate hazardous materials containers.

In checks of nine wells in this area, it was discovered that industrial pollutants and pesticide and fuel residues had penetrated two wells near Ashdod. Some of this material is toxic and some of it is suspected of being carcinogenic or causing damage to the nervous and digestive systems. Concentrations of organic pollutants also increased in the wells, compared to 1988. It should be assumed that these dangerous pollutants will remain in the ground water for a long time to come.

Model of Cooperation

The director of the Association of Cities for Environmental Quality of the Ashdod-Yavneh Region, Aharon Zohar, sees the crowning achievement of the association's activities last year in the treatment that was given to the storage of hazardous materials at Agan Kemikalim, and in the formulation of a master plan for the expansion of that plant in the coming decade that takes into account the quality of the environment.

This plan combines the requirements of environmental quality with the projected growth of the plant, which, for years, has been a difficult, dangerous focus of environmental and health problems affecting nearby settlements, especially members of Nir Galim Moshav, which is very nearby.

Association members view the activities that were undertaken this year with Agan Kemikalim as a model for long-term, professionally-based environmental cooperation.

Second Stage of Dan Bloc Sewage Treatment Project Begins

90WN0121B Tel Aviv YEDI'OT AHARONOT
(Supplement) in Hebrew 27 Apr 90 p 18

[Article by Yafit Greenberg]

[Text] Last summer, residents of Gush Dan opened wide their windows and filled their lungs with air. The stench had disappeared. Beach lovers rejoiced, because the water's natural color had been restored, and suspicious bodies stemming from sewage had stopped splashing next to bathers. Experts speak of a dramatic change in the quality of the environment, namely, the cessation of environmental pollution caused by effluent.

In the past, the sewage of the entire Dan Bloc flowed into the sea, some of it directly, and some of it after draining into the Yarqon and Ayalon rivers. It polluted the beach, sea water, and streams, producing a foul stench. Swarms of mosquitos nesting in affected areas carried viruses into residents' homes, and the danger of epidemics was substantial and threatening.

The ecological level of the Dan Bloc has taken a step toward the late 20th century with the establishment of a sewage treatment plant in the area. The flow of sewage to the sea has stopped. Sewage is being channelled into a sophisticated plant that is not satisfied with preventing

pollution, but is also responsible for "producing" clean water for agriculture, adding to Israel's sparse water resources. The ecological achievement is impressive by international standards. Checks have proven that, since the plant was established, Israel's beaches have become the cleanest in the Mediterranean. Those who used to escape from Tel Aviv's beach to Greece's azure beaches will be happy to know that our beaches are now cleaner! The polio scare that occurred about a year ago directed public attention to the sewage problem, but not in the Dan Bloc. Here, sewage is not an ecological problem. It flows in closed pipes, is treated, and poses no danger of pollution, as certified by comprehensive tests conducted by the Health Ministry when the polio danger erupted.

The treatment plant's extraordinary success was no accident. It has been built by members of the Association of Cities (see box) step by step over the course of years.

[Box]

The Dan Association of Cities—Efficiency and Success

The Dan Association of Cities is an extraordinary example of a large, efficient body operated by a small team. "Perhaps this is the reason for our high achievements..." states a member of the team.

The association's chairman is Yitzhaq Kaspi, deputy mayor of Tel Aviv, and its vice-chairman is David Melamedovitz, the acting mayor of Ramat-Gan. The association has 19 members who represent seven member-cities. It operates on the scale of a municipal council.

"We have no opposition," Kaspi told us. "Here, everyone is in a coalition to solve the Dan Bloc's sewage and ecological problems."

The project's administration, which is responsible for establishing an automated treatment plant, is headed by the association's engineer, Gid'on Zatz.

[End of box]

Already in 1955, it was clear that the large population concentration in the area required a comprehensive solution to the sewage problem, because such a highly concentrated population "produces" an enormous amount of sewage. In order to handle the problem with maximum efficiency, an association of cities was established. It includes Tel Aviv, Ramat Gan, Giv'atayim, Holon, Bat-Yam, Petah Tiqva, and Bne-Braq.

Initially, it was thought that the sea was the solution to the problem. The sewage of the seven cities was drained in pipes to the mouth of the Yarqon (near Reading and in the Menashiya area). From there, it was made to overflow into the sea. Over time, it became clear that this system was not good for the environment, and it was decided that another way needed to be found.

"This also had a national aspect," states Yitzhaq Kaspi, the chairman of the Dan Bloc Association of Cities. "The association saw millions of cubic meters of water being

swallowed up by the open sea, while Israel's water resources were declining. Thus, the idea was raised to try to treat and reuse the sewage water. The goal was to bring the water quality to a level suited to agricultural irrigation purposes."

The association invested in research and the appropriate tests until it decided to establish an oxygenation basins plant in the sand dunes of Rish'on Letziyon. For this purpose, basins were prepared in an area of about 2,000 dunams, which permitted the treatment of about 20 million cubic meters of sewage per year out of an available total sewage supply of about 80 million cubic meters per year.

The plant's start was accompanied by a public storm raised by residents of the site, who complained of foul odors coming from the oxygenation basins. With their characteristic efficiency, experts of the Dan Bloc Association of Cities identified the source of the problem and solved it within a short time. Since 1973, the basins have been purifying sewage water without an accompanying odor to the satisfaction of residents and farmers, and water produced by the oxygenation basins has been flowing to agriculture.

The intention of the original plan was to continue to add new basins to keep pace with the increase in the area's sewage and to incorporate other cities and municipal councils. However, there were technological developments in the world, which led to the planning of an innovative, automated, efficient, advanced treatment facility. Members of the Association of Cities did not want to be satisfied with less. In 1980, the idea for the facility began to be implemented, and construction began.

The idea was to replace the oxygenation basins with an automated plant. "The advantages of an automated plant are great," states Yitzhaq Kaspi. "The clearly appreciable difference carries the field. The amount of sewage that can be treated at present in basins covering 8,000 dunams can be treated in an area of 500 dunams in the automated plant. Even more important is the matter of control. The treatment process in the basins is very dependent on the strength of the sun's radiation. We can bring the sewage, but it is subject to nature as soon as it reaches the basins. In the winter, there are problems during cloudy days when sufficient sunlight is lacking. In the automated plant, by contrast, we activate the processes. We have control. The engines are activated according to need, based on the amounts of sewage, which vary throughout the day and night. A mechanism automatically carries out this operation. Six drawing stations built in settlements in the area transfer sewage to the plant through 55 km of pipes varying in diameter from 60 cm to 2 meters."

Only 40 people are in charge of this complex system, which requires on-going maintenance. All of them, including management personnel, maintenance workers, and engineers, are employees of the association.

In the summer of 1987, the automated plant, in its first stage, began to operate at full speed. It absorbed all of the sewage of the association's cities as well as that of Giv'at Shmu'el, Ro'sh Ha'ayin, Or Yehuda, Ramat Ef'al, Bne-Tiqva, and Rish'on Letziyon, which joined under special agreements.

The plant, which was built with an investment of \$80 million, is creating a real revolution.

The flow of sewage to the sea has stopped completely, and the beaches of Tel Aviv and Bat-Yam have become, as stated, the cleanest in the Mediterranean. Since the plant started operating, 150 million cubic meters of water have been transferred to the national water holding.

The cost of treating sewage in the automated plant, despite its energy consumption, is lower than the cost of treating sewage in oxygenation basins. This is because the process of purification in the basins requires the addition of chemicals, which makes the cost of treatment more expensive.

The automated plant has proven to be an undisputed success. But this is not enough. Yitzhaq Kaspi states that the plant is too small to meet the need. The problem is more severe in the winter when rain waters add to the sewage, greatly increasing the amount of water reaching the plant.

Yitzhaq Kaspi states: "We are not able to absorb the entire amount. In addition, it is impossible to perform equipment maintenance when there is no reserve capacity to receive that quantity. The expansion of the plant will enable us to perform additional maintenance at a suitable level. It will also make it possible to receive additional sewage resulting from the growth of the population and industry in the area, and from the addition to the system of other settlements in the Central District, such as Rehovot and others. Government institutions are recommending that they be connected to existing plants instead of seeking other local solutions. In view of these facts, it was decided to expand and complete the treatment plant. According to the plan, because the plant is modular, stage two will be established in the same fashion as stage one, with an investment of about \$60 million."

Financial Aspect

No financing, including subsidies and grants, is being received for the completion of the plant. Construction and current operating costs are being financed entirely by sewage fees paid by residents of the area.

This is the only plant that is providing an environmental service at a high level. It serves about a third of the state's residents, protects them from nuisances, ensures that they have clean beaches, and injects enormous amounts of water into Israel's sparse water holding.

To date, no agreement or arrangement has been set up concerning the payment that the water holding will pay to the association, in exchange for the supply of recycled water, despite exhaustive discussions of the matter. The association's claim is based on the cost of operating the plant, and does not include in this price, investments in the plant itself. The price that the association is demanding is considerably lower than the price of water sold by the State Water Commission. The plant, which serves primary objectives, namely quality of life with suitable sanitation and the recycling of water, does not receive appropriate and fair treatment. The time has certainly come for a permanent arrangement regarding this matter.

Investments in the first stage totalled about \$80 million. About 40 percent of that sum was provided by World Bank loans and 60 percent was obtained through commercial banks, with the approval and recommendation of the Interior Ministry and the Finance Ministry. The association is repaying the loans with revenues from fees.

The second stage is now underway. Investment in this stage will be about \$60 million, part of which will be financed by the current budget that is covered by user fees, and part of which will be financed by loans from commercial banks with the recommendation and approval of the Interior Ministry. To date, contracts for civil engineering works (cement pouring), worth about \$15 million, have been signed with contractors with winning bids. Aside from the importance of the plant to the entire Dan Bloc, it is expected that construction work on it will provide employment to about 200 workers over a period of four to five years.

The association reports that use of part of the new plant's facilities will begin before the plant is completed. The sewage treatment plant is one of the most successful and important ones to be constructed in the scope of public service.

Public health and the recycling of water underscore the plant's great importance, and the urgency of establishing another [treatment] stage.

JORDAN

Water Pollution Problems Examined

*JN1407094090 Amman JORDAN TIMES in English
14 Jul 90 pp 1, 3*

[By 'Isa Wahbah, JORDAN TIMES staff reporter]

[Text] Amman—This year's headlines in the local papers were made by issues on Earth and environment, environment and pollution, ozone layer and its destruction, dumping of waste in populated areas and the subsequent uproar.

The headlines were meant to carry a message, but their impact on our lives soon fell into oblivion. We are as carelessly using spray cans, dumping waste, and enjoying

a ride in the car leaving thick fumes behind, and who would blame us? Our generation is safe. And if "après moi le deluge" (after me the flood) was good enough for Louis XIV, it is as good for us.

But if individuals cannot (for now at least) be held legally responsible for irresponsible acts, things should be different with factories which are a continuous source of pollution.

Jordan is a country with few water resources. Experts forecast a gloomy picture of the area, with armed confrontations over water. But even as we fear the future reading the warning headlines, we fall back on old habits and wash our hands of any responsibility.

At least it is not "me" the cause of all this.

But washing the hands should remind us of soap. And soap is one big culprit in our water's pollution problem.

According to Dr. Randal Brummett from the Near East Foundation (NEF), investigations and evaluation of water quality in the three reservoirs of the Kingdom (Wadi Ziglab Dam, Wadi al-'Arab Dam and King Talal Dam) found that water ranged from "essentially free from contamination" in the first dam, to "fairly polluted" in the second one and "severely polluted" in the last one.

The soap industry in Jordan continues to manufacture soaps with unacceptable contents—alkyl benzene sulfonates (ABS)—which are non-biodegradable detergents, according to Brummett. "This detergent gets deposited at the bottom, but when water is stirred it surfaces," he said.

The detergent affects fish and even though fishing in King Talal Dam is prohibited, there are people who do fish and end up eating contaminated fish.

The Royal Scientific Society (RSS) collected and analysed water and fish tissues several times during the summer of 1988. Heavy metals and bacteria were analysed and the verdict was—"unfit for human consumption."

It was found that arsenic and bacteria from genera salmonella, staphylococcus, vibrio, aeromonas and shigella were major pollutants.

While arsenic poses a longer term danger to fish and water users, the bacteria are an immediate threat.

Total bacteria counts from carp muscle tissue averaged 23,833 cells per gramme, while the maximum allowable count in the U.S. is 2.3 cells per gramme, according to RSS records.

Water in the dams feeds the Jordan Valley. It goes up to al-Khirbah al-Samra'. There, the Water Authority has a sewage stabilisation facility where water is treated. The water is oxidised and, according to the treatment technology, pathogenic bacteria and the parasite eggs die if

given enough time. In the end, through chlorine contact, bacteria is neutralised and water is considered properly treated.

The capacity of the water treatment facility is becoming increasingly smaller for the water that needs treatment. Too many industries have sprung up in the area along the rivers, bringing pressure on the treatment plant, leading to lesser time and efficiency spent on the purification process, according to Brummett.

Heavy metals, another long-term danger to fish and water users, are all below the standards set by the U.S. Environmental Protection Agency (EPA), except arsenic. Arsenic content should not exceed an average of 17.5 nanogrammes (1 nanogramme (ng) = 1 billionth of a gramme) per litre by EPA standards. But it was found in King Talal Dam in an average of 2,680 ng per liter. Even the slipperiest of the fish could not escape it.

The source of arsenic, Brummett said, could be pesticides.

Another contaminating bacteria found in the al-Zarqa' River, King Talal Dam and the water below the dam is the fecal coliform bacteria that comes from human waste.

The average in the al-Zarqa' River was 720 cells per litre (compared to the U.S. standard of 14.5 cells per litre). The dam averaged 42 cells/litre, and the water below the dam 13 cells/litre.

"Is chlorination enough to depollute water?"

"Contrary to belief, it does not help much and overchlorination is carcinogenic," said Brummett.

The Near East Foundation, after a study in 1988, estimated that getting rid of arsenic and bacteria would cost (at present prices) JD 1.2 million. The fish production, if the water were clean, could be 400 tonnes a year.

As it is, with so many government establishments being involved (the Water Authority, the ministries of water and irrigation, health, agriculture, the RSS, and the Jordan Valley Authority) and nobody really doing much about it. [sentence as published] The pollution problem at King Talal Reservoir renders it useless for fish production.

It is equally useless as far as drinking is concerned and even contemplating swimming should be the furthest idea on one's mind. The government, in an obvious gesture of recognition of the problem, has prohibited swimming in the dam and strongly forbade fishing. This, however, doesn't seem to keep all people away from it and consequences are grave for human health.

A point of real concern is the possibility of contamination of crops irrigated with water from the dam. According to Brummett, contamination is less likely to happen, as by the time water reaches down to the valley

it would have been further purified. The real trouble there comes from pesticides.

"There were seven cases of people dead because of ignorance rather than government apathy. But they died because of pesticides, not contaminated water," said Brummett.

Commenting on the dams' water and the possibility of finding a solution to the pollution problem, Brummett said: "The only reasonable solution is to control the input of pollutants. Sewage-fueled algal bloom would then be at least partially controlled with intensive fish production. Such fish production might well cover the cost of preventing pollution."

Water Authority Head on Water Shortage, Rationing

JN1607112390 Amman AL-RA'Y in Arabic 16 Jul 90
p 8

[By Wafa' al-'Aqaylah]

[Excerpts] Amman, PETRA—Sources at the Ministry of Water and Irrigation Resources say that there is a water shortage of more than 50 million cubic feet per year, with an annual water consumption increase of 10 percent; this is in addition to the danger posed by salination in some wells as a result of the depletion of water basins. If the present situation continues, the future of water supplies in Jordan will be threatened and any attempt to remedy the situation will be futile. [passage omitted]

Engineer Mu'tazz al-Bilbaysi, secretary general of the Water Authority, says that water shortages in Jordan are not a new problem. The problem has existed for a long time and its seriousness has depended on the amount of rainfall over the years. However, it has not posed a serious problem because the ministry took the necessary steps every year to control the water situation and to prevent it from getting worse by rationing water distribution in various areas in a scientific and planned way and in accordance with the requirements of these areas, in addition to the ministry's continued search for substitute water sources.

Al-Bilbaysi added that the shortages this year and last year were acute and their effects have become clear recently for many reasons, such as the scarcity of water sources and rainfall, the population increase, and the better standard of living among some sections of the population. This has led to a 10 percent increase in water consumption. Al-Bilbaysi added: Pumping water from the Zayy water station to Amman at a rate of 30,000 cubic meters a day has also stopped because of the scarcity of water in Al-Yarmuk River and the Jordan Valley. [passage omitted]

Al-Bilbaysi added that the current water situation has forced the water authority to resort to rationing water and supplying it to various areas in turn. [passage omitted]

Al-Bilbaysi noted that the water authority has submitted tenders for providing 12 million cubic meters of water from the Wadi al-Haydan, without affecting agriculture in that area, while trying at the same time to alleviate the impact of the water crisis. [passage omitted]

Irrigation to Valley Farmers Reduced by 20 Percent

*JN2107111190 Amman AL-DUSTUR in Arabic
21 Jul 90 p 28*

[By Jamil al-Sa'aydah]

[Text] Because of a shortage, The Jordan Valley Authority [JVA] has decided to reduce by 20 percent the amount of irrigation water allocated to Jordan Valley farmers. Engineer Talal al-Ghazzawi, chairman of the Jordan Valley Farmers Union, said the valley's agriculture will be harmed as a result. In a letter to the JVA, the Union's board of directors requested that the reserve of irrigation water in the valley be determined so that the union can take the necessary measures and the farmers can decide when to plant for the next agricultural season, which this year is expected to start later than in previous years.

Engineer al-Ghazzawi said that drawing water from the Wadi al-'Arab and Sharhabil Ibn-Hasnah Dams to Greater Amman over the months of April, May, and June, and the low water level in the King 'Abdallah Canal were behind the crisis in irrigation water in the Jordan Valley.

He said that the JVA is now distributing irrigation water to existing plants such as citrus, banana, and fruit trees, while it has stopped distribution to new summer plants.

He expressed hope that the JVA will respond to the Union's request for determining the amount of water so that a clear program for water distribution can be drawn up and the time for planting for the next season can be fixed.

SYRIA

Problem of Drinking Water in Damascus Analyzed

*JN2607163090 Damascus AL-BA'TH in Arabic
17 Jul 90 p 4*

["Spotlight" column]

[Text] Last Saturday the prime minister chaired a meeting to look into the problem of drinking water for

Damascus. Also attending were representatives from the Ministry of Irrigation, the Barada basin, and departments in charge of potable water from 'Ayn al-Fijah.

The meeting was held against the backdrop of a very dry winter producing a shortage of water in the springs of Barada and 'Ayn al-Fijah, and the consequent virtual disappearance of Barada water from Damascus—a rare occurrence that has resulted in supplies being cut off for as many as 13 hours a day from the entire city.

The meeting addressed a crisis of major proportions in a densely populated city—1,0540 people per square kilometer—which is expanding unchecked in population, construction, and industry.

I believe that, had it not been for the squeeze, we would not have had to pump water from Barada to 'Ayn al-Fijah. It would have been advisable to reserve Barada for irrigation, especially since the treatment of Damascus sewage has yet to be completed. As we all know, with the capital's meager rainfall Damascus, without Barada, would be little more than desert instead of a fertile oasis. Barada feeds the capital's underground basin whose wells supply it with enough water for 80,000 hectares of groves and fields.

The unpleasant fact is that, with the present rate of population growth we are bound to consume all the waters of Barada. We know from last year's experience that Damascus' daily water requirement is 640,000 cubic meters, of which no more than 220,000 comes from 'Ayn al-Fijah. Water is less abundant in Barada than in 'Ayn al-Fijah, and the two sources still fail to meet the needs for drinking water.

If we are stuck with remedial measures now, is this to say that drastic solutions are out of the question? The answer is no. There are solutions, costly and difficult as they may be. We need to build dams to trap surplus rain water in winter, and to institute severe restrictions on the building and industrial sectors in Damascus. Further, we need to build plants to treat salt water and then replenish Barada with the purified water. And finally, the general public will have to be discouraged from squandering this precious commodity.

National Policies, Economic Stimuli Viewed; Public Activism Urged

90WN0147A Moscow IZVESTIYA AKADEMII NAUK
SSSR: SERIYA EKONOMICHESKAYA in Russian
No 3, May-Jun 90 pp 22-30

[Article by B.N. Porfiryev: "Economic and Organizational-Managerial Problems in Ecological Policy of the USSR"]

[Text] This article describes the current ecological situation in the USSR and emphasizes the negative impact of the rising water and air pollution on the morbidity and mortality of the population. The author, in using the analogy method, provides an economic assessment of the damage caused by environmental pollution and by the irrational use of natural resources.

An attempt has been made to establish the level of the minimally necessary investments into the conservation sphere. A strategy has been proposed for an ecological policy in the USSR under the conditions of perestroika. The basic tasks and functions have been formulated for the principals involved in the management of the utilization of nature, including the state bodies and industrial enterprises. Particular attention has been given to the role of the public in working out and implementing the ecological strategy.

Over the last 15-20 years, the ecological situation in the Soviet Union has deteriorated sharply. The mass information media, and not to say the scientific publications, have brought out the virtually continuous interference of man into natural processes and the destruction of the ties existing in nature. More and more "sore spots" have appeared on the nation's ecological map.

In comparison with 1975, the discharge of polluted sewage into the interior bodies of water of the nation, according to the official data of the USSR Goskomstat [State Committee for Statistics] has declined by one-third. However, there has been no compensating for the negative effect of the pollution. As a whole over the last 20 years, the designated indicator has increased by almost 5-fold: from 35 to 152 km³ [7, 8, p 78]. By the year 2000, it is assumed that this will increase by 2.5-fold. Up to now, around 40 km³ of sewage¹ (including drainage and collector) are released into the bodies of water completely without treatment or as insufficiently treated, including around 80 percent in the bodies of water of Russia [14].

It is no surprise that the problem of water quality is becoming extremely serious, and primarily on the small rivers of which there are around 150,000. More than one such river has been turned into a drainage ditch and has ceased to exist as a freshwater body suitable for catching fish, bathing and so forth. The need of protecting the large lakes such as Baykal, Ladoga, Sevan, Balkhash, Issyk-Kul and others is acute. At present, each year Lake Ladoga alone, the largest in Europe, receives 7,000 tons of phosphorous, or 3-fold more than 25 years ago; here a

constant rise is observed in the concentration of heavy metals and in particular copper and lead [12].

An equally severe situation has arisen on the large rivers. Probably the most critical is the Volga as well as the tributaries which feed it, in particular, the Oka. Each year some 20 km³ of sewage is released into the Volga, that is, almost 1/2 of the national amount, including over 1.1 km³ of effluents in the delta region alone and these contain toxic substances which greatly exceed the level of the maximum permissible concentration (MPC). From the rice paddies of Astrakhan Oblast alone, each year approximately 600 tons of just pesticides of some 50 types are washed out. And it is precisely in the Volga Delta, according to the estimates of the specialist ichthyologists, that as of now 90 percent of the world sturgeon stocks are concentrated [13]. As a whole, in approximately 40 percent of the monitored bodies of water, pollution exceeds the standard by 10- and more fold [5, No 13].

The situation is no better in the seas. In the Caspian Sea, the phenol concentration alone exceeds the MPC by several-fold. The content of petroleum products in the Black Sea is 2-fold above the norm. There is also a difficult situation in the Baltic which is considered one of the most polluted basins of the world [4, No 39; 5, No 13].

As for air quality, over the last several years in many cities the rate of its deterioration has declined but in a majority of the major cities, the volume and levels of pollution have dropped, including in the most polluted industrial centers of the nation. However, there are no grounds for complacency. Each year, industry and transportation release into the atmosphere over 100 million tons of harmful substances, and their aggregate volume, according to certain estimates, reaches 140 million [16]. The basic "burden" of the pollution, as in terms of the water resources, occurs in Russia with approximately 70 million tons, or according to the humblest estimates, over 1/2 of the national volume [14]. For comparison: in the United States with a gross national product (GNP) which is approximately 4-fold above ours, each year 150-155 million tons of harmful substances are released into the air, in other words, production there is more than 3.5-fold purer.

As a result of air pollution in the USSR in 1989, a bad ecological situation was observed in more than 100 towns and cities and in which 18 percent of the entire nation's population resides with more than 50 million persons. In 68 cities, instances were noted of extremely high concentrations of harmful substances caused by the effluents primarily of enterprises of the lumber, metallurgical and chemical sectors [10, 29 July; 8, p 31]. Particularly "under siege" are the cities of Russia and primarily in the north of the republic and Siberia: Arkhangelsk, Bratsk, Novodvinsk, Norilsk, Ust-Ilimsk and others. According to the data of the Chairman of the RSFSR Goskompiroda [State Environmental Protection Committee] A. Kovalchuk, of the 273 Russian cities

where they monitor the state of the atmosphere, in 1 out of 7 the living conditions are extremely unfavorable if not to say dangerous and this is over $\frac{2}{3}$ of the total number of the ecologically worst cities of the country.

In the air of Gorkiy, Smolensk, Omsk, the nitrous oxides are 20-fold above the standard, sulfur dioxide in Nikel is 33-fold, methyl mercaptan in Ust-Ilimsk is 60-fold, 183-fold in Volzhsk, 289-fold in Arkhangelsk and 478-fold in Novodvinsk, while the benzpyrene content in the air of Novokuznetsk surpasses the MPC by 598-fold [14]. Just in the first half of 1989 in individual cities, there was a surge polluting of the atmosphere with toxic substances. In particular, as a consequence of the leaking of chlorine from the city water treatment facilities in Khabarovsk, people were poisoned. There were also casualties as a result of emergencies at the Batumi Chemical Pharmaceutical Plant, the Alaverdi Mining-Metallurgical Combine [10, 29 July].

At the First Congress of USSR People's Deputies, Corresponding Member of the USSR Academy of Sciences A.V. Yablokov pointed out: "Twenty percent of our nation's population lives in ecological disaster zones and another 30-40 percent in ecologically bad conditions. As a result, there has been a rapid rise in the sickness rate linked to a deterioration in the quality of the environment. One out of every 3 men in such regions during his life will fall ill with cancer. Each year the number of cancer patients increases...while the average life expectancy is 4-8 years less for us than in the developed nations of the world [10, 10 June].

Inevitably, questions arise on the reasons for the existing bad ecological situation and most importantly on the ways for mitigating this. Without going into a detailed analysis of all the reasons for the exacerbation of the ecological situation in the nation but rather trying to isolate the main one, we feel that this would be the conservative administrative-command, bureaucratic system of managing society, its productive forces, including the use of nature. This has strengthened the monopolistic position of the resource-exploiting departments and production and the residual principle for allocating financial means for environmental purposes and has undermined the sovereignty of the people's self-management bodies and the soviets on the spot, having subordinated their activities to narrow pragmatic interests. "The irresponsible attitude of certain ministries and departments of the USSR toward the questions of the use of nature has sharply worsened the state of the environment in individual regions of the nation. In many elements of sectorial management there is a prevalence of departmental and subjective approach to the taking of economic decisions. There continues to be the faulty practice of the "residual" principle for allocating material and financial resources to implement the urgent tasks of conserving nature" [9].

In line with this, it is natural to seek out solutions aimed at mitigating the ecological situation in the nation and primarily in the area of the state management of the

nature use sphere. Over the last 2 years, here positive shifts have been noted and these have been caused by the setting up of the USSR Goskompriroda and its republic local divisions although it has far from always justified the hopes placed on it. The restructuring of the nature use management system is a many-sided process encompassing changes in the priorities of financing, the sectorial and territorial production schemes, the procedures for taking economic decisions and, most importantly, new thinking by both the economic and soviet leaders and by the entire population.

Without claiming to treat all the problems each of which merits an independent analysis, let us endeavor to examine certain of what, in our view, are the most essential.

The main goals and tasks of ecological policy are formulated "proceeding from a recognition of the vital need to settle ecological questions not only for the Soviet people but also for all mankind" [see 9]. Such a posing of the question means primarily that rational nature management and environmental conservation along with public health should stand in first place in the series of priorities in the state's social policy. In considering the close linkage of medical (the etiology of illnesses) problems with the quality of the environment, it is clearly valid to speak about the priority of the medical-ecological or ecological policy in relation to other social problems.

This in essence means the ecological imperative of social development as formulated by Academician N.N. Moiseyev and the following of which is essential both on the level of the survival of the nation as well as for realizing the strategy of accelerating scientific and technical progress. Without effectively solving ecological problems, over the long run we will undermine the natural and hence the food, raw material and generally the economic potential of the nation, not to speak of the main treasure, the health of the population.

Clearly, a change in the place of ecological policy in the social strategy of the state means also corresponding changes in the financing priorities. It is essential to overcome the existing significant gap between the real demand for allocations for rational nature management and ecological security and their actual level. What are these demands and respectively the gap which must be overcome?

For answering the question it is essential first of all to possess data on the harm which society bears as a consequence of the inefficient policy in the nature management sphere. Unfortunately, in a majority of instances the data are lacking or are concealed in the bowels of the departments uninterested in publicizing them and without this information corrective calculations are impossible. For this reason, let us turn to estimates using the analogy method.

At the end of the 1960s, around 200 million tons of harmful substances were released into the atmosphere of the U.S. and the discharge of untreated sewage by

industry was around 4 km³ [18]. During this same period, the damage to the environment by pollution was estimated by American economists at 3-5 percent of the GNP. In considering the aggregate harm caused by economic activity to nature and to man, to his health, and including, in addition to the pollution of the biosphere, the irrational use of natural resources and their irrecoverable loss, the figure of 5 percent of the GNP with a large degree of confidence can be considered the minimal assessment of the aggregate ecological damage. In the first half of the 1970s, for mitigating the acuteness of ecological problems, the United States annually has spent 2.1-2.2 percent of the GNP on protecting the environment. Thus, the gap was approximately 2.5-fold and this probably not least of all predetermined the failure to solve a number of ecological problems at present.

At the same time, the significant absolute expenditures for conservation purposes (in the 1970s approximately \$30 million a year as an average) combined with a well-conceived but not always consistent policy in the nature management sphere brought tangible results to the United States. The volume of the release of hazardous substances into the atmosphere of cities over the last 20 years has declined by almost 1/3 (for a number of pollutants substantially more by 60 percent or even 90 percent), and untreated industrial sewage by almost 3-fold [15, 20]. Nevertheless, new ecological problems have arisen or become apparent and these are related to the polluting of the environment with dangerous (carcinogenic and mutagenic) components. As a result, at present many U.S. specialists assess the ecological harm as significant, on a level of the same 5-6 percent of the GNP. For comparison, we would point out that according to the calculations of West German specialists, the given indicator for West Germany is a minimum of 5-6 percent and a maximum of 10 percent of the GNP [17].

Considering these calculations and the previously given data on the volume of the release of toxic substances into the air and the discharge of untreated sewage into the bodies of water of our nation, let us attempt to tentatively assess the ecological damage felt in the USSR. At present, the absolute indicators for the mentioned discharges in the USSR are comparable with data for the United States, but they are substantially higher for the discharge of untreated industrial sewage. Analogous indicators at the end of the 1960s were correspondingly substantially lower and comparable. With all the apparent conditionality of the comparison, it can still be assumed that by analogy with the United States, the amount of damage can be roughly assessed at approximately the same amount, that is, approximately \$200 billion as an annual average or (according to the official exchange rate) some 130-140 billion rubles and this is 15-17 percent of the GNP.

The given figure at first glance seems unjustifiably high. However, let us consider that with the current level of technology, the United States and a number of other

countries have analogous indicators on a level of at least 5-6 percent of the GNP and domestic technology, as has already been pointed out, is almost 4-fold dirtier than the American. We must also consider the incomplete data on the USSR which is the result, in particular, of poor statistical reporting and this, in turn, is caused by the low technical equipping of the ecological monitoring services. This as yet is unable to cover a series of population points as well as record the low but still health-hazardous doses of harmful substances in the air and water.

Finally, let us consider other assessments by Soviet specialists according to whom just the level from water and wind erosion and the irrational exploitation of mineral wealth (the losses of mineral raw materials in mining and processing virtually are not declining) is at least 25 billion rubles or 3 percent of the GNP.² And certainly here we do not include the irrecoverable losses of valuable forest, fish and fur resources and medicinal plants which as a minimum would double this amount. As for the environmental pollution, the damage from it, according to estimates by scientists at the TsEMI AN SSSR [Central Mathematical Economics Institute of the USSR Academy of Sciences], the VASKhNIL [All-Union Agricultural Sciences Academy imeni Lenin] and others is at least 55-60 billion rubles [see 1], or over 7 percent of the GNP. If we add up these estimates which must, in the opinion of their authors, too, must be considered minimal, then we obtain an amount equal to 13-14 percent of the GNP. As we can see this is very close to the result obtained on the basis of the analogy method.

Thus, the gap between the actual expenditures for protecting the environment and the rational utilization of natural resources (9 billion rubles as an average per year in 1980-1986 and 10 billion rubles in 1987-1989) [5, No 13] and the demand for resources for these purposes is an 11-15-fold amount or 4.5-fold above the analogous gap in the United States.

Proceeding from the given estimates and the imperative-ness of solving the ecological problems and the capabilities of the economy, it is essential to increase the aggregate expenditures by the state budget and chiefly by the enterprises which are the guilty parties of pollution by 3-4-fold, bringing them up to 30-40 billion rubles annually (in constant crisis). The given amount must clearly be considered as the minimum necessary.

We should point out that in discussing the question of the level and scale of financing of measures to protect man and nature against irrational management, it is a matter solely of the volume indicators and does not involve the efficient utilization of the allocated resources. Suffice it to say that in 1988, the fulfillment of the plan to complete sewage treatment facilities in the USSR was 59 percent, for the recirculating water supply system it was 53 percent, and for units to recover and decontaminate harmful substance from released gases it was 66 percent, while in the fuel and energy complex—probably the chief guilty party of ecological disasters

(among the industrial sectors)—these indicators were even lower [5, No 14]. The situation was not much better in the other sectors. Thus, the USSR Minkhimprom [Ministry of Chemical Industry] in 1986-1987 used only 80 percent of the capital investments for conservation measures and this did not prevent the ministry from regularly paying bonuses to the leaders of the main production administrations and enterprises. At the same time, in 1987, instead of a drop in the release of hazardous substances, an increase in them was permitted of some 9,600 tons, and for industrial sewage by 55 million m³ [10, 21 July]. The situation has not improved over the last 1.5-2 years.

The overcoming of the designated gap between the need for allocations and the actually provided funds like an increased return from their use should be commenced immediately, in the current five-year plan. Both foreign and domestic experience are persuasive that prompt investments into conservation activities and rational nature management end up being several-fold less than those expenditures which society bears in compensating for the caused losses (if these can be recovered at all). Capital investments for these purposes in the nation, according to certain estimates, are paid off 1.3-fold faster than as a whole for the national economy [3, No 22]. The repayment time for low-waste technologies in the United States is from a year to 5 years [21]. Thus, these expenditures are not only socially imperative; they are also economically effective.

In emphasizing the priority of ecological policy in a number of other areas of the state's social strategy, we are aware that in addition to the ecological imperative per se, the state and government are confronted with other pressing tasks including those related to human ecology: the production of food, energy, the providing of housing and so forth. This poses the difficult problem of allocating the limited resources in such a manner that all the key problems are resolved efficiently, including the ecological one. The solution is seen in converting the economy and primarily industry to more productive methods which provide high product quality and at the same time conserve raw materials and are ecologically clean. The extensive use of waste-free and resource-saving technologies in all the national economic sectors should become a decisive factor for improving conservation activities in the USSR.

Calculations indicate that resource saving is the cheapest method for developing social production and for simultaneously solving the socioeconomic and ecological tasks. While in 1975 a 1 percent savings in material (essentially natural) resources equaled a rise of 4.9 billion rubles in USSR national income, in 1986, the figure was almost 7 billion rubles [2, No 23].

Investments into waste-free technology are highly effective as is confirmed, in particular, by the following data for the United States. At present, the nation each year forms, according to different estimates, from 260 million to 1 billion tons of wastes and around \$70 billion are

spent on combating this, including around ⅓ by the industrial firms. In order to reduce such burdensome expenditures and obtain a profit, the U.S. companies more and more extensively are converting to low-waste and waste-free production methods. Thus, the well-known 3M Corporation, due to implementing a program under the symbolic name of "Preventing Pollution Pays," since 1975 has saved \$420 million over the 13 years or an average of \$32 million a year, and repayment was achieved after the start of its implementing. In North Carolina, a survey of 74 firms who have converted to resource-saving technologies which reduce the bulk of waste products by 20-98 percent has shown that investments were repaid within 5 years.

Even the military enterprises which are generously financed by the Pentagon have not remained outside the new and advantageous initiative. Thus, the Air Force Base in Ogden, Utah, in converting from a chemical to a mechanical method for removing old paint from the aircraft and ground equipment, has reduced the bulk of solid wastes by 95 percent, liquid ones by 100, energy expenditures by 50 percent, labor by 90 percent, and the repayment was achieved in just a month! [19]

Thus, the low-waste and waste-free technologies the introduction of which is rapidly repaid provide the greatest output of end product per unit of raw material and considering the high level of automation for such production processes also per unit of labor expenditure. The socioecological effectiveness of such technologies is also high. They are ecologically clean, they do not have a dangerous effect on human health and require minimum raw materials and this helps to preserve natural resources and makes it possible to exploit them for other, for example recreational, purposes. We would point out that according to certain estimates, the recreational value of a number of natural resources, for example forests, is several-fold (and sometimes 10-fold) higher than their commercial value as a source of wood. The establishing of realistic prices for the use of natural resources should also conform to a resource-saving policy and this undoubtedly will reduce their irrational consumption.

There is an obvious need for long-term priorities in ecological policy and forms of their realization as well as phases of implementing the policy itself. First of all, there must be a careful scientific analysis of the current situation in the nation. Certain important results of this are reflected in the report on the state of the environment in the USSR and this has been prepared for the first time in our nation. It describes the state of affairs in the area of protecting the air, water, soils, the forest and mineral resources, animals and plants, as well as in the ecologically worse regions of the nation. The report has been published but it is still not available to the entire interested community and has not become a subject of broad discussion by it. The publishing of such reports, in addition to everything else, helps establish the priorities of the main ecological programs which comprise the core of the state strategy in the area of nature management, in

allocating resources under these programs as well as in the zoning of the territory in terms of the environmental quality criteria.

The Decree "On the Fundamental Restructuring of Environmental Protection in the Nation" as adopted by the CPSU Central Committee and the USSR Council of Ministers has formulated the basic functions of the USSR Goskompriroda as an Union republic state management body in the area of the protection of nature and the use of natural resources, but these have not been divided between the central personnel and the regional divisions. In our opinion, the regional divisions (which do not essentially have to coincide with the territorial-administrative divisioning of the republic, kray and oblast) should be entrusted with the following functions: analysis of data from environmental monitoring; the working out on this basis of local and/or regional ecological standards which would take into account the specific ecological situation on the spot; the transmission of the mentioned information and standards to the central personnel of the USSR Goskompriroda for working out national standards and an analysis of the situation for the nation as a whole. The results of the given analysis should be reflected in the mentioned report. In addition, the information obtained by the regional divisions and the standards worked out by them should also be transmitted to the local management bodies (soviets) for supervising the ecological situation on the spot. The divisions together with the soviets should participate in supervising the observance of the standards by inspections, checks as well as by regular supervision.

The central national committee, on the basis of the data obtained from the regional divisions as well as from other, including international, sources of information, can perform a number of functions. In the first place, long-range (strategic) planning, including the elaboration of the state ecological strategy with the determining of the long-range tasks and main programs and the allocating of resources for implementing these.

Secondly, legislative regulation, including the elaboration and supervision by the courts and procuracy of the carrying out of conservation legislation, including the national ecological standards for environmental quality. At present, the first important step has been taken in the given area with the preparation of the USSR Law on Environmental Protection for discussion by the public and by the commissions of the USSR Supreme Soviet.

Thirdly, there is the expert function providing ecological expert evaluation of draft laws for the construction of national economic projects which might be capable of having a significant impact on the environment. For this purpose, it is essential to use the information acquired in the sectorial ministries and it is possible to draw on experts from the academy institutes and VUZes as well as the scientific and technical cooperatives on a basis of cost accounting contracts. The expert evaluation procedures without fail should include an analysis of the ecologically worst of the possible project variations in

order to avoid or maximally prevent the arising of an emergency situation such as the disaster similar to the Chernobyl or the Aral.

Thus, according to the proposed scheme for organizing nature management the USSR Goskompriroda concentrates in itself the functions of strategic management in the designated spheres while the regional divisions, like the regional authorities, provide tactical management in this sphere. The functions of operational management rest on the enterprises and local authorities. The enterprises, in being guided by the set local and regional ecological standards, should ensure their fulfillment, in being guided primarily by waste-free and low-waste technologies which conserve raw materials and energy. In converting to such technologies which takes time, it is essential to provide a maximum start-up and introduce various means for treating harmful effluents and sewage and harden control over the procedure for transporting and storing harmful wastes.

In order that the designated activities be carried out in practice by the enterprises, these activities should be encouraged by administrative-legal and chiefly by economic methods. As for the legal aspect of the question, here we should note the affirmative role of the USSR Law on a State Enterprise where one of the articles obliges the enterprise to fully compensate for a negative impact on the environment, to build and efficiently operate conservation facilities, to carry out all conservation measures as well as pay for the use of natural resources from their own funds or from credit. Otherwise, its operation, as is pointed out in the law, can be halted. We feel that the given point should be strengthened, having pointed out that the enterprises which flagrantly violate the environmental quality standards should be closed down.

Supervision over the carrying out of the ecological standards and the requirements of the mentioned law by the enterprise should be entrusted to the local soviets which would rely on skilled aid from the regional divisions of the USSR Goskompriroda as well as on the labor collective councils and the trade union organizations of the enterprises themselves. Under the conditions of full cost accounting and the sharply stiffened penalties for violating ecological standards the enterprises will be interested in not exposing themselves to the designated sanctions and thereby avoid the stopping of production as this inevitably tells on the profit and, consequently, the earnings of the enterprise personnel. The application of sanctions for the mentioned violations is a prerogative, clearly, of the courts and procuracy.

Among the measures for economic incentives of effective conservation activities by the enterprise, we would point to the following. In addition to credits for installing purification equipment and the introduction of low-waste production methods, it would be advisable to employ accelerated amortization for the given equipment and production lines, paying, for example, corresponding compensation from the conservation entries in

the budgets of the sectorial ministries as well as the local and regional budgets. The volume of designated deductions can be determined as a percentage of the total conservation expenditures by the enterprise for reducing the pollution level and the intensity of exploiting natural resources by a certain amount. The designated percentage must be calculated according to an increasing scale, as the capital intensiveness of conservation measures rises as the ecological situation improves. For example, with a 10 percent reduction in the pollution level, the compensation will be 30 percent of the necessary expenditures and with a 15-percent reduction the compensation will be 1/2; the real amount of compensation is set proceeding from the specific practice of the sectors employing mathematical economics models. Probably only such an approach makes the expenditures on conservation measures advantageous for the enterprise and the measures themselves realistic.

We should particularly point out that in all stages of elaborating and implementing the state ecological strategy and policy, it is essential to have effective involvement of the public, including the conservation organizations which need the greatest possible support of the soviet and party bodies. These activities, in addition, should be reinforced in the legislation, as has been done, in particular, in the United States in the 1969 National Law on Environmental Protection. The largest public organizations of supporters of environmental protection who in the United States number over 1.5 million do not limit themselves to the discussing of plans, programs and projects. Independently of the corporations and state agencies, they provide ecological expert evaluation of the plans for structures which represent the greatest risk for the public and for nature. The expert evaluations are also provided by economists, lawyers and engineers who are employed in the organizations and are specialists in protecting the environment. The smaller conservation organizations called in specialists from universities.

In the USSR, under the conditions of self-administration, the range of actions of the public should be as broad as possible. This would include: from informing the local authorities of violations of the nature management rules (the alarm function); active discussion of draft laws as well as the plans for the construction of enterprises and structures from the viewpoint of their conformity to the requirements of medical and ecological safety (the expert function) to supervision over the carrying out of voter demands by all levels of deputies (the control function).

Moreover, in using the procedures of the election campaign and elections themselves of the people's deputies, the public conservation organizations can have and, as was shown by the elections to the USSR Supreme Soviet in June 1989, already do have an effect in promoting to the superior state bodies those candidates who actively come to the defense of nature and the health of the people and are against the imposing of terms by the departments. Conversely, the electoral mechanism has

been used as a brake against those candidates whose programs and actions are seen by the public as antiecological.

It can be assumed that in the process of the elections to the local soviets, such practices will be further developed. As is shown by the experience, in particular, in the United States, opportunities for this do exist. Thus, during the mid-term elections to the U.S. Congress in 1982, of the 48 candidates supported by the environmentalists, victory was won by 34, or 71 percent. In 1983, under the pressure of public opinion, the administration of R. Reagan was forced to remove the then secretary of the interior who had ignored the questions of utilizing natural resources and the administrator of the Environmental Protection Agency the activities of which seriously weakened ecological policy [6]. In 1986, in the elections to the Senate of the 100th Session of the U.S. Congress, victory was won by 6 new democratic senators and in their political platform an important place was held by the problem of combating environmental pollution [18].

We should note the broad support for the activities of the public environmental organizations by the U.S. population. According to polls, over 3/4 of the population is sympathetic or actively participates in conservation activities, over 3/4 is in favor of having the observance of environmental conservation measures be guaranteed in any event and of them almost 3/4 feels that it is better to close down enterprises and lose jobs than permit deviations from the safety standards and ecological norms [6, pp 101-102]. Indicatively, the results of the polls were recorded at a time when in the United States the strongest postwar economic crisis of 1980-1982 had developed and was accompanied by increased unemployment and a drop in allocations from the state budget for social and environmental needs.

Activating the public in the USSR, its specific actions to shape a competent deputy corps, also on ecological questions, and the full, actual use of all the above-listed managerial functions are, in our view, a crucial condition for a rapid conversion to ecologically steadier development and for the decisive "greening" of the nation's government. In addition to the conservation goals per se, such an approach will contribute to the restructuring of the awareness of people toward greater ecologization.

Footnotes

1. According to the data of the USSR Goskomstat, this indicator is around 29 km³ and according to other sources, 30 km³ (see [8, pp 11, 78]).
2. Calculated from [3, No 22; 8, pp 140-141].

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IAEA Offers Belorussia Chernobyl Help

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Morning Edition p 1

["Abbreviated version" of speech by IAEA General Director H. Blix to Belorussian SSR Supreme Soviet; date not specified: "IAEA Offers Assistance"]

[Text] H. Blix, International Atomic Energy Agency (IAEA) general director, spoke at a session of the Belorussian SSR [Soviet Socialist Republic] Supreme Soviet and proposed a specific program of assistance in eliminating

the aftereffects of the Chernobyl disaster. Here we publish an abbreviated version of his speech.

Following the accident at Chernobyl, the IAEA offered the Soviet Union its services in identifying the technical reasons for what took place. These will be analyzed by Soviet experts along with scientists and engineers from all over the world. The tragedy which took place must be explained. Appropriate lessons must be learned from it.

The analysis which followed the accident at Chernobyl was the starting point for the adoption of a whole series of measures, on the national as well as international level, to reinforce safety in the atomic energy field, and also to reduce the potential consequences of any other similar accident, should one occur.

Still another set of decisions is under discussion today, concerning civic responsibility for losses and damage which can result from nuclear accidents. A multilateral international assessment of the radiological environment resulting from the Chernobyl disaster is being developed.

The studies conducted by our specialists concerned levels of radiation, maps of which were drawn up by your specialists, and checking the data and figures which were obtained here.

This effort will yield an evaluation of present and future radiation doses people receive. International experts are working jointly with Soviet experts. I have given the Belorussian SSR Academy of Sciences a very sophisticated instrument—a gamma spectrometer. It can be used in field experiments as well as in the laboratory to establish the radiation level in any object, as well as its source.

The IAEA has also distributed thousands of dosimeters, chiefly among children of the three republics, in order to determine and be fully aware of what amount of radiation they are receiving from the outside world. We will also soon be sending a truck outfitted with special devices of a subsonic-frequency spectrometer system, which can be used to determine what contamination dose one person or another is receiving from foods. Of course, these measures can in no way substitute for the tremendous systematic effort you are presently undertaking. But they will be able to verify and render more precise, which will also prove valuable.

Over the course of half a year more than a hundred prominent international experts in the fields of medicine, agriculture, and radiation protection will arrive here as part of various programs, with various tasks, so as to bring together into a unified whole all the diverse aspects of today's situation and provide their conclusions. A report will be prepared by the end of autumn and the results of this group's efforts presented. The report will treat a whole series of questions of interest to the people as well as to the organs of power. Specifically, it will touch on safety measures which have already been or are being taken. These are based on scientific data. The extensive international program I am referring to

now is not provided for in the budgets of international organizations. It has become possible because we found our own financial resources. International experts agreed to extend voluntary, free assistance. This program is not being undertaken with the aim of satisfying world curiosity. It has the goal of providing assistance to you and your fraternal republics in the fight against the aftereffects of the Chernobyl accident.

I have been asked many times—can an organization whose charter demands the development of nuclear energy be reliably expected to render an unbiased, objective report? My response is in the affirmative. Yes, IAEA is proud of the fact that it is a scientific organization—and its adherence and faithfulness to scientific standards and the scientific search for truth come before any ambitions whatsoever.

Participating in the program are scientists from all over the world with no relationship whatsoever to the propaganda of nuclear power engineering. The group of scientists is headed by the director of the Hiroshima Nuclear Research Institute and will also include members of the Academies of Science of Belorussia and the Ukraine.

Finally—I understand that, following the Chernobyl accident, most people relate skeptically to the opinions of any experts. We must be prepared to accept critical doubt. Our scientific research is conducted with complete openness. And the report will be presented for broad discussion in your country, in the Ukraine, and in Vienna. I am convinced that it will stand up to any criticism.

I hope people will accept our scientific quest with gratitude and respect—only if this is the case will the social measures deemed both humane and prudent be undertaken.

ECOSOC Session Backs Chernobyl Aid Plan

*PM1907130190 Moscow IZVESTIYA in Russian
18 Jul 90 Morning Edition p 4*

[Report by own correspondent Yu. Kosinskiy under the general heading: "We Are Not Alone in Our Grief"]

[Text] Geneva—A routine session of the UN Economic and Social Council [ECOSOC] has opened in Geneva. The question of international cooperation in eliminating the aftermath of the accident at the Chernobyl Nuclear Power Station is on the agenda.

Its participants supported the USSR, Belorussian SSR [Soviet Socialist Republic], and Ukrainian SSR draft resolution on international cooperation in alleviating and overcoming the consequences of the accident at the Chernobyl Nuclear Power Station. The following fact is indicative of the document: Sixty-three countries, 47 of them members of ECOSOC, were voluntary coauthors of it. This is unprecedented in the history of the organization and it shows the international community's attention, support, and solidarity with the initiative.

It would be naive, of course, to believe that the adoption of the aforementioned resolution will immediately open up the floodgates and bring millions of dollars in international aid into the USSR. The coordination of this aid by the international community will give us only the knowledge we require today, experience of giving medical assistance, methods of combatting disasters and the advanced technology we unfortunately lack, situation forecasts, and the development of specialized laboratories and clinics in our country.

UN Acceptance of Chernobyl Recovery Aid Plan Welcomed

*PM1907111390 Moscow IZVESTIYA in Russian
18 Jul 90 Morning Edition p 4*

[Report by G. Charodeyev under the general heading: "We Are Not Alone in Our Grief"]

[Text] USSR Deputy Foreign Minister V. Petrovskiy addressed a briefing for Soviet and foreign journalists at the USSR Foreign Ministry press center. He said that our country regards as profoundly symbolic the consensus approval by the UN Economic and Social Council [ECOSOC] session of the resolution "International Cooperation in Overcoming the Aftermath of the Accident at the Chernobyl Nuclear Power Station." It was a practical demonstration of the possibility of a broad approach to international cooperation that is not associated with ideology or any bloc considerations, of the idea of collaboration among states on the basis of the principles of common human values and new political thinking.

It has to be said that the Chernobyl situation remains very serious at the present time, the deputy minister continued. The scale of the current and planned health and rehabilitation work is so great and has such an extensive timeframe that to expect to be able to carry it out entirely through our own efforts would be not only arrogant, but also inhuman, from the viewpoint of the need to restore to health the thousands of people affected in one way or another by the accident.

Of course, in order to make the resolution really effective, we have to formulate our specific needs in terms of international aid, both from the viewpoint of specific items and on a bilateral state basis. It is important that this work should be done in a coordinated manner and be based on the carefully gauged, real potential of special UN institutions. In order to be able to define the specific parameters of cooperation we will very likely have to be prepared to accept international experts, as is usual in the practice of interstate contacts. Such contacts would result in a comprehensive plan of action exploiting the potential of all international organizations. It should be borne in mind that this immense preparatory work has to be completed very quickly so that the UN secretary general can present detailed recommendations on international efforts on Chernobyl to the General Assembly 45th Session.

One must point out here, V. Petrovskiy said, the importance of coordinating efforts between all-union structures and the corresponding organs of the three union republics most affected by the tragedy—the Belorussian Soviet Socialist Republic [SSR], Ukrainian SSR, and Russian Soviet Federated Socialist Republic [RSFSR]. The committee to eliminate the aftermath of the Chernobyl Nuclear Power Station accident, recently set up under the USSR Council of Ministers State Commission for Emergencies, has an important part to play in this. The people's deputies who participated in the ECOSOC working session could make a major contribution, in view of the urgent need to set up a parliamentary group (involving the Supreme Soviets of the USSR, Belorussian SSR, Ukrainian SSR, and RSFSR) on the whole range of Chernobyl issues.

IAEA Seminar in Chernobyl Danger Zone

LD1807153990 Moscow TASS in English 1355 GMT
18 Jul 90

[Text] Bryansk July 18 TASS—Three hundred Russian doctors coping with the aftermath of the Chernobyl accident came to Novozybkovo, in southwestern Russia, for a seminar held under the aegis of the International Atomic Energy Agency (IAEA).

Novozybkovo is the largest Russian settlement within the strict radiation control zone. In the town of 45,000 inhabitants, the average density of radioactive pollution exceeds 15 curie per square kilometer. In neighbouring regions, adjacent to Belorussia, this figure is several times higher. More than 110,000 people are to be evacuated from here to uncontaminated territories. Overall, some 500,000 people live in the radioactive zone in Russia.

The IAEA seminar will discuss how low-intensity ionizing radiation affects the human organism, and ways to diagnose and treat radiation-induced diseases. The Russian doctors will hear reports by specialists from France, the United States, Sweden, and Hungary.

The seminar will last three days.

Nuclear Power Stations' Value Discussed

LD1707180190 Moscow Television Service in Russian
1430 GMT 17 Jul 90

[From the "Vremya" newscast]

[Text] [Announcer] Another sector of our economy, which until quite recently was restricted, is revealing its secrets. [video shows the exterior of a building and then switches to a hall where V.F. Konovalov, minister of atomic power engineering and industry, is shown at a podium addressing those assembled. Konovalov's voice is heard indistinctly]

[Begin recording] [S. Milyanchikov, caption-identified] Today, for the first time since the construction of that building—perhaps the most restricted ministry, medium

machine building, was allocated here for a good many years, and now it houses the Ministry of Atomic Power Engineering and Industry—these doors were thrown open for journalists, too. They were invited to a meeting of the staff from the sector dedicated to the development of nuclear energy and to work with the public. As the saying goes, better late than never. Four years have already passed since the Chernobyl accident, and complete data on it, as before, is restricted. And well, at last, the ministry is drawing back the curtain of secrecy. And it is natural that journalists were interested in absolutely everything: Were there accidents before Chernobyl? I will say right away, that yes, there were. For instance, in the southern Urals, in 1957 when there was a 70-tonne explosion of highly active waste. And, will nuclear electric power stations continue to be built in the future? Yes, they will. And many, many other things. And the question which was asked most often: Are nuclear power stations needed at all? And how safe are they for people? To keep a balanced view, I present to you two extreme opposite views. [end recording]

[begin recording] [Konovalov, caption-identified] All our decisions are connected with the introduction of measures for the safety of operational reactors. And we have already elaborated them and implemented them, and today, even an outright mistake on the part of operational staff will not lead to some serious accidents at nuclear power stations. The nuclear power station is, nonetheless, the most ecologically pure today. There is simply no...[correspondent prompts with the word "replacement"] replacement for it today, practically no replacement. [end recording]

[Begin recording] [M.Ya. Lemeshev, president of the Soviet Antinuclear Society, caption-identified] I am deeply convinced that our economy and our society do not need nuclear power stations. And moreover, not only are they not needed, they are fraught with a very great danger for the country's economy, for nature, and for the welfare of our society. [end recording]

Public Attitudes Toward Nuclear Power Issues Examined

PM2007085590 Moscow PRAVDA in Russian 19 Jul 90
Second Edition p 2

[Article by Anatoliy Pokrovskiy, PRAVDA deputy editor for the science department, under the "Viewpoint" rubric: "Nuclear Winter?"]

[Text] For the fifth year now not a day passes without the science department's mail including letters about nuclear power. Sometimes they make requests, like T. Trofimova's letter from Cheboksary suggesting that a map of regions contaminated by radiation be published so that it can be used when selecting where to go on summer vacation. Sometimes they are reflective letters, like the letter from A. Mamasyan, a Voronezh worker who is bewildered about the referendum on the fate of the Voronezh Nuclear Heat Supply Station: "In thinking

about regional development and the transition to a market economy we must have a precise idea of what awaits Voronezh Oblast, which does not have its own energy resources. Discarding the nuclear heat supply station and handing it over to be pillaged? It is already being pillaged. Eating the cow and choking on the tail—that is the only thing that can be said of the situation with regard to the nuclear heat supply station. We have become attenders of meetings but we have not become proprietors..."

But protest letters form the majority. Demands to halt the construction of new nuclear power stations and close down existing ones come in from various parts of the country. That is understandable—the wound of Chernobyl continues to bleed. That is why the political assessment of the catastrophe at the Chernobyl AES [Nuclear Electric Power Station] adopted by the 28th party congress was so harsh. Social tension is mounting in the afflicted regions, the resolution notes. The growth of tension is assisted by the prolonged and unjustified secrecy around the Chernobyl tragedy, the contradictory nature of the assessments made, especially on the medical aspects, and the lack of objective information, comprehensible to the population, on the state of affairs.

How to act in this situation? To continue to pour salt on the wounds, so to speak, or nonetheless to find ways of healing them? There are many supporters of "surgical" intervention—freezing the development of AES's and cutting them off from our power engineering. Under their pressure work has stopped at 20 construction sites at the study stage, work at 15 has been stopped at the construction stage, and work has been stopped at four construction sites at the expansion stage. Total money losses come to two billion rubles [R]. But even money is not the main trouble. Our economy needs an extra 109 million kilowatts of energy. So you cannot help thinking: In freezing nuclear power engineering will we not freeze ourselves in the next winter?

Let's take another attentive look at the party congress resolution. "Under the conditions of the administrative-dict system," it says, "the country's former leadership allowed major blunders in the elaboration of scientific and technical policy in the field of nuclear power and the protection of the population in extreme conditions." An in-depth political diagnosis has been made. It is this diagnosis which makes it possible to set about treating what is frankly a protracted disease. The newly created USSR Ministry of Atomic Power Engineering and Industry has already done quite a lot to eliminate blunders in the nuclear power engineering field.

But the technical aspect in this case is not even half the matter. The decisive factor here is the creation of an effective system for working with the population and public. And here matters are taking shape with difficulty for the department. Of course, we are not used to switching from an atmosphere of often unjustified secrecy to glasnost and openness. That is probably why the steps taken in this direction have so far failed to

produce tangible results. Thus, back in 1988 an interdepartmental council for information and liaison with the public and its executive organ—the center for public information on nuclear power engineering—was formed. Regional public information centers were formed in Moscow, Leningrad, Gorkiy, Sverdlovsk, Kharkov, Murmansk, and Kiev. Mobile thematic exhibits were organized at "hot" spots, the publication of an information bulletin was set up, and scientific and practical conferences and "roundtables" are held with Soviet and foreign specialists being invited.

Alas, the yield from them has been small. A very great distrust in any assurances has accumulated in society and many people are more eager to heed strong expressions against nuclear energy than scientific computations. Moreover, recently picketing has been organized near a number of AES's, which is markedly complicating the work of the servicing personnel and is consequently fraught with the possibility of accidents.

I think that in this increasingly heated atmosphere the only correct decision was taken—to continue seeking ways of mutual understanding with the public. And at the Ministry of Atomic Power Engineering and Industry there was an expanded aktiv of representatives of the labor collectives, enterprises, and organizations of atomic power engineering and industry. Representatives of the Defense Ministry, Ministry of Power and Electrification, Ministry of Health, Ministry of the Maritime Fleet, State Committee for the Supervision of Safe Working Practices in Industry and the Atomic Power Industry, the State Committee for Hydrometeorology, the State Committee for Education, the State Environmental Protection Committee, the State Committee for the Press, the USSR Academy of Sciences, the USSR State Planning Committee, and the "Chernobyl" Society, and journalists were invited to it. And, which is very important, representatives of the public and opponents of nuclear power came there.

Minister V. Konovalov and V. Terentyev, director of the Central Scientific Research Institute for Information and Technical and Economic Research on Nuclear Science and Technology, delivered reports. They spoke of the problems of developing nuclear power in the USSR and increasing the effectiveness of work with the public. There was a long search—lasting almost all day—and a difficult one for a common language. It cannot be said right now that it has already been elaborated. But I want to hope that the sides have started to understand each other better. At any rate a number of constructive proposals were found. They were expressed in the appeal to the country's president and to the supreme soviets and governments of the USSR and the union and autonomous republics. The main ones are to accelerate the adoption of a power program for the country, to determine the place of nuclear power in it, and also to establish its legal status through legislation.

I think that in a rule-of-law state that is precisely how the most complex, the most burning problems should be resolved.

'Stop Chernobyl' Movement Growing

*LD3107123590 Kiev International Service in Ukrainian
1800 GMT 30 Jul 90*

[Excerpts] The Kiev branches of the Ukrainian Republican Party and the Ukraine's Green Party have started forming a public committee which will be known as "Stop Chernobyl."

As is known, the USSR Government, under public pressure from the Ukraine, decided to close the Chernobyl Nuclear Electric Power Station for good. But no one knows how it is going to be done, in what stages, on what specific dates, and who will control the closing-down process. The "Stop Chernobyl" Committee plans to take upon itself an inspector's duties. [passage omitted]

In our view, the Chernobyl problem, because of constant delays in its solution, may again worsen the situation within society. Here is an example. The interparty assembly of democratic forces in the Ukraine has called for a 2-hour political warning strike on 9 August and advanced a single demand: The Chernobyl Nuclear Electric Power Station must be closed immediately. [passage omitted]

Chernobyl Engineer Says No. 4 Block Still Threat

*AU2607140090 Munich SUEDEDEUTSCHE ZEITUNG
in German 26 Jul 90 p 9*

[Christoph Marschall report: "Concrete Enclosure of Reactor Leaky"]

[Text] Munich, 25 July—Over four years after the reactor catastrophe of Chernobyl, the damaged fourth block of the power plant still poses a danger. A total of 100 square meters of the concrete enclosure of the damaged block, called a "sarcophagus," are leaky, because the energy released inside the block destroys the construction material, Vladimir Shovkoshytnyy, a senior engineer at the nuclear power plant until 1987 and a convinced opponent of nuclear power plants today, has stated in Munich. There are plans to build a second sarcophagus, which, however, will probably have the same fate.

Foreign experts will be invited to visit the Ukrainian Republic to discuss alternatives to the "never ending construction of new sarcophaguses," stressed Shovkoshytnyy, who was elected to the Ukrainian parliament in March. He heads the subcommittee for problems within the 30-km zone surrounding Chernobyl.

Since the declaration of sovereignty by the Ukrainian Republic last week, the chances that at least part of the problems caused by the reactor accident can be solved have increased, Shovkoshytnyy stated. Moscow used to

be responsible for questions concerning nuclear energy, and there was little interest in Moscow in revealing the real extent of the disaster. However, the declaration of independence by no means implies that the Ukrainian Republic will renounce the help of the Soviet Union in overcoming the consequences of the catastrophe. The amount of R16.5 billion, provided by Moscow, is not sufficient at all.

Five million hectares of the soil surrounding Chernobyl are so contaminated that its use has been banned. Over 200,000 people should be evacuated from areas where radiation exceeds the permitted value of 5 curie per square km. Values reaching 30 times the allowed amount have been measured in individual cases. As a matter of fact, the new Ukrainian parliament has made available R1.6 billion, but the republic is not in a position to raise the actually required sum. Shovkoshytnyy asked foreign countries for help, "not only at the state level." He called for the establishment of Chernobyl associations.

Republic Officials on Residual Chernobyl Effects

*AU1707200690 Paris AFP in English 1934 GMT
17 Jul 90*

[Text] Geneva, July 17 (AFP)—Four years after the Chernobyl nuclear disaster, studies have indicated that the areas affected by radiation are much larger than had been believed, Russian Federation Deputy Foreign Minister M.B. Kolokov said here Tuesday.

Regions within Russia have been hit "to varying degrees," and the radiation is "affecting much greater areas than had been thought before," Mr. Kolokov told reporters outside a meeting of the United Nations Economic and Social Council.

K.J. Masik, vice-president of the Ukrainian Council of Ministers, estimated that 1.8 million people in the Ukraine, including 380,000 children, are still living in an environment where radiation is above normal levels.

He said that the psychological effects on the populations of these regions have been severe, stating that 90 percent of children exposed to radiation in 1986 "believe that there is no future for them."

Alexander Kichkailo, vice-president of the Belorussian Council of Ministers, said that the limited resources of his republic meant that only 120,000 of the 2.2 million people living in the contaminated area are presently scheduled to be relocated.

He said authorities were concentrating on supplying uncontaminated food, since 72 percent of radiation absorbed by persons still living in the area is estimated to come from produce.

Belorussia Decides on Chernobyl Compensation

*LD1907221490 Moscow Television Service in Russian
1700 GMT 19 Jul 90*

[From the "Vremya" newscast]

[Text] A TASS correspondent reports from Minsk:

The number of Belorussian inhabitants receiving compensation for residing in territory stricken by the Chernobyl Nuclear Power Station catastrophe has increased by 1.8 million people. Commencing 1 August, each person resident in lands with a density of radioactive contamination exceeding one curie per square kilometers will be paid 15 rubles monthly. This decision was made today by the Belorussian Supreme Soviet. However, the deputies have not yet determined how they are to fund this humanitarian action.

Chernobyl Accident Committee Formed

*PM2507155390 Moscow IZVESTIYA in Russian
24 Jul 90 Morning Edition p 1*

[Report by V. Zaykin under the "Fact and Commentary" rubric: "How To Use Billions Correctly"]

[Text] A committee to eliminate the consequences of the accident at the Chernobyl AES [Nuclear Electric Power Station] has been formed within the USSR Council of Ministers State Commission for Emergency Situations.

This committee is assigned the tasks of coordinating all work in the afflicted regions. As is well known, 14 billion rubles [R] were earmarked for the priority emergency measures to eliminate the consequences of the Chernobyl catastrophe. Now the problem is to be able to use these enormous funds sensibly. The committee must elaborate a mechanism for spending money which would prevent their futile expenditure. Alas, practice shows that there are grounds for fears here.

One of the main tasks is to overcome the lack of coordination which is now occurring in the organization of work to eliminate the consequences of the accident. Today ministries and departments of union and republican subordination are working in an uncoordinated way. Plans to perform particular operations often do not have an adequate scientific foundation. Sometimes either excessive investments are envisaged—to play safe—and sometimes, conversely, inadequate funds are envisaged. It is here that the reason for the irrational use of funds often lies.

In addition to "coordinating" functions the committee will resolve the entire package of tasks connected with resettling people living in "polluted" regions and their adaptation in the places where they will reside in future. A very great deal here depends on the conclusion the scientists come to—what degree of radiation contamination of the terrain will be deemed safe for human life. Then it will finally be possible to determine accurately

how many people should be resettled and how much housing should be constructed or repaired in "clean" regions.

Hundreds of thousands of people today can with complete justification regard themselves as the victims of the accident at the Chernobyl AES. It is already essential to provide for what compensations will be made to them in the event of illness. It has emerged that often public movements in the afflicted regions are demanding from the government measures which have already been taken. The reason for this is not entirely clear. Either it is that people are not following press reports very attentively or else there is a shortage of information connected with measures to eliminate the consequences of the accident. In either case the committee will pay the most serious attention to the problem of the population's provision with information.

Funding, Support for Developing Decontamination Substances Urged

90WN0091A Moscow TRUD in Russian 20 May 90 p 2

[Article by TRUD correspondent M. Yurchenko (Kharkov): "The Strontium 'Trap'; Why New Decontaminants for Polluted Soil and Water Are Not Being Tested"; passages in boldface as published]

[Text] In 15 years people in Kharkov will not be able to drink tap water. The local newspaper reported this, citing expert sources. The water of the Dnepr and nearby reservoirs will turn into a "cocktail" of radioactive nuclides by 2005!

The population is being reassured with the news that the new Akva joint stock company will build a plant for the production of ecologically clean water to be sold in bottles and cardboard containers—like kefir. Understandably, this beverage will cost more than tap water, but is there no other alternative?...

The item did not send the general reading public into a turmoil, but it did bring a group of researchers from the Biomos Joint Scientific Production Enterprise (SNPP) in Kharkov to the TRUD branch office. It was obvious that they were having difficulty restraining their emotions when they explained politely that they had no intention of sitting back and waiting for the inevitable. They said they had developed substances (the ones which gave the firm its name) capable of effectively decontaminating water and soil.

These substances are "attracted" to several heavy metals and to other so-called complex-forming agents, including the strontium and cesium the Chernobyl volcano had dispersed so profusely. Their molecular structure includes "empty spaces" into which the biomasses "drag" strontium, which is lethal for all forms of life but is a tasty snack for them. They catch hold of their "prey" like mousetraps and then, for extra insurance, envelop the resulting compound in a strong polymeric casing.

The compounds in the ground water are anchored, as it were, displaying virtually no dilution, elution, or migration.

Can biomosses prevent radiation? No, they will continue "producing background radiation" in the casing until the strontium "expires." They will, however, keep radioactive nuclides out of creeks and streams and out of the Dnepr (and, consequently, out of our water supply)....

Biomosses prepared according to another recipe and applied to the soil in a water solution can, according to the inventors, turn the grass on radioactive territory into a pump for the evacuation of radioactive nuclides.

This is not all the biomosses can do. They can act as filters in gutters. They can turn the radioactive silt which is now creating a radioactive background at the bottom of the Dneprovskoye Reservoir into an insoluble and immobile substance. Finally, biomosses can protect living systems from radiation stress....

Anticipating the questions of meticulous ecologists, we should add that biomosses are harmless in themselves and do not contaminate the soil or the organism.

It must be said that concerned groups were informed some time ago of the Kharkov SNPP's projects. At the beginning of this year the biologists knocked on every door in Kiev and spoke to people in the Southern Department of the USSR Academy of Agricultural Sciences and the Kharkov Oblispolkom. They asked for assistance in stepping up the production and testing of the soil "medicine," but their efforts were futile.

Yes, the founders of the SNPP—the Kharkov Pharmaceutical Institute, the Ukrainian SSR Ministry of Health, the Moscow Branch of the Atomic Energy Scientific Research Institute, and the Kurskaya AES [Nuclear Electric Power Station]—did everything they could: They formed a research team and acquired a work area (even if it is rather shabby). They are incapable, however, of solving the main problems: of organizing the large-scale production of anti-radiation substances to save the contaminated soil and of sponsoring this work. This is a job for the state.

For half a year the biologists have been asking the directors of the Ukrainian Scientific Research Institute of Soil Sciences (located in Kharkov) to sell them a small abandoned plant which was once earmarked for fertilizer processing. It would take only half a year to re-equip it and begin operations here, but their requests have been denied.

After I heard the reasons for the denial (the directors plan to give the plant to some enterprising cooperative managers), I left the mammoth institute building and went down into the damp basement of the residential building where the Biomoss SNPP is located. All of the people there, including the director, looked very odd: They had all tucked their trousers into their socks. This is how they protect themselves from the...huge swarms of

fleas in the basement. The sanitary and epidemiological station knows about the insects, the damp, and the poor lighting in the workplace. It will not allow them to hook up the small boiler, which they went through so much trouble to get, for the preparation of the substance (and it is probably right, because there are people living upstairs). For a variety of "criminological" reasons, the medical personnel decreed that the establishment should be sealed up! Only the intercession of a correspondent stopped this "operation."

The convincing argument for them was the great number of representatives of foreign firms (French, Indian, Syrian, Italian, and others) milling around Biomoss. They are submitting official and private proposals, offering all kinds of temptations and promises. Bids are coming in from the foreign trade licensing administration and the non-governmental mediating organizations representing the interests of the same foreign firms. At any time they might be able to prevail upon the intractable biologists and talk them into sharing their production secrets.

"But if we let them have even a single gram," said SNPP Director A. Beskrovnyy, who also headed the project, "they will have a ton of the product in half a year, and then our country will once again, as it has so many times in the past, have to buy it at a ridiculous price (and with foreign currency). This is why we have to hold out as long as we can...."

The interest of the foreign firms is certainly no coincidence: They know about biomosses. Researchers in the SNPP have compared their results with research findings abroad and have concluded that they have come closer than anyone else to the creation of artificial humus with controllable properties.

The compounds were developed by A. Beskrovnyy and his colleagues around 15 years ago. The value of the invention was confirmed soon afterward when they learned that biomosses are common in nature. They activate the defenses of plants, animals, and soils. Immune systems have been stifled to some degree by the ailing ecological environment. The Kharkov biologists propose to compensate for the shortage of immunity with artificial bioregulators closely resembling their natural counterparts.

The word "artificial" should not be identified solely with synthetic materials, herbicides, and pesticides. As the saying goes, there is no chemistry here. The patented technology simulates natural processes and consists, as the specialists explained, in simply cooking vegetative matter in a kettle. In particular, vegetation can be used in the preparation of the biomosses for the soil in Chernobyl.

Research conducted jointly with the Saratov Medical Institute reportedly confirmed that biomosses can cope with cadmium oxide (even in the human organism), and it belongs to the heavy metal category. The fish in reservoirs filled with the waste water of the Kurskaya AES respond to the addition of biomosses to the water

by developing and flourishing like calves in a good breeding facility. In some cases the compound saved critical patients with radiation burns. The resolution of sarcomas in animals has been recorded at the Rostov Oncology Institute. Biomosses for veterinary medicine and animal husbandry won a gold medal at the Ukrainian SSR Exhibition of National Economic Achievements and have been cleared for industrial production. In short, according to research findings, the compound can do a great deal.

"I should warn you that the article will evoke serious argument or no reaction at all," A. Beskrovnnyy warned. "I should remind you that the response to an item about biomosses in TRUD about 7 years ago was the opposite of what we expected. I can already foresee problems...."

I hope people will listen to him today, and not only because his arguments sound extremely convincing to me.

Have you noticed that reports and arguments about the consequences of the Chernobyl accident usually focus on evacuation procedures, the amount of material assistance the evacuees will require, the shutdown of the still "running" reactors, the organization of waste disposal sites...? Has anyone even suggested the leasing of the "zone" for foreign currency to anyone who might want to conduct experiments there, so that we can derive some kind of benefit from the situation? The item in the Kharkov newspaper about the rescue mission of the Akva Joint Stock Company belongs to the same category. But have we heard many reports of real attempts to rescue the priceless lands of the Ukraine and Belorussia and stop the migration of radioactive nuclides?

Some people might argue that the attempts to defy radiation are senseless and futile, but even if suggestions of this kind are not voiced loudly, this does not mean that they do not exist—not everyone has surrendered. When I was almost through with this article, I read some proposals on ways of "trapping" radioactivity and keeping it from spreading in the subsoil. Their author is V. Gakhov, head of the Soil Radiology Sector of the Ukrainian Scientific Research Institute of Soil Sciences and Agricultural Chemicals. He was unable to complete his research because the 10,000 rubles he was allocated was not enough to cover the cost of experiments.

Some experts predict that it will take from 180 billion to 250 billion rubles to eliminate the consequences of the accident by the end of the century (new construction, resettlement grants, etc.). The additional 20,000 rubles Gakhov needed and even the 20-40 million required, according to the estimates of Biomoss researchers, for the treatment of the contaminated area with their compound, sound like ridiculously small amounts in comparison with those huge sums, and the results might be incomparable!

It is not just a matter of money, although nothing can be done without money. We need another precedent transcending the bounds of current scientific knowledge; we need some incentive for the augmentation of radioactivity rescue procedures.

A unified program for the elimination of the consequences of the Chernobyl accident was approved recently. No reports of the inclusion of Biomoss projects in the program have reached Kharkov. Meanwhile, the Permanent Representation of the Ukraine to the United Nations has addressed the scientists of the world through the world community to ask them to share their experience, achievements, and discoveries. Could this really be more appropriate, more reliable, and less expensive?...

Citizens Picket Transcarpathian AES

90UN2202A Kiev PRAVDA UKRAINY in Russian
7 Jun 90 p 1

[Article by A. Pavlov, Zaporozhye Oblast: "Nikopol Is Against the AES"]

[Text] Nearly 300 Nikopol residents, who crossed the Kakhovskiy Reservoir in launches and on a ferry, picketed the Zaporozhye AES [Nuclear Power Plant].

This is the first time such an act has occurred in Energodar. Nikopol Gorsoviet [City Soviet] people's deputies and Zeleniy Svit [Greens] Ecological Organization activists organized it.

"We demand the establishment of a government commission to conduct a comprehensive inspection in the area of Zaporozhye GRES [State Regional Electric Power Plant]—Zaporozhye AES Energy Complex operations and creation of a special biomedical service for continuous monitoring and observation of the condition of the water, air, soil, and health of the population in the 30 kilometer AES zone. Nikopol residents insist on cessation of construction of the sixth unit and the gradual withdrawal from operation of the remaining reactors. The GRES must immediately transfer to gas," stated Greens leader V.S. Sandul.

"The ecological situation in Nikopol is really catastrophic. But how much is the nuclear plant at fault for this? What specific data do you have about an increase of radiation background or about radioactive contamination of the water and soil?" I posed the question to organizers of the picketing.

Neither Nikopol Gorsoviet deputies N.F. Netunayev or L.N. Krikunenko, nor Greens leader V.S. Sandul could answer this question. Numbers and facts have been replaced by emotions and fear of a possible repetition of Chernobyl.

"We understand and approve of these Greens activities," AES Chief Engineer T.G. Plokhyy surprised me by stating this. "Be careful, there is always someone looking for prey.' Our interests completely coincide in

the matter of environmental protection. The difference consists of the fact that we have information and do not hide it and the people we are talking to do not want to hear anything."

These are the facts: Nikopol enterprises annually discharge 45,000 tons of harmful substances into the air and Zaporozhye AES discharges 32,000 tons. We owe acid rain precisely to the thermal plant. Evaporation of water from AES cooling ponds only aggravates the situation but is not its primary cause.

Unfortunately, the dialogue at the rally that occurred near the plant's walls did not turn out. People already do not believe anyone: Neither reports, nor dosimeters, nor opinions of foreign experts.... It is impossible to blame Nikopol residents for this. They and really all of us have been deceived too many times.

But it is also irrational to close the plant just on the wave of emotion. Picketing the Zaporozhye AES is an act of despair and yet one more attempt to thus attract attention to the city's problems. Appeals of three ecological rallies to the republic's and country's Supreme Soviets have not yet produced results. Not even answers have resulted.

Pickets Block Khmel'nitskaya Nuclear Power Station

*LD2007012590 Moscow Television Service in Russian
1700 GMT 19 Jul 90*

[From the "Vremya" newscast]

[Summary] For several days now pickets organized by the Ukrainian Rukh Movement and Zelenyy Svit have been blockading the Khmel'nitskaya Nuclear Power Station. The pickets' tents come right up to the protective shields around the construction site for the second, third, and fourth generating sets of the Khmel'nitskaya Nuclear Electric Power Station. The main reason for their action is that a moratorium has still not been adopted regarding construction of the nuclear power station. This moratorium was drawn up four months ago by the local oblast soviet. The protesters are aware that there are considerable shortcomings in the design of the nuclear power station. Apparently the nuclear industry workers are themselves complaining about the low quality of equipment being manufactured by Soviet industry. During the three years the station's No. 1 generating set has been in operation, there have been 35 stoppages and several fires recorded. Therefore, there is a basis for people's concern. The pickets say the blockade of the station will continue until the Ukrainian Supreme Soviet settles the question of a moratorium. [video shows tents and pickets outside the station and a reactor building in the background]

TV Reports on Picketing of Khmel'nitskaya AES

*PM2407103790 Moscow Television Service in Russian
1700 GMT 19 Jul 90*

[From the "Vremya" newscast: Report by L. Ilchenko and cameraman N. Strigun, identified by caption]

[Text] [Newscaster] For several days now pickets organized by Rukh [Ukrainian People's Movement for Perestroika] and "Green World" have been blockading the Khmel'nitskaya AES [Nuclear Electric Power Station].

[Ilchenko] [video shows tents and pickets outside AES fence] The pickets' encampment has come right up to the protective fencing around the construction site for the Khmel'nitskaya AES' second, third, and fourth power units. This is the second week now that hundreds of residents from nearby villages and settlements in Khmel'nitskiy and Rovno Oblasts have been living here, demonstrating and pressing for their demands to be met. After all, the zone affected by the consequences of the work at the Khmel'nitskaya AES is on the territory of these regions, as we succeeded in finding out, and the reason why emotions are running high here at the foot of the nuclear reactors is the fact that a moratorium has not yet been adopted on the expansion of AES construction elaborated four months ago by the local oblast soviet. Most of the people involved in this siege around the station, as it were, have devoted their vacation entitlement to fighting for an immediate end to the feeding of nuclear fuel into the station's second reactor.

The situation is developing in such a way that the blockade has jeopardized the safe operation of the nuclear facility. Comrade Likin, the station's chief engineer, told journalists this. The administration is trying to explain things to the demonstrators by means of talks and to discuss the true state of affairs, but nevertheless exhortations are just exhortations, and people are not without reason worried by the continuation of the construction of the station. They have learned that there are considerable shortcomings inherent in the AES' design and allegedly the AES workers themselves are complaining about the poor quality of the equipment manufactured by Soviet industry. In the last three years alone 35 shutdowns and several fires have been recorded in the work of the Khmel'nitskaya AES first power unit. Thus there are grounds for people to be alarmed. We were told by the pickets' coordinating council that the blockade of the station will continue until the Ukrainian Supreme Soviet resolves the question of a moratorium.

[Newscaster] Those are the pickets' demands. The number of unscheduled shutdowns for various reasons is one of the main indicators of AES reliability. Over the last three years the number of such shutdowns has halved in our country, but that is not enough. Here is an example for comparison. Only 12 percent of all our electricity is produced by nuclear power stations. In Japan and the FRG this figure is 30 percent, while in Sweden and France the figure is 45 and 73 percent, respectively.

Ukrainian Supreme Soviet Issues Appeal Over Khmel'nitskaya AES Pickets

PM2407102190 Moscow PRAVDA in Russian 20 Jul 90 Second Edition p 8

[Unnamed own correspondent report: "Show Sense"]

[Text] Kiev, 19 Jul—The Ukrainian SSR [Soviet Socialist Republic] Supreme Soviet has adopted an appeal to citizens living near nuclear power stations [AES's]. It says, in particular:

The Ukrainian SSR Supreme Soviet fully shares the concern over the complex situation that has developed around nuclear power stations and the resulting problems.

The Ukrainian SSR Supreme Soviet considers the solution of these problems in the Ukraine to be paramount. The agenda of the current session includes the question of a moratorium on the construction of new nuclear power stations and reactor units on Ukrainian territory.

However, an extremely tense situation is now developing in a number of regions where nuclear power stations are situated. Particularly at the Khmel'nitskaya Nuclear Power Station, where a second wave of pickets, rallies, and petitions against the construction of nuclear power stations is in progress. All this is having a negative impact on the morale and psychological state of station workers and on their fulfillment of their professional responsibilities and is creating a threat to the work of nuclear power stations.

In this connection the Ukrainian SSR Supreme Soviet urges everyone living near nuclear power stations and other citizens to show sense and restraint and not to take actions that could have unpredictable consequences.

Novovoronezh AES Collective Letter to Gorbachev

PM2707083690 Moscow SOVETSKAYA ROSSIYA in Russian 22 Jul 90 Second Edition p 3

[Letter from the Novovoronezh Nuclear Power Station collective: "To USSR President Comrade M.S. Gorbachev": "An Expert Report—the Truth"]

[Text] Esteemed Mikhail Sergeyevich!

Over the last three years collectives of power workers have appealed repeatedly to the government, expressing concern over its inactivity with regard to the formulation of a program to provide energy to support the country's economy. The vast majority of the items published in the press and the other mass media on the power industry, and in particular the nuclear power industry, are negative and lacking in objectivity, while specialists' contributions are scarcely ever published.

The information vacuum on the state of the power industry, which is undergoing a real crisis, is filled by

rumors and fabrications, and the publication of a few undisputed facts is accompanied by 20 or 30 pseudoscientific ones.

In the regions where the nuclear power stations are located, a sharply negative attitude is developing not only toward the nuclear power stations, but also toward the people working there.

We are not suicidal, our children and our nearest and dearest who live with us in the cities and settlements attached to nuclear power stations are no less dear to us than the victims of the accident at the Chernobyl AES [Nuclear Power Station]. They give us an attitude of unconditional responsibility with regard to our work in running an AES.

As professional power workers, we know that without our labor the country's economy cannot stand on its feet. Without the power industry, without electricity, the country can expect cold homes without light or water, dark cities and villages, empty counters in the stores. The commissioning of new generating capacities at thermal, hydroelectric, and nuclear power stations has fallen sharply—the construction of power stations of any kind is virtually blocked. In everyday life people imagine that as long as there are sockets and lamps, there will always be electricity.

Semiglasnost is giving way to obscurantism, and the situation concerning the AES's, which supply 20-30 percent of the electricity in the country's European territory, is deteriorating every day. Our counterpropaganda potential is disastrously inadequate, and objective materials do not find their way onto the air or into the newspapers. The profession's prestige is falling, and an exodus of highly qualified cadres from the sector has begun. The influx of talented young people to the higher educational establishments has fallen sharply. The truth about the power industry is not reaching people. The country should know the truth. But does that mean first being plunged into darkness and cold?!

Feeling concern for the country's power industry, the lifeblood of the economy, and knowing all its problems from the inside, we demand:

- an objective, open parliamentary examination and adoption of an energy program;
- the whole truth about the state of the power industry, its place in the economy and ecology, and the consequences of the energy crisis for the economy and for people's lives;
- open access to the mass media on equal terms with our opponents;
- the resolution of social questions affecting collectives of power workers and power construction workers, who could become the victims of the government's inactivity.

None of our fellow citizens wants to live in a cave and warm himself by a camp fire—but that is where the authorities' inaction is leading the country.

On the instructions of the collective of many thousands, at the Novovoronezh AES:

[Signed] V. Zverev, director; V. Rozin, party committee secretary; Yu. Pavlov, chairman of the labor collective council; V. Gridnev, chairman of the trade union committee.

Rostov Nuclear Power Station To Be 'Mothballed'

*LD2607222590 Moscow Television Service in Russian
2101 GMT 26 Jul 90*

[Text] [Announcer] At last, to judge by all appearances, the question of the Rostov Nuclear Station has been settled. It has been decided at a session of the oblast soviet to mothball the station.

[Correspondent A. Abramenko, identified by caption] Let us recall this was preceded by repeated and insistent demands by residents of the oblast that the construction of the station be suspended. Alas, the belated explanations from specialists that, in spite of the sad precedent of Chernobyl, nuclear power still does not present any danger, turned out to be unconvincing.

[N.A. Plygunov, oblast soviet deputy, identified by caption] For three years the town of Volgodonsk has been waiting for and expecting the experts' report, which today the people do not accept, the experts' report on the Rostov Nuclear Power Station.

[Abramenko] Taking account of this and the fact that an ecological report by experts, the only one capable of confirming whether or not the construction of the station is justified at all, has not yet been produced, the deputies adopted a decision to suspend it. At long last the "i"'s have been dotted. Measures for the stage-by-stage mothballing of the station are to be elaborated in the immediate future. [video shows demonstrators outside building; soviet in session; interview with Deputy Plygunov]

Smolensk AES Director Gives Details of 22 Jul Fire

*PM2707181190 Moscow PRAVDA in Russian 28 Jul 90
First Edition p 2*

[Report by correspondent N. Popinako under the "Reporting Details" rubric: "Smell of Smoke..."—first paragraph is editorial introduction]

[Text] Smolensk Oblast—As the Main Administration for Atomic Power Stations has already reported, a fire in the cable leading to the start-up reserve boiler broke out at the Smolensk AES [Nuclear Electric Power Station] 22 July. The fire was put out by the firefighting services and the station personnel. Unit No. 2 was automatically shut

down and the reactor dampened down. Our correspondent met Ye. Safrygin, director of the Smolensk AES, and asked him to give more details about the accident.

"Power Units No. 2 and 3 were operational at the Smolensk AES 22 July," Yevgeniy Mikhaylovich said. "Unit No. 1 was undergoing a major overhaul. At 2250 hours the staff noticed burning cables on the gantry linking the main building with the start-up reserve boiler. The fire services and station personnel started putting the fire out. At the same time, current was cut to the main circulation pumps in Unit No. 2. The reactor was automatically dampened down and placed in a cooling condition. It is not yet clear whether there is any connection between the fire in the cable leading to the start-up reserve boiler and the shutting down of the circulation pumps. This will have to be clarified by an interdepartmental commission."

[Popinako] It is well known that the Smolensk reactor is the same type as that at Chernobyl. Were measures taken after the 1986 tragedy to improve the safety of the power units?

[Safrygin] Really major measures were taken. A huge amount of priority technical and organizational measures were carried out. And this work is continuing. But we are worried about the performance standards of Soviet electronic and other equipment and instruments. Take this cable. At nuclear power stations abroad, for instance, cables are isolated with fire-resistant materials. But ours still use lubricated paper. They overheated slightly—and there was a smell of burning.

[Popinako] How have people in Desnogorsk reacted to the incident?

[Safrygin] Quite calmly. After all, the residents are mainly our workers, and many of them are competent specialists in the nuclear power field. They are explaining to people that in this situation there is no reason for any panic. It is a different story in neighboring Roslavl, Smolensk, and nearby villages. Various rumors initially sprang up there. But we have now dispelled them. I would note that the accident did not lead to any change in the radiation situation. Radiation at the station and in the district is currently lower than permissible levels.

[Popinako] How long will Unit No. 2 be out of action?

[Safrygin] That will depend on the commission's findings. It will not take much time to restart it. We are planning to complete the repair and restoration work within three days.

Nuclear Plant Safety Standards 'Unsatisfactory'

*LD2607194490 Moscow TASS in English 1815 GMT
26 Jul 90*

[Text] Moscow July 26 TASS—"There have been no accidents at Soviet nuclear power-generating facilities in the first six months of 1990. But two cases of the

violation of safety standards at a nuclear power station and 75 unplanned shutdowns of power-generating units were recorded," said Vadim Malyshev, chairman of the USSR State Committee for Supervision over the Safe Conduct of Work in Industry and Nuclear Power Engineering.

Speaking at a meeting of the committee board here today, he noted that the safety standard at facilities under control was unsatisfactory: The accident rate at non-nuclear facilities rose by 15 percent in the last six months as against the same period last year. The number of job-related fatalities increased by the same percentage. These indicators rose even higher in separate republics.

In Malyshev's opinion, the increase in the number of accidents and work-related injuries partially reflect social tension in society. "But accidents in production are basically traced to the slackening of discipline, drop in personnel's occupational standard, irresponsible management, antiquated equipment, outdated technology and reduction in the number of the departmental safety services," Malyshev said.

Electric Power Workers' Environmental Protection Program Outlined

904E0127A Moscow PRAVITELSTVENNYY
VESTNIK in Russian No 25, Jun 90 p 8

[Article by Yu. Semenov under the rubric "You Have the Floor, Comrade Minister!": "Pay Back the Debt to Nature"]

[Text] *The power workers are planning to allocate more than five billion rubles for ecological measures in 1991-95—four times more than in the current five-year plan.*

The intensiveness of operation of the units at Soviet thermal electric power plants is the highest in the world. This situation is forced, and it in no way gladdens us. The time when more than a third of the equipment of electric power plants will be physically worn out is not far off. Society, however, is even now coming out against the construction of 60 major electric power plants with a total capacity of about 160 million kilowatts [kW] under the banner of protecting nature. The sector is in a most difficult situation, and we are nonetheless convinced that alternatives—either electric power engineering or the ecology—do not exist. While recognizing that industrial activity inevitably affects the natural environment, we do not have the right to be reconciled to the price that society is paying for a universal and ecologically clean form of energy—electricity.

The leading place in the generation pattern of electric power both today and in the foreseeable future is relegated to thermal electric power plants [TES]. They burn a third of the organic fuels produced in the country, converting it not only into energy, but also into millions of tons of ash, sulfur oxides and nitrogen dioxides. A considerable portion of them—roughly 14 percent—is

discharged into the atmosphere. USSR Minenergo [Ministry of Power and Electrification] considers reductions in the effects of TESs on nature to be a most important task. The modernization of ash collectors, the incorporation of methods suppressing the formation of nitrogen oxides and the widespread utilization of natural gas have all made possible a reduction in emissions into the atmosphere of 3.4 million tons over the years of the 12th Five-Year Plan.

About 300 water-protection facilities were built at 150 electric power plants in the eighties, and the discharge of polluted water has been reduced by 2.4 times here. The rate at which the sector is paying back its debt to nature, however, does not suit us. This was stated clearly at a session of the USSR Minenergo collegium in May. The plan for the construction of environmental-protection facilities was only 86-percent realized last year. Our construction associations—Energostroy [Power Construction], Tsentratomenergostroy [Central Nuclear Power Construction], Kazenergostroy [Kazakh Power Construction] and Ukrenergostroy [Ukrainian Power Construction]—are to blame for this. The assimilation of sulfur-removal installations already in place at the Dorogobuzh TETs is being delayed due to a number of design mistakes and the lack of reliable equipment able to operate in hostile environments.

The more energetic incarnation of the sector strategy set forth in the concepts for environmental protection in electric power engineering to the year 2005 is required today. The creation of gas-scrubbing equipment envisages, in particular, the incorporation of wet-limestone sulfur removal, complete automated emulsifier installations for scrubbing ash and sulfur oxides from gases at new and modernized electric power plants and technologies for the suppression of nitrogen oxides at more than 650 boilers of operating TESs. The USSR Council of Ministers Bureau on Machine Building has charged USSR Mintyazhmash [Ministry of Heavy, Power and Transport Machine Building] with ensuring the creation of the pilot sulfur-removal, nitrogen-scrubbing and ash-removal installations for the enterprises of electric power engineering.

Next is the creation of power units equipped with all systems for the scrubbing of stack gases, the use of boilers with circulating fluidized beds and waste-free water-preparation systems and the repeat utilization of treated effluent.

Emissions into the environment are projected to be cut in half compared to the hypothetical ones in the next 15 years. The next few years will be an important stage on the path of the complete halt of sector emissions of polluted water into natural bodies of water.

Tens of thousands of hectares of land are occupied with ash heaps today. The recultivation of twice as much territory as is envisaged by the current five-year plan is projected. Some 50 million tons of ash and slag from

TESs will be used in the production of building materials, road construction and agriculture for the deacidifying of soil by the year 2000.

People are very troubled by the expense of hydropower construction. I want to note, however, that its opponents sometimes use imprecise and unobjective information. Hydroelectric power plants [GES] are the cost-free renewal of power resources, low power costs, high flexibility and, finally, the comprehensive utilization of water resources for national-economic purposes. The country conserves about 80 million tons of fuel equivalent a year through GESs, thereby averting the emission of 1.2 million tons of ash and 2.2 million tons of sulfur and nitrogen oxides into the environment.

The creation of GESs indisputably forces the inundation of lands and flood-land ponds, and hydropower engineering makes the reproduction of some types of fish more difficult. Some 6.2 million hectares in all have been flooded in the USSR over the years of hydropower development. The flooded agricultural lands, by the way, comprise just about five percent of the total land area taken for urban and industrial construction.

USSR Minenergo has now tightened up the expert ecological appraisal of future power facilities. It is a rule that major projects are submitted for the discussion of broad segments of the population. New GESs are planned to be built in mountainous and foothill regions, reducing the area of flooding by an order of magnitude compared to current practices. The construction of fishways, fish-protection structures and fish nurseries and the creation of artificial spawning grounds will be expanded. The decision has been made not to construct the Turukhan GES with a regard for the ecological situation. The question of the construction of the Katun GES remains an open one pending the completion of the scientific ecological expert appraisal of the plans.

The protection of the environment is an intersector task. It assumes the close interconnection of the fuel producers, creators of the equipment for refining it and the power workers themselves, as well as an active stance by academic and sector science.

There are no few difficulties on the path of creating genuinely "clean" electric power. Domestic power installations, and first and foremost boilers, are markedly inferior to foreign ones in the proportionate emissions of harmful substances into the atmosphere. USSR Mint-yazhmash, as has already been noted, has been charged with ensuring the supply of power installations complete with the necessary gas-dust scrubbing equipment in the next few years. The machine builders are not yet meeting the deadlines, and they are promising to outfit only newly started facilities. That is why USSR Minenergo has decided to organize the production of equipment for sulfur and ash scrubbing at sector enterprises intended

for electric power plants being modernized. This initiative will help get away from the monopoly in the production of environmental-protection equipment and conserve precious time.

The strategic direction of scientific and technical progress in power engineering is the widespread incorporation of installations for the combined steam-gas cycle. They raise the efficiency of fuel utilization markedly and make it possible to accelerate the start-up of new capacity, greatly easing the solution of ecological problems. The transition to this progressive technology, however, is being restrained due to a lack of reliable gas turbines. Great opportunities are present, in the conviction of USSR Minenergo, in conversion and international collaboration here.

The country is spending more and more money every year to reduce harmful emissions into the atmosphere. And they can only be reduced substantially, after all, if we concern ourselves with fuel quality. The "increase" in coal deliveries to electric power plants has come through waste rock for many years now. The annual losses to the sector are hundreds of millions of rubles, and billions for the national economy. World experience shows that the greatest impact is obtained in the enrichment of fuel. The proper attention has unfortunately not been devoted to this area in our country until recently. Today USSR Minugleprom [Ministry of the Coal Industry] is only beginning the construction of enrichment mills for power coals. We understand that this requires considerable capital investment, and we do not rule out our own participation in the creation of fuel-enrichment complexes on a share basis.

The problems of power engineering affect the long-term interests of the whole national economy, and they should be clearly reflected in the statewide ecological program. A dedicated program for coal enrichment and fuel-oil sulfur removal is badly needed at petroleum refineries.

The development of enhanced-safety AESs [nuclear electric power plants] has decisive significance in nuclear-power engineering. The earlier this is done, the faster the principal objections of society against nuclear power plants—to which there are no alternatives in the near future—can be removed. Tomorrow is for the sector a sensible combination of thermal, hydroelectric and nuclear plants.

The protection of the environment costs a great deal of money. More than 12 billion rubles will be required for the incorporation of new waste-free technologies up to the year 2005. The cost of thermal electric power plants will increase by 30-40 percent, and sometimes even double. Where will the funds come from? The sole way out is the temporary—until the acuity of the problem recedes—institution of increased rates for thermal and electric power. I understand that this topic elicits sharp criticism on the part of consumers, but the discussion concerns the interests of all of society, and this must be recognized.

A fee for emissions into the environment is being instituted starting next year. It must be envisaged that this decision, correct in principle, not aggravate the already difficult situation in electric power engineering. The size of the fees by sector for the use of nature and emissions into the environment will be juxtaposed with their total profits. The exaction of such a fee, with the prevailing rates for electrical and thermal power, would naturally signify the conversion of all enterprises into the category of losing ones. A customized and considered approach is needed.

The new conditions of business operation will make it possible to attract the funds of the local soviets and all the enterprises of every region to environmental-protection activity. And it is necessary that these funds be utilized in the interests of all the people, who have an intimate vested interest in the beauty of nature, the cleanliness of the air, earth and water and ecologically clean power.

Japanese Scientists Praise Nuclear Waste Plant

LD2607135990 Moscow TASS in English 1346 GMT 26 Jul 90

[By TASS correspondent Yevgeny Tkachenko]

[Text] Chelyabinsk July 26 TASS—"We have been impressed by the scope of production and the capacity of the radioactive waste vitrification facility that is now under construction," Professor Atsuyuki Suzuki, head of a delegation from the Japanese nuclear industrial forum, told a news conference on Wednesday after visiting the Mayak chemical complex, the firstling of the Soviet nuclear industry.

"Handling highly radioactive wastes is the most complex problem for the specialists in all countries that want to develop the nuclear power industry," he said.

"It would be great if we could address the problem with Soviet colleagues. We have been able to see an enterprise with rather high scientific and technical potential. It has gained experience and has promising elaborations," Suzuki said.

The Japanese nuclear scientists were the first from that country to gain access to the defence industry complex in the southern Urals.

The Japanese guests toured the radioactive waste vitrification shop, familiarised themselves with how waste is treated, stored and transported, and heard scientific reports on problems that are of interest to them.

The enterprise, any mention of which in the press or even in a private conversation was taboo, has now drawn up extensive conversion plans that are not concealed from the general public.

Four uranium-graphite reactors producing weapon-grade plutonium have already been shut down here over

the past two years. The enterprise is developing its own technologies for application in various branches of the economy and medicine.

Nuclear Submarine Dismantling Plan Protested

LD2107210890

[Editorial Report] Moscow Domestic Service in Russian at 1500 GMT on 21 July broadcasts a four-minute report by Correspondent Vyacheslav Zdorikov from Sovetskaya Gavan Gulf on the dismantling of nuclear submarines in the gulf. He says that "the inhabitants of Sovetskaya Gavan have voiced a demand to declare the shore of the Tatarskiy Strait a nuclear-free zone. Yesterday, 20 July, a demonstration of labor collectives and the public of the coastal town took place." Zdorikov says that the Sovetskaya Gavan gulf is the widest and most convenient point on the USSR's Pacific coast for vessels to moor, and staff officers of the Pacific Fleet have selected one of the bays in the gulf as a dumping ground for obsolete nuclear-powered submarines. Zdorikov says: "Representatives of the Pacific Fleet headquarters visited Sovetskaya Gavan this spring, and decided that disassembly of nuclear reactors could be carried out here. The inhabitants of the town and region heard about these plans, and naturally no one could remain indifferent to them. A wave of protest swept the town, culminating in a demonstration at the Zavet Ilyicha housing estate in Sovetskaya Gavan." Valeriy Ivanovich Kulik, chairman of the estate soviet of people's deputies, said at the meeting that all the inhabitants of the region are being turned into hostages. A well-considered program for eliminating nuclear weapons on earth must be drawn up and implemented, and the citizens of Sovetskaya Gavan must campaign for that, he adds.

Zdorikov observes that not all those at the protest meeting heeded Kulik's call for moderation: "Very many people are currently susceptible to radiophobia, a fear of radioactive contamination, and these people, blinded by terror, resort to the most extreme measures." For instance, Zdorikov says, a chief petty officer serving on one of the decommissioned nuclear-powered submarines was not allowed to speak at the meeting. He tells Zdorikov that the Greens Party had on 16 July picketed the checkpoint and prevented personnel from entering the base. This is the ugly form in which people are campaigning for the ecological purity of Sovetskaya Gavan, Zdorikov says.

Senior officers of the Pacific Fleet are indefinite as regards their plans, Zdorikov points out. "No sooner has it been decided to dismantle nuclear submarines here in Sovetskaya Gavan than suddenly a statement by Admiral Gennadiy Ivanovich Khvatov, commander of the Pacific Fleet, appears. The issue of salvaging nuclear vessels has never been raised by the fleet command, and is not on the agenda. It is a complex engineering problem, the solution of which is technically impossible at the indicated base area. Such contradictory reports from the fleet command indeed compel the inhabitants

of Sovetskaya Gavan and the adjacent areas to come out with fresh protests against the plans for dismantling nuclear vessels in Postovaya Bay. It remains only to be hoped that this will never come to pass," Zdorikov says.

Workers in Far East Protest Against Nuclear Submarines

AU2407123090 Paris AFP in English 1222 GMT
24 Jul 90

[Text] Moscow, July 24 (AFP)—Some 400 workers at the Soviet Pacific port of Vanino, opposite Sakhalin Island, held a warning strike Monday to demand the withdrawal of nuclear submarines from the bay, INTERFAX, a semi-independent news agency, reported here Tuesday.

The employees have threatened to hold a 24-hour strike on August 23 if the submarines, on which work is being carried out, are not withdrawn, INTERFAX said.

Meanwhile, some 250 people demonstrated Monday outside the Balakovo Nuclear Power Station in the Saratov region of central Russia to protest the construction of two more reactors—the fifth and sixth—at the plant, INTERFAX said.

Planned Strike Over Mukachevo Radar Station Called Off

PM1907135590 Moscow IZVESTIYA in Russian
18 Jul 90 Morning Edition p 2

[Interfax report: "Strike Called Off"]

[Text] A conference of the Mukachevo "Rukh" organization has called off the planned mid-July all-Carpathian strike as a mark of protest against the construction of a military facility—a radar station—in the area. "We decided just to hold rallies and pickets giving notice of our protest," Yaroslav Kirichek, a "Rukh" leader, said in an interview for an "Interfax" correspondent. "The government has kept its promise and halted the construction of the station, although the document on the closure of the military facility has not yet arrived in Mukachevo. Nor is there any document transferring the facility to the local soviet. The Defense Ministry has not yet compensated for the damage to the area as a result of the construction. We are still uneasy because of all this. Nevertheless, we believe that a strike is inadvisable in the new conditions."

Radar To Be Moved Due to Civilian Health Concerns

90UM0728A Moscow KRASNAYA ZVEZDA in Russian
11 Jun 90 p 2

[Article, published under the rubric "Permanent Correspondent's Column," by KRASNAYA ZVEZDA correspondent Capt 2nd Rank V. Pasyakin: "Radiophobia or Negligence?"]

[Text] Capt L. Ionov sounded the alarm, and not without grounds, in a letter to the editors. On their base several radar facilities are operating in proximity to dwellings. Even the non-specialist will say that radar sites are not entirely harmless installations. Special monitoring is needed here in order not to do injury to the health of people working and living close by.

The officer writes: "For some time my legs have been covered with open sores, and I have been having headaches. I am sure that it is caused by the radars. But the point is not me! I am fearful for the health of our wives and children."

I must admit that my first thought was that the letter's author was patently exaggerating the hazard.

Unfortunately, however, a visit to the installation soon made me feel otherwise. I shall state at the outset that they have neither specialist personnel nor equipment to measure emissions. The concern of the author of the letter and other people living on the base therefore had solid grounds.

Incidentally, I shall not claim that the people living and working alongside the radar installation have been totally ignored. People recall that testing was done here in the summer of 1988, with the participation of specialist personnel from the armament service of higher-echelon subunits. But here is the problem: they were unable to find documents containing the results of the emission measurements taken during that testing. I should comment that these results are supposed to be kept for a period of five years, while measurements should be taken no less frequently than once a year. Long-time residents recall talk to the effect that one of the radars, the one which is operated by the Navy and is located practically right in the center of the base, had raised the background electromagnetic field strength to a new value. But just what is this new background level? To what extent does it exceed the normal background, and what is the strength of the electromagnetic fields generated by the facility's antennas? Nobody was able to give this correspondent a meaningful answer to these questions. Neither the naval personnel nor the people at the Air Defense Forces radar facility. What we were facing here was lack of unified administrative responsibility and disregard of elementary rules and procedures of radar facility operation.

Nevertheless radiotechnical unit deputy commander Col V. Simonenko maintains that people's complaints are due to radiophobia [excessive or unfounded fear of radio-frequency emissions or radioactivity]. He did acknowledge, however, that the matter is not entirely clear-cut and has not been thoroughly studied.

Radiotechnical company commander Maj Yu. Ablov, who is responsible for the most powerful of the radars, was unable to introduce any clarity to the matter, for he was stationed elsewhere when the testing was performed and therefore is unacquainted with the results. Sr WO A. Verpeta, whose radar operates in the frequency band

which presents the greatest hazard to people's health, was also unable to present any documents on intensity of emissions.

Thus events proceeded according to that well-known pattern where everybody passes the buck—the Navy people to the Air Defense Forces people, the latter back to the former, and so on. Confusion in such a serious matter as this is incomprehensible! It seems that living quarters and working quarters are not shielded, that is, are not protected at all. Even though there occur on the base induced stray currents from the radars. They did concern themselves, however, with the building in which sensitive equipment is housed. It was shielded.

Perhaps radars operating separately do not present a health hazard. But as an aggregate, where the fields generated by the different radars may be superimposing on one another, they may be doing irreparable damage to people's health. For this reason the base's residents are justified in feeling that a thorough and comprehensive investigation should be made. Measurements must be taken of the combined electromagnetic energy flux. But this requires forming a board of inquiry with authority, independent of the agencies to which the facilities belong.

I recently contacted Air Defense Forces corps chief of staff Col S. Dymov. He stated that the facility in question has reached its service life limit and will be dismantled. A new site will be set up further from base facilities. No measurements had been taken at the radar site. The reason for this? No test instruments available. The facility was to be dismantled in a couple of months....

Several questions arise following this reply. Why is it that an air defense combined unit does not have at its disposal the proper equipment to measure electromagnetic fields? How are they planning to site the facility—once again by rule of thumb, without instrument monitoring or testing? And, finally, is there a guarantee that this will actually take place in a couple of months and that people will be set at ease?

In short, this incident demands special attention and a specific solution. An attitude of secrecy and hushing up the true situation are intolerable, just as is close-mouthed confidentiality in the activities of boards of inquiry of this kind.

'Greens' Party Constituent Congress Ends

*LD2807202590 Moscow Television Service in Russian
1700 GMT 28 Jul 90*

[Text] The constituent congress of the federal ecological movement Greens in the USSR completed its work in Moscow today. The aim of the new public organization is to improve the ecological situation in the country. The movement has no political purposes.

Volga-Don 2 Canal Construction Halted

*LD0108093790 Moscow Domestic Service in Russian
0900 GMT 1 Aug 90*

[Text] By decision of the Volgograd Oblast Soviet, construction and financing of the Volga-Don 2 Canal has been halted effective today. This decision is based on the fact that construction was begun without sufficient ecological and economic justification.

Industrial Spill Forces Cut-Off of Bryansk Water Supply

*LD2307191790 Moscow TASS in English 1857 GMT
23 Jul 90*

[By TASS correspondent Yuriy Lodkin]

[Text] Bryansk July 23 TASS—All the water intake facilities supplying water to the city of Bryansk have had to be cut off because of the pollution of the water in the Desna River with phenol and other toxic substances. The city with a population of 500,000 will be supplied with water from reserve artesian wells and these supplies will have to be rationed. The situation is likely to remain unchanged for at least a week—the time required for the self-purification of the river around the city.

The pollution was caused by an accident at the Ivotskiy Glassmaking Factory—two metal reservoirs containing liquid phenol-formaldehyde resins were punctured and leaked nearly 40 tonnes of chemicals, of which part was washed by a shower into the Ivotok Rivulet. Two hours after the accident the concentration of formaldehyde in the water exceeded the maximum permissible level 400 times, and of phenol—more than 2,200 times.

The situation was considered by the regional commission for emergencies and at the urgently convened meeting of the regional executive committee. Criminal proceedings were instituted relating to the accident that caused dramatic ecological damage.

Bryansk Water Supply Polluted With Phenol After Accident

*PM2707142190 Moscow Television Service in Russian
1430 GMT 25 Jul 90*

[From the "Vremya" newscast: Report by A. Guglya, identified by caption]

[Text] [Newscaster] In the spring we reported an accident at an industrial enterprise in Ufa. At the time, phenol—a highly potent toxin—was discovered in the city's drinking water. The RSFSR [Russian Soviet Federated Socialist Republic] Government took urgent steps to eliminate the consequences of the accident.

It never rains but it pours. On 21 July at approximately 1800 hours an accident happened at the Ivot Glassworks in Bryansk Oblast.

[Correspondent] Two engineers driving shunting locomotives while under the influence of alcohol overturned and damaged tank cars containing phenol and formaldehyde. All this happened in pouring rain, as a result of which more than 20 tonnes of noxious substances threatened to seep into the Desna River together with the runoff. [Video shows damaged tank cars, stream of white liquid] Water from the Desna is used to supply Bryansk's population of almost 500,000.

An emergency commission adopted urgent measures to localize the consequences of the accident. The inhabitants of the oblast center are at the moment being supplied with water from reserve artesian wells only.

The contaminated upper layer of soil at the scene of the accident is being temporarily deposited in a special pit on the works territory. [Video shows bulldozers]

[A.A. Yudin, director of the Ivot Glassworks, identified by caption] It remains to be agreed now where this soil should be buried, and I hope that within the next day or two all the work in connection with the accident which occurred at our works will be completed.

[Correspondent] At 0000 hours on 24 July the permissible limits of phenol and formaldehyde concentrations in drinking water were exceeded by 1.8 and 3.0 times, respectively. The hygiene service is constantly monitoring the water, and prosecutor's office organs are conducting an investigation.

Disagreements Continue in Leningrad Barrier Project Controversy

90WN0092A Moscow IZVESTIYA in Russian
22 May 90 Morning Edition p 3

[Article by IZVESTIYA special correspondents Anatoliy Yezhelev and Kim Smirnov: "The Leningrad Barrier: Shield or Sword?"; passages in boldface as published]

[Text] How many years have the arguments about flood protection for Leningrad been going on? Numerous commissions have stated their conclusions. The two latest scientific appraisals were conducted just recently by the Leningrad Scientific Center and the Presidium of the USSR Academy of Sciences, and a conference on "The Experience in Independent Appraisals of the Leningrad Barrier" was held in the Polytechnical Museum in the capital. The range of opinions, however, is still extremely broad—from fervent assurances of the absolute ecological safety of the structures to the jokes, transmitted along the "people's telegraph," about how the levee in the gulf has provided Leningrad with a cesspool.

In essence, the irreconcilable "pros" and "cons" are the following:

Con...

The barrier will turn the bay into a sump filled with a whole bouquet of dirty and hazardous substances. Besides

this, it could become a "chemical and biological reactor," in which mutation processes will cook up a terrible "soup" threatening Leningrad with epidemics of diseases still unknown to medicine. We could have a biological Chernobyl right next to the gigantic metropolis!

The designers and builders of the barrier, scientists, and earlier "city fathers" staked their reputations on its ecological safety, but is the value of all their reputations combined comparable to that of Lenin's city, a place sacred to all our people?! Officials come and go, but Leningrad is eternal. Does anyone have the right to stake his reputation or his conscience on its future?

The design for the barrier did not have the necessary ecological substantiation. The first studies were not conducted until 3 or 4 years after it had been approved, in 1981-1982. Some essential data are still lacking. In particular, there were no land evaluation studies of the banks. The choice of the barrier site was never substantiated. It was purely arbitrary. The location of the outlets of the northern sewage treatment facilities was an unfortunate choice, and the southern location was the worst possible choice. In general, the outlets should be beyond the barrier instead of near the shore. The run-off should be directed farther away from the shore through pipes.

We still do not have a comprehensive and objective ecological service in Leningrad to provide us with all of the facts. For this reason, no one can guarantee the validity of the ecological safety data the barrier's supporters are citing. No one can give us any solid guarantees of this safety today. For this reason, would it not be better to halt the construction until the discharge and dumping of enterprise sewage into the Neva and Lake Ladoga have been completely stopped?

The planning and the construction of the barrier were conducted in line with the worst stereotypes of the period of stagnation: Secure financing approval as quickly as possible; begin the work without any thorough scientific—including ecological—investigations; link the work with problems of vital importance to the city. When sizable sums have already been spent on a project, it is virtually impossible to call a halt to it. This is the logic of the expenditure mechanism that was perfected over decades, but sooner or later we must give up these practices.

Why not start with the Leningrad barrier project? Why not dismantle the barrier for souvenirs, like the Berlin Wall? Of course, this would seem inconceivable to the old members of the Leningrad soviet. After all, they were chained, like Prometheus to his mountain, to the levee—or, more precisely, to the authoritarian system which gave birth to it—and each objection to the project tore at their livers as ferociously as the mythical eagle. We have to put our hope in a new Leningrad soviet....

Pro...

Anyone who calls the protective structures a barrier or levee is stretching the point and trying to state the issue in

unforgivably crude terms. This is a unique and intricate product of the art of engineering, which is unparalleled in the world and which not only has no negative ecological effects but, rather, can regulate the ecology for the better if necessary.

The amount of pollution in the water simply does not depend on the barrier (for the sake of brevity, we will continue to use this word—Authors). This is why its designers and builders and all of the people in Leningrad are in favor of the start-up of sewage treatment facilities as soon as possible, the renovation of the technology in the Ladoga basin, and the recycling of water in Leningrad plants. All of the pollutants reaching the barrier will pass right through it, and nothing will accumulate in the inlet.

Therefore, there is no reason to hold up the construction of the protective structures, and of the shipping locks in particular. After all, the latter are "above suspicion." They will let water out, not keep it in. The suspension of the construction project before "all of the pieces have been put together" (temporary bridges, locks, etc.) could inflict disastrous damages on Leningrad in the very first severe flood. The best solution is to step up the construction work.

The protective structures do not simply represent Leningrad's set of "false teeth." Their construction will solve a whole group of the most pressing current problems of the gigantic city—in areas ranging from demography to transportation. Flood protection is an integral part of the Leningrad General Plan, securing the most economical way of establishing new neighborhoods on the banks of the inlet, connecting the banks by highway, and reducing traffic in the center of the city.

The main thing, however, is the probability of floods, the Damoclean sword hanging over Leningrad. The suspension of the barrier project (i.e., leaving it half-built) or dismantling the protective structures, which could already serve as a shield for Leningrad in the near future, could postpone the decision on new ways of protecting the city for years or decades. During these years, we would have an almost 100-percent guarantee of a devastating flood, which the historical center of the city, with its decrepit foundations, simply could not survive.

The opponents of the barrier are instituting legal proceedings against its supporters—from former Politburo member G. Romanov to the people who actually drew up the plans—and have suggested the closure of the institutions and organizations connected with the protective structures. But who will take the responsibility for the collapse of the Cathedral of St. Isaac, the Winter Palace, the Admiralty, and Smolny Convent? The members of today's informal movements and the "independent" experts? They cannot even be held accountable for anything in the courts!

Alternatives

These are the two points of view summing up the hours, months, and years of fierce arguments in the city on the Neva. Each has been supported by a multitude of facts, figures, and graphs, but although the debates have been going on for several years in the form of an open and unrestricted clash of opinions, neither side has scored the winning point or delivered the knockout blow yet.

We have to say right away that we have no intention of offering our own judgments in place of the opinions of scientists and specialists. They and only they should come up with the final answers to the questions of whether excessive algae is growing in the Marquise's Pond, whether or not flood seasons should be "bath days" for the Neva, whether or not the protective structures affect fish reserves in the inlet, and what must be done now—whether the construction of the barrier should be stepped up or whether it should be "dismantled for souvenirs."

We, however, are interested not only in the scientific and economic arguments over the barrier, but also their social implications. By their "roots" and original causes, they are firmly connected with the recent signs of stagnation in our life. To an equal extent, the present high pitch of these arguments reflects the new developments connected with perestroika. It is time to learn important lessons from these arguments and to apply them to more than just the local problems of Leningrad.

First Lesson

We must learn technological democracy.

What does this mean? The supporters of the barrier project allege that it was born in an atmosphere of competition between various options, with the extensive involvement of the scientific and technical community, as if those who question it are mere dilettantes. Nevertheless, many facts prevent the description of this birth as a ray of light in a dark and stagnant realm.

In essence, it is only now, and only to the accompaniment of considerable difficulties, that research displaying the features of genuine democratization is making some headway in our country—features such as the refusal to follow the arbitrary orders of head institutes, the first steps toward diverse and even alternative plans, and the creation of a mechanism to carry them from the blueprint stage to completion, a mechanism in which the appeal of "prominent names," "first secretaries," and "solid firms" would lose its strength and in which economic expediency combined with ecological safety would be the primary objective. Is there a single specialist today who can swear on his honor that all of these features were present in the plan to protect Leningrad from floods and that it was not influenced by authoritarian orders?

It is too late to return to the stage of the first blueprints, where countless options can be explored on paper. The

structures have already been built or are being built. They are definitely linked with many of what are known today as fateful economic and social problems of the city on the Neva. But after all, this was also the highest principle of the period of stagnation: Poorly planned massive projects were linked with the people's crucial concerns without any feedback from these people.

According to the supporters of the barrier, no hydraulic engineering project before or since underwent a more thorough ecological analysis. According to its opponents, this was not an analysis, but merely an attempt to tailor research results to fit assigned requirements. There is the same clash of opinions on each detail—general and particular.

Why were there delays in the construction of the waste treatment facilities? Why did the design need adjustments, which then had to be "corrected" in a hurry? Why was no one held personally responsible for this? Why, finally, were the plans for the construction of protective structures and waste treatment facilities kept separate, even on the organizational level, although they would seem to constitute a single ecological engineering project? These questions will remain rhetorical until the appeals to "stay ahead of ecology" take physical form in a tangible and effective system of ecological and social protection, backed up by strictly scientific appraisals and eliminating the possibility of arbitrary authoritarian behavior.

There were no ecological appraisals of the Leningrad barrier project, no matter how many times we are assured that there were. This "state procedure" simply did not exist in our country at that time. In Japan, for example, a resolution of the cabinet of ministers on the procedure of ecological appraisal went into effect in 1986. Some of the nine compulsory stages are the announcement of the conclusions of the board of experts, their discussion by the public, and the comments of local residents on the proposed project. In our country, the USSR State Committee for Environmental Protection is still only taking the first steps in this direction. We can still hear the echoes of the departmental, regional, and authoritarian disregard for ecological laws and imperatives.

Consider this: In Japan they found the precise legal balance between the appraisals of specialists (they are the ones who judge the project and the appraisal data) and the opinion of the inhabitants of the regions where projects are to be undertaken. We are still arguing even today about whether the population has any right to make decisions reserved for specialists. This is an upside-down view of the entire issue. If we were to turn it right-side up, we would be asking whether specialists are competent and responsible enough to avoid jeopardizing the future of people with their technical decisions.

Deputy Chairman A. Mishchenko of the academy commission of experts expressed this point of view accurately in his report on "Expert Appraisals in the USSR

Academy of Sciences" at the conference mentioned at the beginning of this article: "I remember what Academician B. Raushenbakh said when he was arguing against the opinion that only specialists have the right to make decisions on matters connected with ecology, the administration of the national economy, and other such complex issues. What we need, he said, is for each citizen of the Soviet Union—and, in our case, each inhabitant of Leningrad—to have enough reliable information to make a conscious choice and take a firm stand on, for instance, the barrier project. If science cannot explain one of its conclusions to the average citizen, this is science's problem, and not the citizen's."

Second Lesson

The time for complete ecological glasnost in the country is approaching, and we must be equipped with all of the achievements of the modern art of monitoring and a comprehensive system of ecological observation, with compulsory reports on these matters to the public.

If a referendum were to be held in Leningrad on the barrier project today, most of the citizens would vote against it. This would not tell us anything about the side with the most competence, but it would give us quite definite indications of the current state of public opinion and of public likes and dislikes.

This phenomenon is not confined to Leningrad. Why is it so difficult to soothe public opinion throughout the country and to convince the public with statistics whenever the discussion turns to ecological problems? Why are rallies and demonstrations in defense of the environment so volatile and uncontrollable? Is it simply the fact that "our 'Greens' do not want to hear anyone else's arguments" (as one explanation puts it)?

The roots go much deeper: Now that the people have begun expressing their wishes openly, they do not want to be the submissive guinea pigs of the authors of any "projects of the century" or dams, levees, and chemical complexes. They want to know the truth about everything affecting their living environment.

The resolution of the 19th party conference "On Glasnost" already said that "the unjustified restrictions on the use of statistical information about the socioeconomic and political development of the society and the ecological situation must be lifted, and a system for the collection, processing, and distribution of information, based on modern data processing technology, must be established...." It has been around 2 years since the resolution was passed. The supporters and the opponents of the barrier project have referred to it repeatedly. Both sides are in favor of complete glasnost. Each side believes that complete information would convince the people that its position is the right one. Both are complaining about the absence of complete ecological glasnost.

One of the reasons is that information about the environment always had to be, and still has to be, literally

wrested from the depths of the authoritarian system. We often hear frightening warnings about the unpredictable consequences of the provision of the population with the whole truth about the air it breathes, the water it drinks, and the land on which it grows vegetables and fruit.

But after all, there is no other solution. Realistic measures to improve the living environment cannot be undertaken without a knowledge of all the details. The people who kept the truth about ecology hidden were afraid of more than just the ecological rallies and demonstrations of the "unaware" public. They were afraid they might have to find real solutions to environmental problems today, without having a chance to transfer them to the shoulders of tomorrow's "fathers" of our cities and rural communities. They were afraid they might have to move from "ecological jabbering" to real action—to extremely difficult action.

New people have now taken charge in the majority of soviets in the country, including Leningrad. Many of them received the mandate of trust because they promised to tell everyone the truth about the environment and to do everything within their power to improve it. Soon they will have to keep this promise. In Leningrad they will have to tell the people the whole truth about the barrier, explaining all of the details, and then decide its future.

Today no one can ignore our ecological concerns. Everyone will have to take a stand. It will be a crime to say nothing about the distressing state of the environment. Chernobyl is only one indication of this.

Returning to Leningrad and the need for flood protection, we must say that although much has been done in recent years to inform the population through the press, radio, and television, the city still cannot brag about an all-encompassing and unified information system providing inhabitants with regular and complete reports on the ecological situation in the inlet and on its banks. It is no wonder that rumors are started.

We have heard about the uncontrollable algae in the water, and about the layers of dead smelt on the river bed near the barrier. All of the facts have to be checked. We have to check them together—the supporters and the opponents of the project. It is important to separate not only truth from rumor, but also facts from their interpretations and extrapolations. Finally, we need a single ecological service for the protective structures, the mouth of the Neva, the whole river delta, and any other body of water in Leningrad, even the smallest creek. The service should be headed by the chief ecologist of Leningrad, an incorruptible individual with considerable authority and "veto" power.

Now that we have all decided that we cannot get along without complete ecological glasnost, will we manage to supply the population with complete and reliable information? After all, this will require special equipment and knowledgeable experts. The country is just approaching the threshold of ecological instrument building.

Something else is also important. Ecological information should not be anyone's "private domain." Environmental monitoring should be the responsibility of a single service, and not of separate departments. Within this service, specialists should work with public spokesmen expressing both points of view—or, more precisely, representing all of the interested parties.

Third Lesson

Nothing is preventing the actual improvement of the environment more than the irreconcilable battles between different forces in charge of these matters.

We said that neither side had delivered any "knockout" blows, but let us assume that one side does. What will happen then? Will this immediately create an atmosphere of peace and harmony? Hardly. The momentum of the struggle is too strong today. Both sides have gone too far in creating an "enemy image." Journalistic license has been substituted for objective reporting too often.

At the conference on the barrier, for example, a respected scientist had some serious complaints about the earlier Leningrad leadership and presented them in the following carefully worded phrases: "In the time of Grigoriy Rasputin (laughter in the auditorium)—excuse me, I mean Grigoriy Romanov—the tyrannical member of the Politburo who was so brazen and had such a strong sense of impunity and immunity, all of the members of the Leningrad gorispolkom catered to his every whim. I do not think I will offend anyone by saying this. But after he was gone, other leaders continued his practices....

"The guilty must be punished. There are guilty parties here, beginning with Grigoriy Rasputin (laughter and applause)—guilty, beginning with Grigoriy Romanov. But he is still wearing the star of a Hero of Socialist Labor. Who should punish him? I think the inhabitants of Leningrad should make this decision. This is their business.

"*"Lenmorzashchita!* I accuse you of beginning to build the barrier before the waste treatment facilities had been built and started up. Your flagrant violations of all the rules caused an ecological crisis. You were gambling with the future of millions of Leningraders! This deserves punishment, not medals and awards. And this should not simply entail the loss of a job, but also prosecution in court (applause)."

What is this? A speech by a public prosecutor? A declaration at a rally with a carefully constructed series of scathing remarks? No, it was the end of a scientific report filled with data, their analysis, and conclusions.

The supporters of the barrier have responded to each and every attack: "Dear Comrades, on the assumption that you are gullible readers, viewers, and listeners with no knowledge of hydraulic engineering, the political adventurers, under the guise of struggle for a clean environment, have tried to stir up mass indignation against the

protective structures and those who devoted all of their knowledge, thoughts, energy, and willpower to their construction. People, do not believe them. Their hearts and souls are not troubled by your concerns or your misfortunes and they do not care a bit about the city....

"I sincerely believe that you, dear Leningraders, will not give in to the provocation and will understand the truth of the matter."

This is what Lengidroenergospetsstroy General Director Yu. Sevenard wrote in a GIDROSTROITEL article.

After events take this turn, it is not a long way from mutual accusations to acts of sabotage: ecological on one side and political on the other. Would it not be better to return to the source and try to understand that Yu. Sevenard, who is defending the barrier, and S. Tsvetkov, V. Bresler, and V. Znamenskiy, who oppose it, are all Leningraders who love their city and who wish it nothing but the best, although they might disagree on what the best is? Is it possible that the supporters and opponents of the project will still be competing 2 years from now to see which can hurt the other the most with a scathing remark?

This does not take much intelligence. This is just a continuation of the old traditions dating back to the August 1948 session of the All- Union Academy of Agricultural Sciences and earlier.

If we take a look at the history of the protective structures in Leningrad from today's vantage point, we will see many famous names from our scientific community and government on both sides, going all the way back to Peter I, who decided to found this city on marshes and human bones, under the constant threat of minor floods. Both sides are demanding a "speedy and fair" trial. This, however, is not happening.

God forbid that someone should decide we are trying to justify the actions of the former Leningrad leadership. No, we simply support a proposal voiced at the conference: The Institute of Government and Law of the USSR Academy of Sciences should establish a special commission on the legal aspects of the design and construction of the barrier. All of the arguments about the history of the project and the personal responsibility of its "architects" and "superintendents" are groundless without a solid legal foundation. All of our rash actions in response to public opinion and mob rule will only delay the answer to a question of vital importance to each Leningrader.

Yes, people deserve to be put on trial for much of what was done in the years of stagnation instead of being awarded medals and stars, but they must be tried in accordance with law, on the basis of solid evidence, and with their guaranteed right to defend themselves. Otherwise, we will not have come very far from the 1930's, when the grounds for serious accusations and death sentences could be the unsubstantiated remark that "everyone knows that...."

Now we will take a look at the future from today's vantage point. Will the present confrontation bring us any closer to the best solution to a double problem: the need to guarantee the ecological safety of Leningrad and the need to protect it from floods? It will not. This means that it is time to move away from mutual accusations to a legal and scientific basis. All of the "pros" and "cons" of both sides must be cleansed of emotion and we must take an objective look at them together.

Dean A. Mishuyev of the Moscow Construction Engineering Institute, head of the School of Hydrodynamics, has suggested the establishment of a comprehensive scientific research laboratory of quick response, so that differences of opinion can be settled without delay and without waiting for another expert appraisal. There should be a single database on the project. Space and aerial cartography of the mouth of the Neva, the river itself, and Lake Ladoga, meeting all of the requirements of both sides, should be organized. An independent team should be formed to conduct regular surveys of the state of the inlet. A comparative analysis of all of the conflicting data on the barrier project and its ecological substantiation from various sources should be conducted. Other measures can be undertaken in common if the two sides show a willingness to cooperate.

Paradoxically, after all the years of conflicting opinions and views, all of us will eventually become richer—in the volume and quality of information and the accuracy of conclusions. The present problem is that these riches are concentrated in two different places, on the two opposite banks. Before we can answer the question of whether the Leningrad barrier should be completed or dismantled, we must build a bridge of trust between the two banks.

Latvian Greens Protest Against Firing Range

*LD2507212190 Vilnius Domestic Service in Lithuanian
1900 GMT 25 Jul 90*

[Text] Members of the Green Party in Saldus Rayon near the Lithuanian border have organized a protest march to the (?Izvarde) firing range. Since 1955 bombing and strafing exercises from military aircraft have been taking place there. Through the fault of the servicemen a cemetery on the territory of the firing range has been destroyed. This has provoked indignation among the local rural population.

Upon the demand of participants in the demonstration, military authorities have been compelled to allow the marchers access to the cemetery, where the graves were put in order and crosses erected on them. The participants in the march demanded that the territory of the firing range be returned to the Republic of Latvia.

Oil-Shale Mining Damages Estonian Environment

*LD2407120690 Tallinn International Service in English
2030 GMT 23 Jul 90*

[Excerpts] In an area of about 1,000 square miles in the northeastern part of Estonia, just across from Finland,

disasters sure to shock anyone who sees them come one after another. In the city of Kohtla-Jarve, red bubbling extracts from oil-shale processing plants run untreated into the Baltic Sea. In Narva, a major city near the border with Russia, power plants spew tons of radioactive debris from soaring smokestacks. In Kunda, towers at an antiquated cement plant pump heavy white ash into the air, which then falls onto surrounding houses and trees like a heavy snow. In and around the city of Tapa, some of the well water is contaminated with fuel.

Ironically, by far the biggest source of the pollution comes from Estonia's greatest natural resource, which under Soviet rule has become its greatest environmental curse. That resource is oil shale. [passage omitted]

Since the Soviet military takeover of Estonia in 1940, uses and methods have changed. Today under the total control of central authorities in Moscow, over 31 million tonnes of shale is mined each year, almost eight times the amount mined during Estonia's independence. [passage omitted]

The result of Soviet methods is waste and devastation. [passage omitted]

Frequently, the heavy toxic residue has to be run out directly to nearby rivers, or is incompletely treated and then pumped out to sea. [passage omitted]

Over all, half of the 30 million tonnes of shale mined each year ends up on the ground as inorganic residue. Of the electricity generated in the process half goes to fulfil all of Estonia's energy needs. The rest goes to Russia, Latvia, and Belorussia. Some of the electricity is even sold to Finland for hard currency. Estonia, however, gets nothing of the hard currency revenue. Because of senseless all-union accounting systems, Estonia also ends up getting paid less by Moscow for the electricity it produces here than it actually costs Estonia to produce it. In short, Estonia is forced to subsidize the destructive and inefficient energy industry over which it has no control. [passage omitted]

For the steep monetary and environmental costs of producing the third largest per capital amount of electricity in the world, just behind Norway and Canada, Estonia gets comparatively nothing in return. Moreover, because the inefficient use of the shale to produce electricity requires that such massive quantities of shale be mined each year, the Soviets are quickly depleting the once-rich shale reserve. At the present rate of mining, the shale deposits that could have provided Estonia a source of hard currency on the world market and kept Estonia energy self-sufficient for years, will be gone in 25 years.

Odessa Residents Demand Closure of Chemical Plant

PM2607155590 Moscow Television Service in Russian
1700 GMT 24 Jul 90

[From the "Vremya" newscast: Reportage by S. Fateyev, B. Zamchinskiy, identified by caption, on opposition to Odessa chemical plant]

[Text] [Newscaster] The question of the future of the Odessa dockside chemical plant, one of the biggest enterprises in the sector, has been placed on the agenda of the Odessa City Soviet session, among other questions which are causing concern among the city's inhabitants.

[Correspondent] This is one of the biggest chemical complexes for the production and storage of ammonia and [?carbonite]. There are also the wharf where large-tonnage ships take ammonia on board, the ammonia pipeline from Odessa to Tolyatti, and huge tanks containing liquid ammonia, ethanol, and other dangerous substances. [video shows installations] And all this on the seashore, near the Grigoriyevskiy flood plain which at one time abounded in fish, in a resort area. The inhabitants of Odessa are outraged. They have organized a rally. The plant, which was a Komsomol [All-Union Lenin Communist Youth League] shock building project at one time, is now described only as another potential Chernobyl, as a Sword of Damocles hanging over Odessa.

Some inhabitants of Odessa have come to the building of the City Soviet to express their opinions.

[unidentified woman] We are against the ammonia plant.

[second unidentified woman] It must be switched to a different type of output or closed down. [video shows demonstrators displaying protest posters]

[S.P. Kuleshov, member of the "ecological council," identified by caption] We paid a visit to the dockside plant a few days ago and we were able to see for ourselves that, given its current condition, it cannot be effectively switched to a different type of output. I have brought along the signatures of some 20,000 Odessa inhabitants who are demanding that the plant be closed down without delay.

[A.A. Melnik, city soviet deputy, a doctor by profession, identified by caption] The session is opening today and we will seek a suspension of operations at the plant, and an exhaustive investigation of the situation by a competent extradepartmental commission, possibly with the assistance of foreign experts, to be carried out to arrive at a clear-cut answer as to what kind of plant this is, what harmful effect it has already had on the environment, and what is in store for Odessa in the next few years.

Quarries Cause Environmental Problems in Dagestan

PM2607094590 Moscow Television Service in Russian
1430 GMT 23 Jul 90

[From the "Vremya" newscast: Report by D. Beybutov and V. Mamiyev, identified by caption]

[Text] [Newscaster] As the saying goes—we do not treasure what we have, but when we have lost it, we cry. Unfortunately, this saying applies to the general ecological situation in our country. And Dagestan is no exception.

[Correspondent] "Everything, everything is beautiful in this region." Well said, but unfortunately Lermontov said that a long time ago. When the unique nature of this region is discussed today, it is not so much a subject for lyricists as for investigative journalists who should sit down and describe what is being done to this part of the world between the Caspian and the peaks of the Caucasus.

There is no need to go far for evidence. It is enough to take a walk around Makhachkala and its surroundings in order to see and appreciate how unscrupulously nature's riches are being treated throughout the republic.

The sea and the Tarki-Tau Range, which rises 700 meters above the capital of Dagestan like a protective wall, are a true gift of the gods and a salvation for the 300,000-strong population of this southern city. The inhabitants of Makhachkala describe the mountain range as an oxygen factory and the lungs of the city.

But someone decided to quarry stone for construction purposes precisely here. And the industry developed to such an extent over the past quarter of a century that it was difficult to halt this process. Literally a few days ago the hoppers on this cableway came to a standstill. [Video shows cableway] Stone quarrying has finally been discontinued. The ravaged land is now to be recultivated at the cost of tens of thousands of rubles. But will the springs start flowing again in Tarki-Tau? While one stone quarry has been closed down on the plateau, another is being developed with redoubled zeal on the northwest slope of the mountain. It is a complete paradox. While this slope is being ruthlessly destroyed, attempts are being made, at tremendous cost and labor, to grow pine terraces on the opposite, southeastern, slope. [Video shows terraces]

And there is another point. Who is responsible for the fact that asphalt factories are belching smoke around the Tarki-Tau and that oil workers are working in such close proximity? Has nothing been learned from the accidents which occurred in spring of this year at the Dmitriyevskoye deposit near Makhachkala? Who is to answer these questions? Both the Makhachkala city authorities and the Dagestan republic organs. They all have the Tarki-Tau before their very eyes.

Armenian Authorities Urged Not To Take Drastic Action Against Major Polluters

90WN0101A Yerevan KOMMUNIST in Russian
4 May 90 p 2

[Article by A. Matnishyan, member of Public Ecology Council of Armenian SSR State Committee for Environmental Protection, doctor of chemical sciences, and professor: "Look Before You..."]

[Text] The ecological movement in the republic is a relatively recent development, but in spite of the support of the press, headed by Zoriy Balayan, the USSR Ministry of the Chemical Industry and the republic government have not always paid attention to our proposals. In fact, we have frequently been ignored by these institutions. Without any reliable data on pollutants, we looked like dilettantes to the representatives of ministries and government commissions.

In 1988 the Armenian SSR State Committee for Environmental Protection entered the people's unequal struggle for their health. At that same time the Nairit Scientific Production Association (NPO) made an attempt to present its own arguments, but it was already too late and no one trusted anyone else. The procrastination of government agencies and the reluctance of Nairit representatives to make specific decisions on existing ecological problems aggravated the situation dramatically. It reached the point at which the commission organized in 1989 by order of the Armenian SSR State Committee for Environmental Protection to investigate the ecological state of the Nairit NPO, one of the members of which was the author of these lines, was unable, despite our insistence, to obtain the necessary data of a qualified analysis and assessment of the actual quantity of effluent from the Nairit NPO. As a result, some members of the commission refused to take part in the inspection. All of these circumstances contributed to the dissolution of the informal ecological council that existed at that time, and many specialists grew disillusioned and ceased to work effectively. This led to a crisis in the movement as a whole and to the development of new extreme views in the movement, which was no longer under any kind of supervision. There was a new group of activists who were not always competent but were sincerely committed to the cause. Rash decisions were made on both sides in line with the idea that the whole world could collapse as long as ecology triumphed.

As a result, we are now on the verge of the total collapse of the republic economy without having solved any of our ecological problems to any appreciable extent. It was under these conditions that the republic Supreme Soviet's decision on the closure of the Nairit NPO was published on 25 June 1989. Incidentally, the whole thing would have remained on paper if it had not been for the vigorous actions of desperate people.

I believe that the decision of the Armenian SSR Supreme Soviet is unjustified because several objectives of vital importance to the republic have not been attained. Their

attainment will be impossible without the sequential redirection of Nairit into new channels and without a specific plan for re-specialization, which, as we know, can take years.

How could a decree be passed on the closure of the entire Nairit association, including the production units supplying the republic with dry ice, carbon dioxide, oxygen, caustic soda, and chlorine gas? After all, heat and electric power stations, the food industry, and the purification and disinfecting equipment of the sanitary and epidemiological station cannot work without these components, the work in hospitals will be complicated, etc.

Our people, who have always valued knowledge, are now closing a scientific center employing highly skilled specialists who took part in the development of production in other parts of our country and abroad. How can we throw away our scientific potential so carelessly at a time when the whole world is importing it? Is it possible that some people feel we have become too smart? At a time of such tragedy, how could the decision have been made to close the acetylene production facility in Yerevan and the calcium carbide facility in Kirovakan when these are so necessary in welding operations in the disaster zone? In general, is anyone giving any thought to the people in the disaster zone, where the shortage of crude resources and materials is having a much greater impact than in Yerevan? How can the production of polymers be stopped at the polyvinyl acetate plant and the Nairit NPO when they are the raw material for other enterprises in the republic—the enterprises in light industry, the footwear industry, and the production of cigarette filters which have given Armenia a chance to conduct international operations? At a time as crucial as this, now that the existence of the entire nationality is at stake, how can its industrial potential be destroyed, especially the chemical potential that determines the defensive capabilities of states? We have to wonder who will benefit from this.

I think that the republic Supreme Soviet should take all of this into consideration and take immediate measures. Today attempts are being made to isolate the intelligentsia from our people, to take away their scientific potential, and to put the republic on the verge of total chaos. Under these conditions, it will be easy to stop the process of democratization as well.

I am requesting the republic government to unite all of our people's scientific potential in commissions and soviets with the right to approve or influence government decisions, and to restore the informal republic ecology council, which should work with the State Committee for Environmental Protection on an equal basis, and not just work with it formally as it does now, and should take part in making decisions in the Council of Ministers. I repeat, it should have voting rights. I think that this is the only way we can enlist the services of skilled experts to solve the republic's current problems.

The republic's meager crude resources will not allow the development of electronics or machine building, where chemical processes, according to the data of Japanese specialists, account for 50-70 percent of all expenditures. Today the use of facilities operating on gas, which is still the only organic resource reaching the republic, and the processing of polymer by-products can maintain our industrial potential and the viability of the republic.

Officials Comment on Safety Issues at Kazakh Nuclear Physics Institute

*90WN0101B Alma-Ata LENINSKAYA SMENA
in Russian 3 Apr 90 p 4*

[Article by Marat Asipov: "Turmoil, Radiophobia, and...the Lack of Information; A Return to a Topic Which Has Already Been Discussed on Our Pages, or 'When the Nuclear Physics Institute Initiates a Dialogue'"]

[Text] When I received an assignment from the editors to go to the Nuclear Physics Institute of the Kazakh SSR Academy of Sciences and report on the work being conducted to increase the safety of the reactor, I set off for Alatau. Instead of interviewing one or two institute researchers, however, I met representatives of the entire research team when I was invited to a seminar organized by the institute for the discussion of "Nuclear Physics: The National Economy and Questions of Radiation Ecology."

After the seminar, the guests were invited to tour the institute and see the reactor—an extraordinary event in itself for an establishment which had previously been closed to the public.

The reason the institute administrators took this step was the turmoil aroused by the press, informal associations, and the gorispolkom over the reactor and the radioactive waste disposal site.

Here is what seminar speakers had to say.

I. Kazachevskiy, Activation Analysis Laboratory Director

"We now know that everything is radioactive to some degree: The water, the air, and the earth. We are under the constant influence of cosmic rays, which engender elementary particle flux when they interact with our atmosphere. All of this constitutes what is known as the natural background, in which the human race came into being and evolved for thousands of years. The radioactive background is distributed extremely unevenly in the world. In some places, indicators can be 10 times as high as the world average. In India, for example, the radioactivity of the soil in the state of Kerala is around 3-5 rem (medical roentgen- equivalent) a year, which is comparable to the radiation dose of reactor personnel under normal operating conditions. Radon sources have always been reputed to have curative properties, and now there is evidence that they can help to cure infertility. Most

mineral waters contain dissolved radioactive isotopes. The radioactive background in Alma-Ata is 0.33-0.5 rem because of its geographic location, close to the mountains and high above sea level."

Yu. Kuznetsov, Physics Research Group Supervisor

"Mankind is now facing one of its most difficult problems—the problem of the compatibility of power engineering with nature. Existing sources of energy powered by traditional fuels—coal and oil—do not meet ecological requirements because they pollute the atmosphere with vast amounts of carbon dioxide, sulfur dioxide, and nitrous oxide, which could be the cause of the greenhouse effect—the global warming with results comparable to those of a nuclear war. Environmental pollution is already creating acid rains which kill all forms of life.

"Experts have estimated that if coal and oil continue to be consumed at the present rate, by 2075 atmospheric temperatures will be 10 degrees Celsius higher near the equator and 20 degrees higher at the poles. Nuclear power plants are a realistic alternative and could save us from certain ecological disaster if the necessary safety measures were to be observed. Of course, any reactor is a potential source of grave danger. The Chernobyl tragedy demonstrated the consequences of the failure to comply with elementary safety requirements and of flagrant technological errors. From now on the design, construction, and operation of reactors should be monitored at all levels by a large group of experts and independent monitoring agencies. The experience of developed capitalist countries, such as France (where nuclear power plants produce around 70 percent of the electrical power in the country), Japan, and Australia, is interesting in this respect. Members of the most diverse population groups tour the reactors there, from schoolchildren to retired individuals. In other words, people there are kept well informed.

"The use of nuclear power engineering reduced per capita pollution by 250 kilograms in France, 110 in the United States, 85 in the FRG, 61 in Japan, 57 in Great Britain, and 33 in the USSR.

"Decisions of vital importance should not be made without extensive discussion, and because it is impossible for people with only a vague idea of the topic to discuss it seriously, specialists should make a maximum effort to provide the public with objective information."

V. Dobrovolskiy, Senior Scientific Associate in the Radiation Safety Office

"The monitoring of radiation levels around the reactor began 4 years before it began operating and has been conducted for 26 years now, with samples taken from 33 specific points at distances ranging from 1 kilometer to 70 kilometers from the reactor. We monitor the air, the soil, the water in reservoirs and wells, and agricultural produce throughout the growing cycle.

"We use a broad range of methods—pumping air through a special unit with a capacity of 2,000 cubic meters an hour, gamma-graphing, conducting water evaporation tests, and studying atmospheric precipitation and airborne dust for the maximum concentration of radioactive elements. Measurements conducted under the supervision of the radiological department of the republic sanitary and epidemiological station have shown no deviation from the natural background. Here are a few figures: specific beta activity for the soil is 1.5 curie per square kilometer, for vegetation it is 2×10^{-10} C/kg, for atmospheric aerosols it is 1×10^{-17} C/liter, for water it is 2×10^{-12} C/liter, and for dust (fall-out activity) it is 1×10^{-3} C/km²."

Subsequent reports concerned the utilization of radioactive waste. The dosimeters for group and individual use employed in Semipalatinsk were demonstrated. It is interesting that the device recorded the radiation level of...an old mechanical clock.

Unfortunately, there was not a single speaker at the seminar to express the views of the people who have a different opinion of nuclear research and nuclear power engineering. The organizers said with regret that their undertaking had essentially failed. They had expected representatives of party, soviet, and public organizations, including informal associations and monitoring bodies, and the news media to attend the seminar. According to institute Deputy Director G.A. Batyrbekov, invitations to the seminar had been sent out to 35 different groups but were ignored for some reason. For this reason, a discussion of the republic's current pressing problems by interested parties could not take place.

After the seminar we—a KazTAG correspondent, some representatives from Semipalatinsk, and I—went to see the reactor and the waste disposal site. The reactor looked quite impressive and resembled a construction site in some respects. Work is being done here to enhance the reactor's stability in a 9-point earthquake. Besides this, two separate tanks have been installed here to extinguish the core in response to a signal from any of the 14 seismic gauges. At any rate, its safety will be judged by a government commission. The waste disposal site looked less reassuring, and in spite of our guide's promises that it was guarded reliably, the pits and mounds on its territory aroused doubts about its safety from "troublemakers."

Therefore, the Nuclear Physics Institute offered a chance for dialogue, a dialogue which is necessary to us today because we are not insured in any way against our own carelessness. In the presence of strict control by independent experts, we could avoid such disgraceful practices as the construction of homes with materials containing radioactive isotopes and eliminate the possibility of consuming contaminated foods—in other words, we could protect ourselves from radiation. Besides this, the widespread discussion of the details of the construction of nuclear reactors would be constructive.

Our future is in our hands, but we cannot make a choice without knowing what we are choosing and why.

RSFSR Government Session Reviews Lake Baykal Cleanup Progress

90WN0085A Moscow SOVETSKAYA ROSSIYA
in Russian 12 May 90 Second Edition p 3

[Article by N. Kharitonova: "In the Battle for Lake Baykal; Notes on a Session of the Presidium of the RSFSR Council of Ministers"; source of boxed material as noted; passages in boldface as published]

[Text] Lake Baykal is priceless. Its crystal-clear water is worth more than all of the gold mankind has ever mined—this is something we have known since our childhood. The pearl of Siberia is being destroyed, however, and the distressed public has been complaining to government agencies about this for 30 years now. Unfortunately, the public efforts have been largely unproductive. For this reason—let us be frank—the report of a session of the Presidium of the RSFSR Council of Ministers, where the efforts to protect the lake during the 3 years since the appropriate decree was passed were to be discussed, did not arouse any particular excitement. Could this make any difference? It was difficult to dismiss this biased view because the people who live near the lake know that any number of decrees might have been passed, but Lake Baykal is not getting any cleaner.

A full working day of heated debates, however, offered convincing proof. The analysis of the state of affairs in the Baykal zone on the governmental level was enough in itself to represent an advance in the resolution of one of the republic's most difficult problems. In addition to members of the government, people's deputies, prominent scientists, and the heads of soviet and party organs, sociopolitical organizations, and environmental protection committees and organizations took part in the discussion. We are publishing our correspondent's comments on this meeting.

The discussion began with distressing reports of procrastination, interruptions, and errors, but first I should say a few words about the history of the issue. It was exactly 3 years ago that decrees were passed by the CPSU Central Committee and USSR Council of Ministers and by the RSFSR Council of Ministers "On Measures To Secure the Protection and Intelligent Use of Natural Resources in the Lake Baykal Basin in 1987-1995." The decrees already constituted a major event in the history of Lake Baykal in themselves. Although the need to save the lake had already been discussed for a quarter of a century, this was the first time that directive agencies had summarized all of the requirements in this kind of comprehensive document. The decrees listed the main perpetrators in the destruction of the lake and stipulated that they would have to abate their appetites for

untouched nature and undertake certain specific measures. Did they do this? Here is an excerpt from the report of the investigating organization—RSFSR Gosplan.

"The situation is depressing," Gosplan First Deputy Chairman A. Kamenev reported. "The lake and the conservation zone are still being polluted with gas from the pulp and paper combine and the sewage of industrial enterprises of the union ministries and public utilities in Ulan-Ude, Irkutsk, Shelekhov, and Angarsk and the Buryat agricultural complex. Last year—just listen to these figures!—around 200 million cubic meters of polluted sewage was dumped in the lake and atmospheric emissions in the region amounted to more than 1.2 million tons of harmful substances, with most of these also falling into Lake Baykal."

It was depressing to listen to the list of aborted measures. It sounded as though we were listening to a list of entries from a highly specialized technical reference work, with the addition of the phrase "not completed" after each item on the list.

"Sewage treatment facilities were not installed in the Petrovsk-Zabaykal Meat Combine (State Agroindustrial Committee), municipal sewage treatment facilities still do not exist in Ulan-Ude (Buryat ASSR Council of Ministers), the fire stations of the forest protection service have not been equipped (USSR Gosplan)..." and so on and so forth. But here is something indicative: It turned out that not all of the items on this gloomy list were equal in terms of the damage they inflict on the lake. There are three main sore spots, and anyone who is concerned about the future of the lake should know what they are. First of all, USSR Minlesprom [Ministry of the Timber Industry] still has not set the guidelines for the re-specialization of the main polluter, the Baykal Pulp and Paper Combine. Second, USSR Minenergo [Ministry of Power and Electrification] still has not installed facilities for the removal of sulfur compounds from flue gas and has not hooked up residences in the Baykal coastal zone to the electrical network. Third, through the fault of the Gazprom concern and USSR Mingeo [Ministry of Geology], enterprises in Irkutsk, Shelekhov, Angarsk, Usol'ye-Sibirskoye, and Cheremkhovo have not been hooked up to gaslines. Oil and coal are still being burned in their boiler rooms, and this is inflicting tremendous damage on the environment.

This is the "Bermuda Triangle" where we are losing the battle for Lake Baykal.

"I feel that the efforts to carry out the decree of the Central Committee and USSR Council of Ministers and our resolution have been extremely unsatisfactory," Chairman A. Vlasov of the RSFSR Council of Ministers summarized the situation. "All of the parties concerned are greatly in debt to Lake Baykal."

Academician A. Yanshin clarified the situation:

"In essence, the only instructions which were carried out were the easiest, the cheapest, and therefore the least effective in protecting the lake."

The next speaker unexpectedly made a controversial remark:

"The failure is understandable, because the measures stipulated in the decree could never have been carried out!" The declaration by USSR People's Deputy G. Filshin was challenging, and everyone expected arguments. He reminded the gathering of the results of one game. A game? No, its only relationship to juvenile entertainment is terminological; it is actually the organizational game known as collective brain-storming and represents an extremely serious undertaking. In October 1988 it was conducted at the suggestion of the Irkutsk and Buryat party obkoms. In essence, it became a comprehensive socioeconomic appraisal of the situation in the Baykal zone. At that time SOVETSKAYA ROSSIYA described the "technology" of the game in detail, saying that it revealed the conflicting opinions of, first, various population strata; second, levels of administration; third, various departments, etc. In this game, as in a model, options were played out to portray a stepped-up version of what unfortunately did occur later in reality, but in the form of irretrievable losses and hopeless situations.

"The main conclusion of this appraisal was that Lake Baykal could not be saved under the conditions of the old system of economic relations," G. Filshin said. "Ecological problems would be insoluble without profound economic reform. The departmental nature of administration only aggravated these problems while pretending to solve them."

Did anyone at the meeting dispute the people's deputy's remarks? Not at all. Representatives of ministries seemed to be expounding on his line of reasoning as they frankly admitted that nothing serious had been done for Lake Baykal, and nothing would be done in the future. When the sums allocated by departments and enterprises for the protection of Lake Baykal in the current year were reported, their indifference became obvious. The Ministry of Railroads was supposed to have allocated 350,000 rubles for air-cleanup facilities in the iron foundries and steel- and copper-smelting shops of the locomotive plant in Ulan-Ude, but actually paid out only...50,000. Was this an isolated example?

There was understandable confusion: Where would the money come from for the next five-year plan? After all, this would require two and a half times as much money! The future of our wondrous lake is being decided in this kind of struggle against the absurdities of departmental interests.

Incidentally, our inefficient and, to coin a phrase, anti-enterprising economy has many absurd features. Academician A. Yanshin reminded the gathering that fresh water is becoming a commodity in our era of ecological disasters, now that most bodies of water are polluted.

Furthermore, it is a commodity of great value to the consumer. In northern Sweden, for example, there is already a large enterprise which bottles spring water and sells it at a high profit in Sweden and abroad. The Alpine spring water sold in Nice and Paris costs a franc and a half for a liter bottle.

"The whole world is concerned about the future of Lake Baykal," the scientist went on to say. "Businessmen are already saying openly: 'Your lake is a unique reserve of fresh water for the whole planet. Do not destroy Lake Baykal. Tomorrow its water will be in great demand throughout the world.'"

This has no effect on the departmental economic fly-wheel, however, which is incapable of considering its own welfare or the public interest.

The discussion did more than arouse indignation, however, because it was also quite informative, even for those who thought they knew everything about the problem.

When scientists and writers first began speaking in defense of the lake 30 years ago, they were viewed literally as dissidents in that stifling time: Who had allowed them to have their own opinion? Who dared to question the "party line" after the wise officials in the Council of Ministers and Central Committee had already decided everything for the country and knew the direction it should take, and after everyone else knew that this was the right direction? Yes, this was the situation then.

Eventually, their efforts produced results—the ecologists and public spokesmen who were fighting for Lake Baykal were supported by party and government leaders. In the people's memory, however, this dangerous division was never eliminated: They still think of directive agencies as an impenetrable wall.

If you look through these eyes at the latest meeting of the Presidium of the RSFSR Council of Ministers, you make one discovery after another: Where is the wall? It does not exist. On the contrary, it is clear that the issues are being investigated by people with a sincere wish to preserve the unique lake. The government feels obligated to learn everything it can about the situation. Furthermore, it is not superficial knowledge that it wants, but serious scientific analyses.

Three years ago the government asked scientists and experts to draw up a territorial comprehensive conservation plan for the Lake Baykal basin. The work began on a grand scale, with the Giprogor Institute of RSFSR Gosstroy in charge and with more than 70 institutes of different ministries and departments participating in the project. According to members of the Presidium of the Council of Ministers, the result was an important instrument of administration: It was a comprehensive investigation of the entire set of factors influencing the ecology, economy, and social communities in the Baykal zone. Only this kind of overview of the Lake Baykal issue can

exclude the possibility of administrative voluntarism, primitive decisions, incompetence, biased plans, and interference in regional affairs in the future. Regrettably, there has been more than enough of all of this in the past.

The first object of investigation was the vast territory taking in 18 administrative regions directly adjacent to the lake, with a population of 1.2 million, reported project leader A. Melik-Pashayev, workshop foreman at the Giprogor Institute. The project was based on all of the positive experience in protecting the Great Lakes and the Tennessee Valley in the United States, the southern lakes in Sweden, and Ehrmscher Park in the Ruhr Valley (FRG). The results were ultimately fed into a computer and analyzed. The Irkutsk Computer Center of the Siberian Department of the USSR Academy of Sciences and Irkutsk State University used the database to derive 12 (!) scenarios for the development of productive forces in the region with a view to their social and ecological impact. (At this point I just want to mention how unfortunate it is that our industry cannot start dealing with the Lake Baykal problem as comprehensively and carefully as our science! Regrettably, we are only successful when it comes to understanding the problem....)

After reviewing all of the data, the scientists proposed three alternative strategies to the government. In the simplest terms, they could be classified as the cheapest alternative, the medium-priced one, and the most expensive but most radical one. What should the choice be? The situation is all the more dramatic in view of the fact that the three alternative strategies revealed exactly what we had been doing to date. We allocated millions in resources and funds and felt pleased with our efforts to save the lake, but we were actually carrying out the first plan, the "cheapest" one, and only in isolated areas. This "cheap" alternative actually hurt the lake. Therefore, while we were creating the illusion of activity, we were effectively driving the lake to the verge of destruction.

There is no question that the choice will be difficult. Once again, the scientists expressed their opinions.

"Even though the third alternative, the one we call 'goal-oriented,' has an estimated cost of 20.4 billion rubles and is certainly beyond the country's ability unless it is carried out sequentially, we still believe," Melik-Pashayev said, "that only it can stop the transformation of the Lake Baykal region into a disaster zone and secure the continued reproduction of the unique ecosystem and gene pool of Lake Baykal and its basin."

The scientists recommend this as an imperative. And they are not the only ones. Many other people agree with this recommendation—the Siberian public, the local authorities in Buryat, Irkutsk, and Chita, and the experts from the State Environmental Protection Committee.

Someone in the auditorium objected:

"This alternative is certainly appealing and promising, but we have to admit that it is from the realm of science fiction. We have to realize that, judging by the amounts

we are spending on conservation today, it will take us 200 (!) five-year plans to scrape up this much money. Are people not likely to call us cranks, to put it mildly?"

Melik-Pashayev replied:

"Yes, it is a huge amount, but we have to consider the recoupment mechanism. We will only spend one-fourth of the 20 billion on purely protective measures. The rest will be used to develop production. In other words, it cannot be called an expenditure in the real sense of the term. It will be used for the intensive incorporation of new, ecologically clean technologies. These, however, will begin producing a profit in the future, and it is expected to be large enough to recoup these production costs and the expenses of environmental protection in 15 years."

A. Vlasov concluded the discussion with this statement:

"We will pass a resolution recommending the approval of the territorial comprehensive conservation plan for the Lake Baykal basin, its re-editing with a view to the comments made here, and its submission to USSR Gosplan and the USSR Council of Ministers for final ratification. I think we should recommend that the Supreme Court of the Russian Federation review the law on Lake Baykal."

Let us assume that the best will happen and that money will be allocated for Lake Baykal. This will not eliminate our worries that, as the Russian proverb puts it, the feed might not reach the horse. Have there been so few times in our history when billions of rubles were lost through mismanagement? Are we not sick and tired of the mountain of phony excuses and justifications we hear from officials when all of the setbacks have already occurred and nothing can be done to rectify the situation? The discussion at the meeting inevitably reached the point of the insistence that someone would have to deal mercilessly with all of the liars and institute the strictest control over the plan. There will be no end of this kind of work.

"Each department has its own 'explanation' for the unsatisfactory state of environmental protection in the facilities under its jurisdiction," said Deputy Chairman V. Kulikov of the USSR People's Control Committee. "We always run into excuses of this type: 'I cannot start building until I have the documents'; or 'There will be no documents until the equipment arrives'; or 'There is no equipment because the machine builders have not delivered it yet' and so forth. Nevertheless, we suspect that the problem does not stem from these causes, but simply from the fact that everyone is comfortable with the system of constant setbacks."

Yes, Lake Baykal could be the victim of the poverty of our economy and also of unscrupulous efforts to satisfy departmental interests. Deception verging on sabotage is practiced so openly that it was apparent even in the misleading, "calm" reports presented here, at the meeting of the Presidium of the Council of Ministers.

Minister of the Timber Industry V. Melnikov, for example, discussed the re-specialization of the pulp and paper combine at length in his report: He said that the ministry had drawn up five optional plans for the conversion of the plant. At this point USSR People's Deputy G. Filshin accused the minister of "embellishing" the facts: Three of the five options had been rejected by the ministry itself, and experts already know that the other two are economically and ecologically unsound. Therefore, the impressive figure "five" was cited on the assumption of the participants' lack of information.

"There are, however, the completely realistic proposals of the 'Baykal Fund,'" Filshin went on to say, "on the announcement of an international competition for the re-specialization of the combine. The International Red Cross will even assume responsibility for the foreign currency portion of expenditures if the production of disposable syringes for the region can be organized at the combine. There have been other proposals as well, but Minlesprom has made every effort to prevent their discussion, and it always submits the kind of proposals that are certain to be rejected so that it can say later: 'You see, we have already drawn up so many alternative plans, and not one has been accepted.'"

Is there an antidote for the exaggeration of estimates, juggling of facts, and outright lies of departments on all levels? After all, this arsenal could easily put an end to any good intention. What is the antidote? Economic reform and the expansion of regional economic autonomy. There must be economic incentives for conservation. The public is already aware that the local soviet is the most reliable defender of nature. Could a lake, forest, or field be injured if the local soviet were to feel completely in control and able to defend it? Conversely, people can only whatever they wish on their territory, to the point of the barbarous destruction of nature, after they have "broken down" the resistance of local authorities. Unfortunately, we have seen many examples of this.

Lake Baykal is no exception. The Baykal problem is a problem of powerful union ministries and departments breaking down the resistance of the Buryat, Irkutsk, and Chita authorities. Sometimes the shrewdest tactics are employed. Chairman Yu. Nozhikov of the Irkutsk Oblispolkom said that when the committee was going to prohibit superfelling in the Baykal zone, its requests for lumber for the construction of homes, schools, and hospitals were immediately denied. That would teach it a lesson.

What is needed, in short, is the establishment of "parity" in the relations between local authorities and union ministries. Today this is the main way of protecting Lake Baykal, numerous speakers stressed at the meeting. Incidentally, our parliament has already taken an important step. The recent law passed on local self-government was designed specifically to reinforce the local soviets' own budgets so that they could establish their own material

and technical base for ecology, sign contracts for scientific projects, order plans, etc. By the force of inertia, however, local authorities are not making use of the opportunities created by the economic reform. This inaction was criticized by Chairman A. Vlasov.

Does this mean that we have finally found the solution to our ecological problems? Does it mean that tomorrow no one will be able to hurt a river, a forest, or a lake? Unfortunately, it does not take an expert economist to know that the development of regional economic autonomy alone cannot solve environmental problems. This is clear from the experience of the capitalist countries: Although local authorities there have the kind of complete economic autonomy we are still only dreaming about, the equally predatory destruction of lakes, rivers, and forests occurred there. Nature's gifts were bought and sold. Is this really impossible in our country? Is there no possibility that, for example, a contract might be signed on the delivery of lumber from the heavily forested areas of the Buryat ASSR to another of our republics with no forests? Although it would profit both sides greatly, it would injure the Baykal ecosystem.

The obvious conclusion is that no reform can improve the situation in the Baykal zone unless its interests are protected by a government with a strict sense of state and republic priorities. It is on the level of state strategy that the problem of preserving the unique lake can hold its own among other objectives, and life is certain to present us with many more of these.

Personal responsibility is something that can keep the government under control. Priorities are worthless unless they are supported by an Ivanov or a Sidorov. Some people at the meeting had complaints about the Russian Government. In particular, they complained about the loss of control. The interval of 3 years between the issuance of assignments and the verification of their completion is too long a period in view of the importance of the Baykal problem. A decision was made to form a special commission of the RSFSR Council of Ministers to take charge of the Baykal zone.

Is everything settled? Yes, if we remember that there is another element of control over the observance of state priorities by local soviets (and by the government itself)—the defense of these priorities from below, their defense by the public, which gave the mandates of authority to the people it elected. The manner in which these three forces are consolidated will decide the future of our remarkable lake and, by the same token, of all Russian nature.

From the Resolution of the Presidium of the RSFSR Council of Ministers

No later than August 1990, USSR Minlesprom is to draft the technical and economic substantiation for the re-specialization of the Baykal Pulp and Paper Combine in the 13th Five-Year Plan for ecologically safe production with the cessation of cellulose production in 1993 and secure the approval of the substantiation by the RSFSR

State Environmental Protection Committee and the Irkutsk Oblispolkom; a water recycling system is to begin operating at the Selenginsk Pulp and Cardboard Combine in 1991.

In the first half of 1990 USSR Minenergo is to draft a program for the conversion of populated points on the Baykal coast to electrical power, beginning with the use of electricity in electric boilers on the south shore of the lake, with the help of USSR Gosplan, in 1990; working in conjunction with the State Committee of the USSR for Prices, it will set preferential rates for the electricity used for this purpose in 1991; in conjunction with the USSR Ministry of Heavy Machine Building, it will step up the installation of effective devices to remove the sulfur content from the flue gases of power engineering enterprises located in the coastal region.

The Gazprom state gas concern will draft plans for the exploitation of the Kovyktinskoye condensed gas deposit in 1991 and 1992 so that the construction of natural gas shipment and refinery facilities can begin in 1993.

Sakhalin Waters Hit by Cadmium Pollution

*PM1907144590 Moscow Television Service in Russian
0830 GMT 18 Jul 90*

[From the "Vremya" newscast: Report by V. Feoktistov and V. Shinkarev]

[Text] [Newscaster] A year on, the causes of an ecological emergency which caused alarm among the inhabitants of Sakhalin last August have finally begun to emerge. You may recall that at that time fish, birds, and animals were dying in Aniva Bay, a very popular vacation spot on Sakhalin. Investigations revealed that seawater was highly polluted with cadmium, the harmful heavy metal. However, how it got into the sea remained a puzzle for a long time. Puzzles are usually solved and, once again, man's carelessness seems to have been the cause of this ecological tragedy, as you will see from our correspondent's report. Incidentally, the ecological tragedy at Aniva Bay is repeating itself this year. Beaches have again been closed, newspapers have again reported heightened levels of cadmium in the seawater.

[Correspondent] Virtually untreated industrial and domestic effluent from Yuzhno-Sakhalinsk, Korsakovo, Aniva, and dozens of coastal villages, livestock units, and coal mines is dumped in Aniva Bay. Treeless shores, piled high with rubbish. Intensive shipping. But who in particular is causing the pollution, and to what degree? Or is there perhaps also another, as yet unknown source of the cadmium pollution? A creative collective comprising the "Opyt" Cooperative, staff from the Institute of Geology of the Ukrainian Academy of Sciences, the Physics Institute of the Belorussian Academy of Sciences, and the Scientific Council for the Study of Natural Resources by Remote Methods decided to find the answer to these questions.

It is known that in Sakhalin the cadmium concentration level is much higher than elsewhere in the country. Nonetheless, how do you explain the recent upsurges?

[Son Gen Te, leading engineer at "Sakhalin-Geologiya" Computer Information Center, identified by caption] First of all, we do believe that a major part in this is played by a heightened natural background level of cadmium in Sakhalin. Another possible reason are water sources, both surface and underground sources. Furthermore, during the spring high water, for instance, in April and May cadmium from sediment is churned up and is then registered in the water readings. The suspension of solids in Sakhalin rivers is the highest in the Far East. This reflects our brutal attitude to tree plantations.

[Correspondent] In Japan, and Hokkaido in particular, a serious regional disease "itai-itai" has emerged. Are we going to wait until it reaches Sakhalin? Or should we pool the efforts of state, cooperative, social, and charitable organizations to block the advance of "itai-itai." This is no time to give kid-glove treatment to bureaucrats.

Resurs-F Satellite Mission Detailed

*LD1807104590 Moscow TASS International Service
in Russian 0847 GMT 18 Jul 90*

[Text] Moscow, 18 July (TASS)—Another artificial earth satellite, Resurs-F, was launched in the Soviet Union on Tuesday from a Soyuz rocket-carrier.

The satellite carries apparatus intended for variable-scale, multi-zonal and spectro-zonal photography for continuing the study of the earth's natural resources, in the interests of various branches of the USSR national economy and tackling ecological tasks, and for international cooperation.

The satellite has been placed in an orbit with the following parameters: initial period of revolution, 88.9 mins; apogee, 278 km.; perigee, 194 km.; orbital inclination, 82.3 deg.

The apparatus aboard the satellite is working normally.

At the end of the flight, the exposed film will be handed over to the USSR Main Administration for Geodesy and Cartography "Priroda" State Scientific Research and Production Center for processing and subsequent distribution of the information obtained to customers.

Resurs-6 Ecological Monitoring Satellite Launched

*LD1807083390 Moscow Domestic Service in Russian
0800 GMT 18 Jul 90*

[Text] Resurs-6, another artificial earth satellite, has been launched in our country using a Soyuz carrier rocket. It carries photography equipment for continuing the study of the earth's natural resources in the interests

of various branches of the national economy and international cooperation, as well as tackling ecological tasks.

Anthropogenic Transformation of Tundra Ecosystems

90WN0042A Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA GEOGRAFICHESKAYA in Russian No 2, Mar-Apr 90 (manuscript received 15 Feb 88) pp 47-56

[Article by G. Ye. Vilchek and M. A. Vaysfeld, Geography Institute, USSR Academy of Sciences]

[Abstract] An evaluation was made of the present status of tundra ecosystems in a region of active industrial development with particular attention to the Vorkuta industrial region in which a wide range of anthropogenic factors are operative. Among the anthropogenic factors the following are considered in detail: mechanical disruptions, such as unregulated use of transport; dustlike pollutants; agricultural land use; hunting and recreation. The influence of the combination of anthropogenic and natural factors was evaluated by making radial and circular reconnaissance surveys which took in areas occupied by mines, several villages and a cement factory. An evaluation was made using a six-unit scale for the evaluation of environmental impact; the scale is discussed as applicable to local conditions and a map of the Vorkuta area was compiled on which different levels of anthropogenic/natural disruption are plotted. This scale

is applicable for investigating other Arctic and Subarctic regions. Figures 3; references 12: 9 Russian, 3 Western.

New Ceramic Element Converts Gaseous Fuel Energy Into Electrical Energy

907K0292 Moscow NAUKA V SSSR in Russian No 3, May-Jun 90 pp 55-56

[Article by I. A. Zudov]

[Abstract] Scientists at the Institute of Electrochemistry of the Urals Division of the USSR Academy of Sciences have developed a ceramic element which converts the electrical energy of a gaseous fuel directly into electrical energy with an efficiency of up to 55-60 percent. At present the experimental model can power only a 100-W light bulb.

Specially prepared natural gas and air pass through channels in the element. Oxygen in the air oxidizes the hydrogen and carbon monoxide, and the liberated energy is converted to electricity. The by-products are nitrogen, water vapor, and carbon dioxide.

The elements are made of a solid solution of oxides of metals such as yttrium, scandium, and zirconium. Vacancies of oxygen ions are formed in the solution. Oxygen can migrate along the nodes of the crystal lattice, which gives the ceramic its unusual properties. Sensors in the element are used to monitor combustion so that it can be regulated and made more efficient.

Prospects for the use of this new technology in automobile engines and power engineering are discussed.

EUROPEAN AFFAIRS

EC Hazardous Materials Legislation Examined

90WN0124 Frankfurt/Main FRANKFURTER
ZEITUNG/BLICK DURCH DIE WIRTSCHAFT
in German 22 May 90 p 8

[Article by Dr. Eberhard Kempf: "Manufacturers Required to Label Properties of Hazardous Substances"]

[Text] Frankfurt, 21 May—On August 1, 1990 and on May 1, 1990, respectively, the First Amendment to the Chemicals Law and the Second Amendment to the Hazardous Materials Regulation, will be passed by the German legislature. In enacting these provisions, the legislature will translate into German national law several directives issued by the European Communities dealing with hazardous materials and formulations or hazardous substances.

This procedure is by no means new in the area of hazardous substances. As early as 23 years ago, the EC issued directives related to hazardous substances which were subsequently adopted by the German parliament. The first such directive, entitled Classification, Packaging and Labeling of Hazardous Materials (67/548/EEC), was issued by the Council of Ministers on June 27, 1967. This came at a time when nobody was thinking about EC-wide rules concerning technical matters.

And while reflecting on the EC rules' implications for trade, production, and—not least of all—job safety, and while discussing the pros and cons of such rules, EC laws governing hazardous substances has long since prevailed and proven effective.

The EC rules cover the following three areas:

1. Classification, packaging and labeling of hazardous materials and formulations;
2. Limitations on marketing and use of certain hazardous materials and formulations;
3. Employee protection against endangerment in the work place through the presence of hazardous substances and formulations.

The basic directives have been supplemented with more than 30 individual, amending and adapting directives; additional directives are in the works or on the drawing table. In the Federal Republic of Germany, these directives are incorporated into German national law primarily by amending the Chemicals Law and the Hazardous Materials Regulation. It is fair to say that the very existence of the Hazardous Materials Regulation has its origin almost entirely in the translation of EC rules into German national law.

Thus, almost all provisions of this Regulation which govern the marketing of hazardous materials and formulations are based on EC directives. The classification and

labeling of substances and formulations may be cited here as appropriate examples. The EC stipulated what the design of the label was supposed to look like and what type of information it had to contain. In addition, the EC created the well-known danger symbols and danger labels as well as special references to particular dangers (r-sentences) and safety recommendations (s-sentences).

It is primarily these uniform labeling provisions that are of particular importance because the labels provide introductory information about the properties of certain substances and, consequently, furnish important data which will determine how potentially necessary safety measures are chosen and implemented, including instructions with respect to the use and handling of a certain substance.

In addition, many provisions of the Regulation dealing with the handling of hazardous substances—i.e., their production and use—have their origins in EC rules. This applies, for example, to certain restrictions in the use of carcinogenic substances—especially asbestos—and of lead. Businesses and the market place have long since adapted to these provisions. There are even demands for farther-reaching restrictions and nobody is even thinking twice about the fact that this is the real-life EC experience.

In the wake of amending the Chemicals Law, three EC directives are being ratified into German national law and preparations are underway to pave the legal way for the implementation of two directly applicable EC rules. It should be emphasized that the Federal government now has the power to regulate (generally by amending the Hazardous Materials Regulation), how and in what form

- certain information pertaining to the properties and attributes of hazardous materials and formulations or products, capable of emitting or containing such hazardous substances, is made available by the manufacturer or the importer as well as data pertaining to immediate measures in the case of accidents (e.g., in the form of a safety information sheet);
- certain formulations and products are to be labeled or could be labeled which do not contain certain substances which must be specified (e.g., "does not contain CFC").

The first regulation in particular is a welcome one since it will require, in the foreseeable future and without further demands on the part of the consumer, that manufacturers or importers of hazardous substances or formulations provide information beyond the labeling of their products and/or goods. Current law (Hazardous Materials Regulation, Article 16, Section 3) stipulates that only upon request of a consumer are manufacturers and importers required to disclose to the consumer the dangers that may result from the use of dangerous substances and what measures to take in case something goes wrong.

It is fair to assume that with the implementation of the new regulations complaints about safety data sheets containing insufficient information will become a thing of the past. Creating the foundation for such new regulations should also greatly facilitate recording, evaluating and monitoring the use of hazardous substances.

In amending the hazardous Materials Regulation, the government is ratifying six EC directives into German national law. The most significant changes include broadening the provisions governing substance-specific labeling and a prohibition for marketing certain formulations. Accordingly, formulations and alloys containing cadmium which are used for soldering and welding must be specially labelled. In addition, there will be restrictions on the use of certain formulations and it must be indicated on the label that their use is limited to commercial buyers.

The aforementioned restrictions cover, for example, certain aromatic amines, lead carbonates and sulfates, as well as arsenic, mercury and organic tin compounds used as antifoulants or wood preservatives. Furthermore, the prohibition of marketing and using formulations containing benzene has been broadened. Until recently, this ban pertained only to formulations containing more than 1 weight percent of benzene; this weight percentage has been rolled back to .1.

In line with EC directives relating to asbestos, a general ban is in force with respect to marketing, producing and using crocidolite and products and formulations containing crocidolites. Existing exceptions have been eliminated. Additional provisions concern the tightening of the monitoring responsibilities in accordance with Section 18 of the Hazardous Materials Regulation.

Specific procedures and measuring practices must be observed when performing analyses and measurements within the framework of monitoring the use, manufacture and import of hazardous materials. These procedures and practices are formulated by the Committee for Hazardous Substances on the basis of the most up-to-date version of Directive 88/642/EEC. However, it is not expected that the measuring practices currently observed (e.g., TRGS 402) will be modified in the near future.

EC Council Policy on Energy, Environment

Energy Council Meets

90AN0324 Brussels EUROPE in English 21-22 May 90
p 8

[Report: "Energy Council: Adoption of the THERMIE Programme and Directives on Price Transparency for Gas and Electricity, and Electricity Transit—Problems on Directive Concerning Gas Transit and Investments"]

[Text] Brussels, 21 May (EU)—The Energy Council held today reached rapid decisions concerning the less controversial topics of its agenda, keeping the more difficult

topics for the second part of the session. Over lunch, an informal debate was held concerning the situation of the oil market and, more particularly, the energy policy of the EEC and the Eastern European countries. This debate was opened by Mr. von Wurtzen, German secretary of state, who informed his colleagues about the consequences in the area of energy policy of the implementation of the state treaty on economic, monetary, and social union between the two Germanys.

The Council, meeting with Mr. Bobby Malloy, Ireland's energy minister, in the chair, and with European Commissioner for Energy Mr. Cardoso e Cunha in attendance, deliberated on the following topics:

1. THERMIE Programme Concerning The Promotion of Energy Technologies for Europe (1990-1994)

Only the financing problem was left, and the Council, while approving this five-year programme as a whole, limited itself to approving the financing for the first three years, namely ECU 45 million (already written into the budget for this year) for the current year and ECU 305 million for 1991 and 1992, keeping in mind the revision of the financial prospects and of the annual budgetary procedure. The ulterior financing is in principle assured, since the Council declared that it is aware that ECU 350 million will be needed for 1993 and 1994, but the formal decision is linked to the adoption of the new financial prospects for the post-1992 period.

The THERMIE programme includes actions in the following areas: the rational use of energy (buildings, industry, energy industry—electricity and heat; transport and urban infrastructures); renewable energy sources (solar energy, biomass and waste, geothermal energy, hydro-electric energy, wind energy); solid fuels (combustion, conversion, waste, gasification integrated into a gas/steam cycle); and hydrocarbons (exploration, production, transport, stocking).

2. Single Energy Market in 1993

a. Community procedure concerning the transparency of prices for the final industrial consumer of gas and electricity: The directive on this subject has been adopted. As soon as it enters into force, the Member States will take the necessary measures so that the companies concerned forward to the EEC's Statistical Office their prices and sales conditions applicable to final industrial consumers, the price systems in force, as well as the breakdown of consumers and quantities supplied by consumer categories. The Spanish reservation concerning the transparency of costs was withdrawn after the other delegations agreed on the controls that the European Commission will carry out on subsidies and other abusive taxes which might distort free competition as regards costs. The confidentiality of costs will be preserved.

b. Electricity transit on large networks: The directive has been adopted. It will contribute to the realisation of a fundamental element of the large energy market in

Europe through the increase of intra-Community electricity exchanges. Its adoption was made possible by several declarations added to the minutes stating unequivocally that this directive does not in any way prejudice the introduction of the common carrier principle for inter-State electricity supplies. This issue still requires thorough and independent studies, that the Commission has already undertaken.

c. Transit of natural gas through large networks: Agreement appeared ruled out on this point, despite the efforts made by the ministers.

d. Communication of energy investments of Community interest: A compromise remained possible in the early evening.

Furthermore, the Council approved conclusions concerning the Commission's communication on energy and the environment. Concerning the role of nuclear energy, it welcomed the Commission's opinion according to which the debate concerning nuclear energy and the resulting environmental problems (safety, transport, waste, including waste resulting from decommissioning) should be continued.

Council Conclusions

90AN0326 Brussels EUROPE (EUROPE Document No 1621) in English 1 Jun 90 pp 1-3

[EC document: "EEC Energy Policy Increasingly Takes Environmental Problems Into Account—Guidelines Adopted by Energy Council, Support for Projects of European Commission"]

[Text] On 21 May, the Energy Council adopted "conclusions" on the subject of "energy and the environment" which represent more than a recognition of the problems posed. Energy production can be very polluting; even environmental protection installations need energy which causes pollution. The EEC has already taken increasingly stricter measures to limit poisonous emissions from certain sources of energy; but they are no longer enough. The "environment" element must become an essential aspect of any Community energy policy.

The conclusions of the Council represent political support for the guidelines and intentions of the European Commission in this direction, which should become concrete when the projects presented are approved. The only aspect of the "conclusions" which has resulted in some differences among the Twelve is nuclear energy: Should it continue to be said that it contributes to limiting atmospheric pollution? The text adopted (Point 9) is quite explicit but at the same time recommends continuing the debate on nuclear energy.

Here is the text of the Council's conclusions.

Council Conclusions on Energy and the Environment

Having had a policy debate on the communication from the Commission concerning energy and the environment, the Council:

1. Underlined the importance of this communication as a contribution to determining future policies for the supply and use of energy in an environmentally acceptable manner, and agreed with the factual analysis contained therein;
2. Underlined also the importance of involvement by the Community in the global discussion and measures on climate change and the need for an international legal framework within the context of present IPCC work;
3. Noted that progress towards the Internal Energy Market should also produce benefits for the environment and welcomed the Commission's intention of reviewing Directive 75/404/EEC of 13 February 1975;
4. Noted progress made and anticipated in reducing SO₂ and NO_x emissions in the Community as a result of Community and national environmental legislation, energy efficiency improvements and the use of cleaner fuels; recognized that whilst there are still uncertainties on some scientific aspects of the greenhouse issue, CO₂ emissions will continue to grow in the absence of alternative policy decisions, especially in the energy sector but also in other areas, and that the greenhouse effect may in the long term become the main constraint on fossil fuel energy use;
5. Welcomed the Commission's work programme on the evaluation of the options to reduce CO₂ emissions and indicated its willingness to collaborate closely with the Commission in the subsequent development and implementation of the part of the programme relating to energy policy;
6. Recalled its invitation to the Commission and the Member States to take urgent action to increase energy savings, to improve energy efficiency, to promote the development and use of energy sources, such as non-fossil fuels, which will not contribute to the greenhouse effect; the Council also invited them to give high priority to the development and introduction of commercially viable new technologies in these fields. In this context due account must be taken of security of energy supply, safety aspects, environmental impact, public health and economic considerations;
7. Welcomed the fresh energy policy measures outlined by the Commission with a view to reducing environmental damage caused by the supply and consumption of energy and in particular the THERMIE [European Technologies for Energy Control] programme for the promotion and dissemination of new energy technologies in a market-oriented manner;

Noted the Commission's intention to:

- Bring forward the SAVE Special Action Programme for Vigorous Energy Efficiency,

- Propose the drawing up of voluntary codes of conduct with the energy industries in the Community in both the private and public sectors founded on principles favourable to health and the environment and the prudent use of finite natural resources,
- Continue the analysis of economic and fiscal instruments which satisfy at the same time energy, environmental and fiscal requirements;

8. Agreed with the Commission that in making its proposals for environment-friendly energy measures it should be guided by the following considerations:

- Use of the best available technologies not entailing excessive costs,
- Environmental impact and risk assessments in the context of existing Community legislation,
- Ensuring that energy costs reflect, as far as possible, the full environmental costs,
- Respect for a high level of environmental protection, through economic standardization and fiscal measures, taking account of the specific ecological, economic and energy conditions of the Member States and peripheral regions of the Community, and the results already obtained in the area of the environment,
- Establishing a legislative framework offering flexible yet stable conditions,
- Improving institutional links and cooperation between administrations responsible for energy and the environment,
- Continued scientific research,
- Collection and development of related statistical information,
- Ensuring consistency between the measures to be applied in the energy sector and those adopted in other areas;

9. Recognized that nuclear energy contributes to the limiting of polluting. Welcomed the Commission's view that the discussion on nuclear energy and environmental issues, covering safety, transport and waste (including waste from the decommissioning process), should be pursued.

The Council will resume the examination of these questions at its next meeting on energy matters and will pay particular attention to the measures for making the Commission's communication operational.

EC Environment Council Meets 7 Jun

Ozone Layer, CFC's Discussed

90AN0334 Brussels EUROPE in English 9 Jun 90
pp 7-8

[Report: "Environment Council: Agreement on Directives on Waste, Batteries, Dangerous Substances, and on Greater Protection of the Ozone Layer; Divergence on the Greenhouse Effect; Idea Proposed for a Tax on CFC's"]

[Text] Luxembourg, 8 June (EU)—Because the environment ministers preferred to concentrate their work in one day rather than the two planned, it was late on Thursday night [7 June] that the president of the Environment Council, Irish Minister Padraig Flynn, convened its final press conference. He welcomed the agreement reached by the twelve ministers on directives concerning: a) a new strategy for waste management; b) batteries and storage batteries; c) the monitoring of water pollution for four additional dangerous substances.

The president also acknowledged that "no extraordinary step was taken today, but the pace was maintained" in the negotiations on the Community's position on how to counteract the greenhouse effect. The Council will have to reach an agreement at the October session to allow the EC to defend its single position at the second world conference on the climate, to take place in early November in Geneva. A divergence, still muffled, was confirmed between the United Kingdom and Commissioner Carlo Ripa di Meana regarding the need for an EC commitment in favour of specific dates, in particular, for the stabilisation of CO₂ exhaust (the year 2000 for the commissioner, with reductions in CO₂ exhaust beginning in the year 2010). The British delegation says that this must not prevent those member states that have not yet done so (British Prime Minister Mrs. Thatcher has planned on the year 2005 for her country) to set into motion national strategies to stabilise and reduce gases responsible for the greenhouse effect, as agreed by the member countries of the UN Economic Commission for Europe at the recent conference in Bergen (Norway). The commissioner said in this regard: "Making a clear commitment seems vital if we wish to retain our leading role. We must not go to battle in dispersed order. This would be a good excuse for those who do not wish to act." He added: "If we set a deadline, we set in motion the willingness and the effort needed to meet it. I would like all the member states to make a commitment to stabilise and reduce CO₂ exhaust." As for the different dates suggested or chosen, the commissioner stated: "The official position [the EC member states agreed to stabilise CO₂ in the year 2000 at the Noordwijk conference in November 1989] has not been called into question by any of the member states; so we have not yet heard the last word."

The president then announced that the Council had adopted the EC negotiation mandate for review of the Montreal Protocol on substances that deplete the ozone layer. This review will take place at the London conference on 20-29 June. During the Council session, the Dutch and German ministers proposed the idea of establishing a tax on CFC [chlorofluorocarbon] (without going into detail), an idea that apparently was not rejected a priori by their colleagues. The Commission is examining the possibility of such a tax, according to its spokesman. If it should turn out to be feasible, the tax on CFC could constitute a precedent. EUROPE reminds its readers that the possibility of a tax on CO₂ has also been raised.

Finally, the Council, which is eager to give rapid approval to the change in the 1970 directive concerning measures to counteract air pollution caused by motor vehicle exhaust, has asked the European Parliament to adopt its opinion using the emergency procedure.

The results of the Council session are as follows:

1. Free Access to Information on Environmental Matters: Following the agreement in principle reached at the March session, the Council formally adopted the directive on this subject by tacit procedure.

2. Reinforcement of the 1974 Directive on Waste: The Council expressed its agreement on the change that would reinforce the 1974 directive, which will henceforth become a framework directive. It also decided to change the legal basis of this directive and opted for Article 130S (environmental policy, with Council unanimity, rather than Single Market policy, Article 100A). The Parliament must therefore give its opinion once again. The directive will take effect on 1 June 1992.

3. Batteries and Storage Batteries Containing Certain Dangerous Substances: The Council reached agreement on the content to be included in a common position on the directive in this area (based on Article 100A of the Treaty, cooperation procedure with the Parliament).

4. Water Pollution From Four Dangerous Substances: Since all reservations were withdrawn, the Council reached an agreement under which Annex II of the directive—on setting limit values and quality objectives—will be changed to include four new substances: dichloroethane (EDC), trichloroethylene (TRI), perchloroethylene (PER), and trichlorobenzene (TCB).

5. Monitoring of Water Quality: Little progress was made in regard to the separation of powers between the Commission and the Council, powers of application as well as powers of adoption to the technique of the directives: a) from 1976, on measurement methods and the frequency of analysis of surface waters; b) from 1975, on surface waters; c) from 1980, on water for human consumption.

6. Protection of the Ozone Layer: The Council adopted the EC negotiation mandate for the review of the Montreal Protocol.

7. Greenhouse Effect—Council Conclusions: "The Council held a discussion on climatic changes. It re-examined its preceding position, which is included in the resolution of 21 June 1989, and took note of the progress made since that time, both at the Noordwijk conference in November 1989 and the Bergen conference in May 1990. The Council recalled that, in its resolution of 21 June 1989, it had called on the Commission to present action proposals by the end of 1990 at the latest. Due to the urgency of the problem and in anticipation of the second world conference on the climate to take place in November 1990, the Council has urgently asked the

Commission to move ahead in its work, taking into consideration the principles enumerated above, in order to allow the Council to re-examine the issue at its next session in October."

8. Pollution Caused by Nitrates: The brief Council examination of the draft directive on the protection of fresh waters, coastal waters, and sea waters from pollution caused by nitrates from diffuse sources did not conclude with any notable progress.

9. Urban Waste Water: The Council was informed of the progress in the work concerning a draft directive concerning the treatment of waste water, a text that is part of the overall policy to fight pollution caused by nitrates and phosphates.

10. Protection of Habitats: Since the opinions by the Parliament and the Economic and Social Committee have not been delivered yet, the Council simply held a quick exchange of views on the draft directive on the protection of natural and seminatural habitats and wild flora and fauna.

'Negotiating Mandate' Detailed

Brussels EUROPE in English 9 Jun 90 p 12

[Report: "Environment Council, Ozone Layer: EEC Negotiating Position in Favour of Strengthening of Montreal Protocol—The Timetable and the Financial Provisions"]

[Text] Luxembourg, 8 June (EU)—The Environment Council adopted the negotiating mandate which will enable the European Commission to defend a single EEC position during the revision of the Montreal protocol aimed at its substantial strengthening as regards the limitation of production and consumption of substances harmful to the ozone layer. The revision will take place during the second conference of the parties to the Protocol, which will be held in London from 20 to 29 June. Here are the mandate's main provisions:

1. Dates For the Reduction and Elimination of Substances Harmful to the Ozone Layer: Contrary to the draft introduced by the Irish Presidency, the EEC does not commit to a precise date by which it and its Member States will abide. The Council failed to reach an agreement, but it undertook to complete the review of the Commission's proposals (which selected for the Community as a whole the threshold date of 1997) "by the end of this year at the latest". Without making further commitments, the Council continues to consider that the EEC should phase out the production and the use of CFCs and halon gases as early as possible and "even implement at an early date the requirements of the Montreal Protocol". On the other hand, the mandate includes the threshold dates that the EEC will defend during the conference, keeping in mind the "need to enable the largest possible number of countries to adhere to the Protocol." They are:

a. CFCs: Gradually cut production and consumption by 50 percent between now and 1991-1992, by 85 percent between now and 1995-1996, and by 100 percent between now and 1997, and at the latest by the year 2000 (thus taking account of the various positions of the Member States);

b. halon gases: gradual reduction of production and consumption: 50 percent by 1995-1996 and 100 percent by the year 2000. Certain exemptions, to be agreed between the parties, concerning essential uses, might be authorised after the elimination date;

c. carbon tetrachloride: Gradual reduction of production and consumption: 50 percent by 1991-1992, 85 percent by 1995-1996, and 100 percent by the year 2000;

d. methyl chloroform: A freeze by 1991-1992; gradual reduction of 25 percent by 1994; 50 percent reduction by the year 2000, subject to a revision in 1994;

e. halogenous CFCs: A declaration including directives concerning the use of halogenous CFCs as transitional substances.

2. **Financial Mechanism:** The mandate notes that the "request of developing countries for additional financial and technical resources to help them implement the Protocol should be endorsed." To that end, the Contracting Parties should establish a financial mechanism which:

- Will cover the additional costs ("which remain to be determined," according to the mandate) resulting from the respect of the Protocol provisions for developing countries;
- Its implementation should be coordinated with the World Bank, UNEP and UNDP;
- The cost-sharing formula for the mechanism is not defined, but it should ensure a fair distribution of the burden. Two positions exist: The cost-sharing formula would be based on the administrative contributions of each State to the UN, or on the share of the industry of each signatory State in the worldwide production of substances harmful to the ozone layer (this formula is favoured by the Commission, since the first formula would overly favour the United States compared with its share in worldwide production);
- The funds granted under the financial mechanism should facilitate technology transfers to developing countries which signed the Protocol;
- The financing of the mechanism should be both bilateral and multilateral. This provision would enable the EEC to take part in the financial mechanism as such.

Spain had first asked that the Ministers debating the financial aspects of the Montreal Protocol meet for an intergovernmental conference, since it considered that

the EEC lacks competence in these matters. Commissioner Ripa di Meana recalled that the EEC as such is a party to the protocol and is therefore competent to negotiate all the elements it includes.

The Principle of Special Financial Support for Developing Countries Is Approved by the EEC

It results from the mandate that the EEC approves the principle of a special financial support for poor countries to help them eliminate CFCs (while the United States considers that an ad hoc mechanism would duplicate existing international aids). The EEC hopes that its position will help convince large Third World Countries, which have up to now refused to sign it, to adhere to the Montreal Protocol (notably India, China, Brazil and Mexico).

EC Issues 'Green Paper' on Urban Environment

Commission Meeting

90AN0332 Brussels *EUROPE in English* 7 Jun 90 p 10

[Report: "Environment and Cities: Commissioner Ripa di Meana Presents the Green Paper on Future EC Urban Environmental Policy"]

[Text] Brussels, 6 June (EU)—Commissioner Carlo Ripa di Meana presented the "Green Paper" on the urban environment adopted today as an official European Commission communication (in the 4th Action Programme for the environment, the Commission agreed to pay greater attention to this subject), as a "preliminary, not yet operational" document that should serve as the starting point for broad interinstitutional debate on the approach of future Community actions aimed at resolving the environmental problems existing in European cities. Those cities in Central and Eastern Europe, which are experiencing growing problems due to the degradation of the environment, are also concerned, the commissioner added, specifying that, for the time being, they could not be covered by the measures that will possibly be taken at the Community level. Mr. Ripa di Meana added that the "Green Paper" makes concrete the resolution the Parliament approved in December 1988.

The commissioner particularly stressed the ill effects of private automobile circulation in EC cities, in which 80 percent of the population lives, i.e., 250 million inhabitants. Traffic, Mr. Ripa di Meana said, is the principal environmental threat in cities. It has been calculated that there are some 120 million private vehicles in the EC, or 379 for 1,000 inhabitants. This figure should increase by 20 percent in the next twenty years. Although London has successfully purified the waters of the Thames and greatly reduced its smog, it has traffic that is increasingly nightmarish, which could lessen the city's attractiveness in relation to other EC capitals. Paris has abandoned the plan drafted by its mayor, Jacques Chirac, for underground highways. The commissioner believes that "the answers to these problems can certainly not be the

absorption by cities of more and more cars, because atmospheric pollution (in 1986, in Milan, the limit values for CO₂ were exceeded for more than 30 days), noise pollution (50 percent of the population of the Netherlands is already subject to a tax on noise exceeding 55 decibels), and pollution harmful to historic monuments will not slow down." Furthermore, "the failure of urban highways is not only a problem in Brussels, it is also serious in Los Angeles." Oslo and Singapore have set up toll booths at highway entries.

As a general rule, due to the concentration of populations, "cities represent the most serious pollution concerns," the commissioner stated. Indeed, in addition to cars, other sources of pollution are concentrated in cities: heating, waste, used water. In writing the "Green Paper," city management officials in cities such as Brussels, Rome, Avignon, Cardiff, and Bremen were consulted. Following the indications gathered, operational measures concerning the following items should be formulated:

- a. Air quality: The Commission, Mr. Ripa di Meana recalled, has just submitted a proposal on clean lorries, but "we need to go further" and not only think about electric cars, which are not a panacea for all ills;
- b. The protection of green zones;
- c. Water management: Mr. Ripa di Meana launched an appeal for a healthier water supply for Naples and for water treatment centres in Brussels, Milan, and other cities where their absence is transforming our rivers and seas into open sewers;
- d. The protection of monuments.

The commissioner also explained that national and local authorities remained the only authorities competent for the concrete management of environmental problems in the cities for which they are responsible. The Commission can try to increase awareness within the EC of problems common to all European cities and thus further an exchange of information and experiences. The Commission could then propose common solutions for these common problems via regulatory proposals. The principle of subsidiarity must apply here, the commissioner finds, so that "in this field there will not be legislation from the centre to the periphery (which would be rejected)." An overall inventory of reactions and suggestions from the institutions will be presented at the London meeting in March 1991, after which the presentation of Community legislation in this field can be envisaged. The commissioner added that he was well aware that the problem was important and thorny because it affects everyone's way of living as well as production interests: "We must be careful about what we do."

The chairman of the Parliamentary Committee on the Environment, Public Health and Consumer Protection, Mr. Kenneth D. Collins (Socialist, Britain), expressed his satisfaction in noting that the Commission had quickly

reacted to the resolution by his institution. Mr. Collins also said that the EC had to get involved in urban environmental problems, because, due to 1992, inter-urban competition will only increase.

Suggested Action

Brussels EC INFORMATION MEMO in English No P(90) 38, 6 Jun 90 pp 3-5

[Article: "Resume of Priority Suggested Lines of Action"]

[Excerpt] [passage omitted]

Urban Planification

Suggested lines of action:

1. That the Commission, in cooperation with Member States and local authorities, should evolve guidelines for the incorporation of environmental considerations into town planning strategies—a detailed investigation and elaboration of the principles outlined above. Such guidelines will attempt to influence town planning practice and provide an important complement to the proposed directive of environmental assessment of policies, plans and programmes.
2. That further research into the treatment of contaminated soils, which so often hinder redevelopment of existing city sites, be encouraged.
3. That further financial assistance be given to pilot projects aimed at revitalizing less favoured urban areas by introducing a greater mixture of uses and hence access to urban facilities. At the same time, such actions should aim to protect and assist existing residents in these areas. The Commission should also consider how it can extend this action building on lessons learnt from these pilot projects.
4. The Community should consider the question of whether it wishes to extend financial support for urban renovation and environmental improvement schemes beyond the types and areas of support permitted by the current structural funds and if so, how this could be achieved.

Urban Transport

Suggested lines of action:

The Community should:

1. Encourage city authorities to incorporate decisions about the coordinated future development of public transport and road construction into their plans for land use and transportation. The Commission should expect future submissions for structural fund assistance towards transport infrastructure to demonstrate that such an analysis has been carried out.
2. Encourage innovative approaches to the use of public transport and the environmental management of urban

traffic by contributing to the cost of pilot projects and monitoring their effects. Research programmes should attach high priority to environmental considerations and should include innovative public transport, environmentally friendly vehicles and advanced traffic management systems. This should not lead to the encouragement of the greater use of urban areas for motor traffic.

3. Encourage the Community-wide exchange of information in urban traffic management to maximize the benefits of a wide range of experience.

4. Consider in detail, possibly by financing pilot projects, the potential for using economic instruments such as road pricing to help solve the environmental problems generated by urban traffic.

Protection and Enhancement of the Historical Heritage of European Cities

Suggested lines of action:

1. That the Community provide more substantial finance for the conservation of historical buildings and areas of European significance.

2. That consideration be given to the potential benefits of a Community system of recognition of the historic and cultural significance of individual buildings and parts of urban areas.

Protection and Enhancement of the Natural Environment Within our Towns and Cities

Suggested lines of action:

1. The Commission should consider a programme of pilot projects across the Community to demonstrate the benefits of green plans and programmes of action.

2. City authorities should be encouraged to review their provision of public open spaces and seize opportunities where available to extend such provision.

Urban Industry

Suggested lines of action:

The Community should undertake measures to promote the growth of small and medium-sized enterprises in a harmonious way within the overall fabric of the urban environment and should provide assistance, where appropriate, to enable them to comply fully with regulations and good practice in considerations relating to the environment.

Urban Energy Management

Suggested lines of action:

1. That the Community continue and intensify its activities in urban energy management, seeking in particular to encourage and assist the cities in order to take steps towards urban energy planning measures; to disseminate useful advice on appropriate means in this framework,

e.g., on building design for energy saving; and further to demonstrate the benefits of various energy conservation techniques by pilot projects.

2. While Community legislation on product norms defines standards for insulation materials for building construction, there is currently no Community legislation requiring that specific standards be actually applied in new construction. While the Community has previously made recommendations in this area, it may now be appropriate for the Community to consider legislation.

3. That the use of economic instruments to encourage energy conservation in buildings be the subject of a detailed report and proposal.

4. That public authorities be encouraged to set a good example by the adoption of energy conservation measures in the buildings they operate.

Urban Waste

Suggested lines of action:

1. The Commission should encourage city authorities to take into greater consideration constraints linked to waste management in drawing up short- and medium-term plans for urban management: designated sites for collecting sorted household waste and setting up treatment plants.

2. The Commission should encourage—by means of financing, research and projects aimed at making people aware of the importance of sanitation—developing urban and architectural design that favours the sorting of waste at source, as well as sorted collection; and finding new uses for urban waste, particularly that resulting from construction.

3. The Commission should encourage the exchange of information and experience in the field of sanitation, especially as regards cleaning technologies, sensitization of the population, legal instruments and the recycling of urban waste.

EC Supports Syse in Desire for Central Environmental Control

90WN0182A Oslo AFTENPOSTEN in Norwegian
28 Jun 90 p 6

[Article by Bente Egjar Engesland: "Syse's Environmental Proposal Receives Support"—first paragraph is AFTENPOSTEN introduction]

[Excerpts] Felipe Gonzalez presented an entirely new EC to Jan P. Syse during the Spanish-Norwegian summit meeting yesterday. As the community becomes increasingly close-knit, non-members must make an increasingly greater leap if they want to join in. But Syse's proposal for international environmental rules won support in Madrid. [passage omitted]

Greater Leap

Gonzalez made it clear that countries that now want to get into the EC must be prepared for a qualitatively new leap. The EC is not the same. At the same time he said that a more closely integrated EC must not shut itself in, and he stressed that it is important to complete the EC-EFTA [European Free Trade Association] agreement on economic cooperation as quickly as possible.

The question is whether the EFTA countries have been pushed entirely to the sidelines after Dublin; must Norway reorient itself in the new terrain?

Prime Minister Jan P. Syse's reply is that Norway's path is via the EC-EFTA negotiations and that there is no other way now. "But we note the strong dynamism in the EC and feel how important it is to strengthen the EES [European Economic Space] process on which we agree," said Syse. After the one-and-a-half-hour talk with Gonzalez, who is one of the EC's active advocates of stronger integration, AFTENPOSTEN asked if Syse feels that Norway is being marginalized on the outskirts of Europe. "We must avoid that and display corresponding determination," he said.

Energy Community

The Dutch proposal at the summit meeting on an energy community is not a Spanish-Norwegian theme, but Prime Minister Jan P. Syse and his advisers are very interested in it. Prime Minister Ruud Lubbers' move came as a great surprise, and Norway is trying to find out what it might mean. The idea of political guarantees for energy shipments, sales, and market access across national borders affects Norway as an energy exporter. For many years Norway has warmly advocated energy policy cooperation, but even so the "Lubbers Plan" is complicated; for as AFTENPOSTEN understands it, Holland wants to ensure long-term gas deliveries from the Soviet Union—which has larger reserves than Norway. The question now seems to be how Norway can reconcile its economic interests as a gas exporter with political commitment to an energy dialogue.

Syse's Environmental Idea

In general, Syse is glad that the EC is following up on his idea of joint environmental protection guidelines and a decisionmaking system that can guarantee them across national borders. Norway will push hard for a broad pan-European base for such an arrangement instead of limiting it to 12 countries. Undersecretary Kai Eide, who is Syse's adviser, also says that Norway is fighting here for full participation, and said that an "A" team and a "B" team would be meaningless. In his speech at the official dinner yesterday evening, Syse said that political and physical barriers have not prevented pollution from crossing national borders, but they have hindered effective countermeasures. Now we have an opportunity for joint action, he stressed. Gonzalez supported the idea of environmental cooperation that includes more than the 12 countries.

As AFTENPOSTEN predicted yesterday, Syse also took up Norway's security policy position. An expansion of NATO's political role and a change in its military role must not weaken the alliance, and there should be no security policy competition between the EC and NATO either, in Norway's opinion. His Spanish counterpart seems to have given assurances that Spain's interest in a security policy dimension in the EC does not mean "competition" of this kind. [passage omitted]

Norwegian Minister Presents Strongest Demands for Ozone Preservation

90WN0182B Oslo AFTENPOSTEN in Norwegian
28 Jun 90 p 6

[Unattributed article: "Norway Faced With Demand for Ozone Measures"]

[Text] Environmental protection organizations fear the results of the ozone conference which began in London yesterday. Norway has made a number of demands for emission reduction but has given them up to create unity.

Among other things, Environmental Affairs Minister Kristin Hille Valla is presenting proposals aimed at halting the use of CFC gases (chlorofluorocarbons) by 1997, stopping the use of halogens by 2000, and cutting emissions of methylchloroform by 85 percent by the end of the century.

Strong Pressure

This last Norwegian demand originally called for total elimination, but after strong pressure from the EC, the United States, and Japan, among others, the demand was reduced. The group behind the London conference, the UN Environmental Program (UNEP), favored a 50-percent reduction in methylchloroform emissions by the year 2000.

"Our hope is that Norway and the other Nordic countries will stand behind their proposals and manage to steer the rest of the conference in the right direction," Fiona Weir of the international environmental organization, Friends of the Earth, told NTB [Norwegian Wire Service]. She is disappointed that even before the conference really got underway Norway moderated the demand for the total elimination of the ozone-destroying substance methylchloroform.

Will Double

It is the quantity of chlorine in the stratosphere that determines the rate of ozone destruction. The most important ozone-destroying substances, CFC gases and halogens, have a long lifetime and will continue to consume ozone for 100 years in the future. All new emissions will augment the sins of the past and help to more than double the chlorine concentration in the stratosphere in relation to the level that was there before the ozone hole over Antarctica was discovered.

Gambling

This is simply gambling with future generations. A high chlorine level can have dramatic effects, for example a drastic weakening of the ozone layer over the North Pole, according to Fiona Weir. The Nordic lands, the EC, Australia, and several other countries support removing the most important ozone-destroying substances by 1997. The conference of ministers will probably decide on the year 2000 as a target date.

FEDERAL REPUBLIC OF GERMANY

Total CFC Ban Slated for 1995

90AN0327 Brussels *EUROPE in English* 2 Jun 90 p 13

[Report: "CFC Production and Distribution in the FRG To Be Banned From 1 January 1995"]

[Text] Brussels, 1 June (EU)—The FRG has just decided that the production and distribution of gases suspected of destroying the ozone layer (chlorofluorocarbons—CFCs, halon gases, and carbon tetrachloride) would be banned on its territory from 1 January 1995. A programme has also been provided to ban the use of CFCs when alternative solutions are available. This will apply from 1 January 1991 to aerosols and synthetic packaging. Within three months, all products containing CFCs will have to display a label mentioning it. The German decision thus goes beyond the provisions of the Montreal Protocol, which mandate a 50 per cent reduction of CFCs by the year 2000. At the London conference on the follow-up to the Protocol, which will be held from 20 to 29 June, the FRG will defend its proposal to ban CFCs worldwide from 1997.

At Community level, the European Commission also proposed to the Twelve to ban CFC production and distribution in the EEC from the same date. The Environment Council which will meet on 7 and 8 June in Luxembourg is scheduled to review draft conclusions on the revisions of the Montreal Protocol.

Foreign Aid Policy To Focus on Environmental Protection

90WN0166B Duesseldorf *HANDELSBLATT in German* 31 May 90 p 9

[Article by sm: "Cuts in Armament Expenses Also To Be Used To Save Rain Forests"]

[Text] Reductions in armament costs in the nineties will also be appropriated for environmental protection in the area of foreign aid. This announcement came from Chancellor Helmut Kohl according to Juergen Warnke, foreign aid minister, when the eighth foreign aid report was adopted in the federal cabinet yesterday.

When commenting on the report before journalists, Warnke emphasized that worldwide environmental

problems in particular will shape international collaboration in the coming years. Mainly as a result of the Chancellor's initiative the FRG had assumed a leadership role at the world economic summits in Toronto and Paris with regard to global environmental protection.

Bonn has made environmental protection a key responsibility of German foreign aid. In 1990, DM800 million are budgeted for environmental projects, including DM300 million for the preservation and careful exploitation of tropical forests. This places the FRG at the top of all donor nations in this area.

In the tropical forest report, which the cabinet adopted at the same time, the Federal Government places particular emphasis on the necessity for international approaches to solutions and internationally coordinated measures to substantially increase, in Warnke's words, the successful preservation of tropical forests, which so far has been inadequate. Presently, the tropical forest action plan coordinated by the UN Food and Agriculture Organization (FAO) and the international tropical wood agreement form the main basis for common action by industrialized and developing nations.

The EG foreign-aid ministers have previously advocated a doubling of funds for the protection and preservation of tropical rain forests. As a model for the necessary coordinated actions they also approve of the tropical forest action plan. Those countries who support preservation of these forests through legal, taxation, and institutional measures should have priority.

Bonn is endorsing the World Bank's proposal to start a "global environmental facility" to be endowed with DM2 billion within the next three years. According to Warnke, these monies, serving as core funds, shall be used multilaterally while supported by bilateral measures. At the economic summit in Houston/Texas in the beginning of July, Kohl will push to concretize the international measures. The goal is to safeguard, through binding agreements under international law, the protection of the tropical forests.

At present, Warnke is negotiating with Federal Finance Minister Theo Waigel to have his budget increased by a "three-digit amount in the millions" in the 1991 federal budget, the objective being to enable the financing of worldwide environmental protection in addition to previous foreign aid collaboration.

However, the CSU [Christian Social Union] politician announced that the previous foreign aid cooperation in the bilateral area would also be subject to review. Cuts would be a possibility particularly if effectiveness studies should prove this to be advisable. Governments who notoriously misdirect their economic policy or do not control their human-rights violations have to expect definite consequences reaching as far as the cancellation of national German foreign aid, Warnke admonished.

The minister cited the Sudan and Somalia as examples for misguided economic policies. He is concerned about

human-rights violations in El Salvador. On the other hand, the Federal Government plans to support countries and governments who have started on the difficult course to economic and political reforms. As cases in point Warnke cited Chile, Nicaragua, possibly Vietnam and probably Peru.

By pursuing such a policy, the Federal Government wants to emphasize that the upheavals in central and east Europe characterize an impetus in the direction toward more democracy and socially oriented market economy for the Third World. In those countries where public foreign aid is cut or cancelled because of economic or human rights considerations, the Federal Government intends to use other avenues by which German aid can reach the poor. As examples Warnke cited measures to ensure the supply of food, health care, or basic education, which would be taken in cooperation with nongovernment organizations.

The minister stressed once again that the Federal Government, on its path to German unity, is fulfilling its commitments toward the developing nations. To demonstrate, the foreign aid budget for 1990 had received an above-average increase when compared to the overall budget. Within the coming years further increases in German foreign aid are equally essential.

Karlsruhe Ecology Information Center Established
 90MI0211 Bonn *TECHNOLOGIE NACHRICHTEN-MANAGEMENT INFORMATIONEN* in German
 12 Apr 90 p 18

[Text] An environmental research information office has recently been established at the Karlsruhe Nuclear Research Center (KfK), to support the FRG Ministry of Research and Technology (BMFT) in carrying out its environmental research funding program. The information office is housed in the KfK's Department of Applied Systems Analysis. Approximately 2 million Deutsche marks [DM] have been allocated to cover its running costs—initially for a three-year period—including salaries for about four permanent employees. The establishment of this office further extends the KfK's already considerable environmental research and engineering commitment. Approximately, 18 percent of the KfK's annual research capacity of about 4,300 employees and DM650 million is now deployed in this priority area.

The information office's primary tasks are to collect and assess information on environment policy and research and on the relevant national and international developments for those involved in the environmental research program, and to arrange a regular information exchange between them. Its primary goals are both to tackle new environmental issues promptly and to coordinate and cooperate on the relevant national and international projects, improve the uptake rate of these research results into the national economy, and, last but not least, create an improved information basis for planning, performing, and monitoring the environmental research and engineering funded by the BMFT.

The KfK's department of applied systems analysis provides excellent operating conditions for the information office, as it has carried out, and continues to carry out, comprehensive system analyses regarding the economic, ecological, and social benefits and risks of technology.

For example, extensive work on the advantages, feasibility, and impact of new coal technologies and coal-based fuels have already been carried out. The current program focuses on assessing the consequences of the agricultural cultivation of renewable raw materials, and studying the use of biodegradable plastics for packaging and the impact on health and the environment on the manufacture, use, and disposal of electronic components and circuits in microelectronics. Studies on electronic publishing and expert systems are also being carried out. Revising and refining current methods of assessing the impact of technology and building up the required data bases complete these projects.

The KfK's work on environmental research and engineering is organized as a multi-institute project, "Pollution Control in the Environment." The project's goal is to develop processes and technologies for overcoming environmental problems, for example, waste disposal, emission level reduction, drinking water purification, and sewage treatment. In addition, the behavior and propagation of pollutants are being quantitatively recorded and described using the latest mathematical models. Basic biological research primarily covers the impact of pollutants on genetics and cellular biology. Then there are also the aforementioned system analyses.

The KfK's environmental research information office can already point to a number of successful examples, such as the project on the European Clean Air Research Center, for which the Land of Baden-Wuerttemberg provides an annual grant of DM10 million, the "Water - Refuse - Soil" project, and the management of the "Water Technology and Sludge Treatment" project awarded by the federal government.

Impact of Ecological Measures on Industry Assessed

90MI0234 Bonn *WISSENSCHAFT, WIRTSCHAFT, POLITIK* in German No 19, 9 May 90 p 6

[Text] Economic growth and environmental protection should not be incompatible. With these words Federal Environment Minister, Professor Klaus Toepfer, presented the first "1990 Environment Report." In more than 680 pages, the report assesses the state and prospects for clean air, water management, and waste disposal. Additional chapters deal with environmental research, cooperation with the GDR, environmental technologies, and environmental protection measures during the 11th congressional term. Toepfer emphasized that by taking environmental protection measures, the FRG has relieved the strain on the environment despite a growing economy.

According to details supplied by the Federal Ministry for the Environment, Nature Conservation, and Nuclear Reactor Safety (BMU) it has been possible to reduce

sulphur dioxide emission by 72 percent (1970: 3.75 million tonnes, 1989: 1.05 million tonnes), dust emission by 59 percent (1970: 1.3 million tonnes, 1989: 0.53 million tonnes), and carbon monoxide emission by 40 percent (1970: 14 million tonnes, 1989: 8.45 million tonnes) despite an increase in production levels. While alone nitrogen emission increased by an overall 15 percent in the past few years (1970: 2.35 million tonnes), this increase was clearly below the increase in the gross national product. The BMU has meanwhile noted a new trend owing to the nitrogen removal from power stations and the introduction of low-pollutant technologies in automobiles.

At the same time, the importance of environmental protection as an economic factor increased. Prof. Toepfer stated: "The Federal Government's policy along with regulatory measures and economic incentives have led to the use of latest environmental technologies in industry." This has contributed quite substantially to the modernization of the national economy.

According to the latest survey by the Federal Bureau of Statistics a total of 35.7 billion Deutsche marks [DM] was spent for environmental protection in 1988. Of this total, DM17.2 billion was from the manufacturing sector and DM18.5 billion from government authorities. Compared with 1979, the manufacturing sector's share of the total expenditure for environmental protection thus rose from 35.7 percent to 48 percent. Environmental protection currently represents 1.7 percent of the gross national product. Thus, according to Toepfer, the FRG holds a leading position worldwide. Based on OECD figures, to date no other country spends such a great portion of the gross national product on environmental protection. In 1988 the manufacturing sector spent approximately DM8 billion on environmental investments, that is, 7.8 percent of total investments.

Dornier's R&D in Ecology Outlined

90MI0225 *Friedrichshafen DORNIER POST in English*
No 1/90, pp 34-36

[Article by Dr. Christoph Schnell: "The Ecological Challenge"]

[Excerpt]

[Passage Omitted] For many years, Dornier has tried to make essential contributions to technical environmental protection using its resources as a technology company for developing new concepts, methods, and instruments for planning and systems analysis, but also new technologies, products, and systems. These activities include work in the aviation and space fields; they support scientific programmes as well as the planning and monitoring tasks of the environment authorities; they contribute with products, services, and system solutions to reduce pollutant emission by treating exhaust gases, waste water, and residues; they help accelerate the development of cleaning and removal strategies towards

reduction and avoidance strategies. These Dornier activities form part of activities in other divisions of Deutsche Aerospace AG and in the whole Daimler-Benz concern. They are part of the strategy of building up new future-oriented business areas.

This article indicates Dornier's main activities in the environment, energy, and safety fields, some of which are explained in more detail in other articles of this Dornier Post issue.

The future market development in energy technology will increasingly demand highly efficient, environmentally compatible, climatically neutral technologies because of the ecological and climatic problems, and also because of safety and acceptance aspects.

Since the mid-1970's, Dornier has worked on the Hot Elly programme where the electrolysis of water vapour is used for the highly efficient generation of hydrogen at operating temperatures of about 1000°C. When reversing this process, one obtains the solid-oxide fuel cell which offers good chances for future use in decentralized power generation as it allows a practically pollutant-free current generation from any combustible gas with an efficiency of approximately 60 percent.

While fuel-cell technology may be an alternative to present-day power generation with a clearly reduced CO₂ emission even if operated with fossile fuels related to and its higher efficiency, other systems which use regenerative energies offer the chance of entirely pollution-free operation. Dornier is developing solar thermal systems which are for the time being mainly operated in developing countries. The components for process heat generation (high-power collector, heat exchanger, store) as they are needed today for water pumps or for food and medicine refrigeration plants, however, are also the basis for industrial and domestic water heating plants which will in the medium term, meet with great demand in industrial countries when energy prices keep increasing.

From the economical point of view, the first plants to be introduced on the market will probably be wind energy converters. Dornier is participating in the development and demonstration phase with Darrieus wind energy converters with vertical axis in the power range of 50 kW to 2 MW.

New climatically neutral energy systems and their application, also in developing countries, take account of the global demand for reduced CO₂ emissions. Space and satellite technologies, as they are prepared and pursued by Dornier, can make special contributions to analysing these global phenomena and to discover and monitor changes in the global climatic system.

There are not only individual experiments like MAS (Microwave Atmospheric Sounder) which aim towards the measurement of pollutants and their distribution in the atmosphere. The measuring tasks of ERS-1, built by Dornier under contract to ESA, and ERS-2, the future mission of which is being prepared by Dornier, are

essentially directed to questions of climatology and meteorology. Besides, Dornier has essentially contributed to the recently started development work for a special environmental satellite called Atmos, which will mainly check ozone concentrations in the atmosphere and measure other climatically relevant tracer gases.

In addition, Dornier offers the Earth Remote Sensing Data Service (EDS) which gives access to imaging and measuring data from satellite missions in the original form or after application-oriented preprocessing. Satellite monitoring and satellite data complement the measuring and control tasks as they are mainly implemented by terrestrial measuring stations and networks. Dornier also offers the Dornier 228 as a suitable carrier vehicle for airborne monitoring tasks, as well as expert service in equipping the aircraft with suitable sensors, data systems, and workstations.

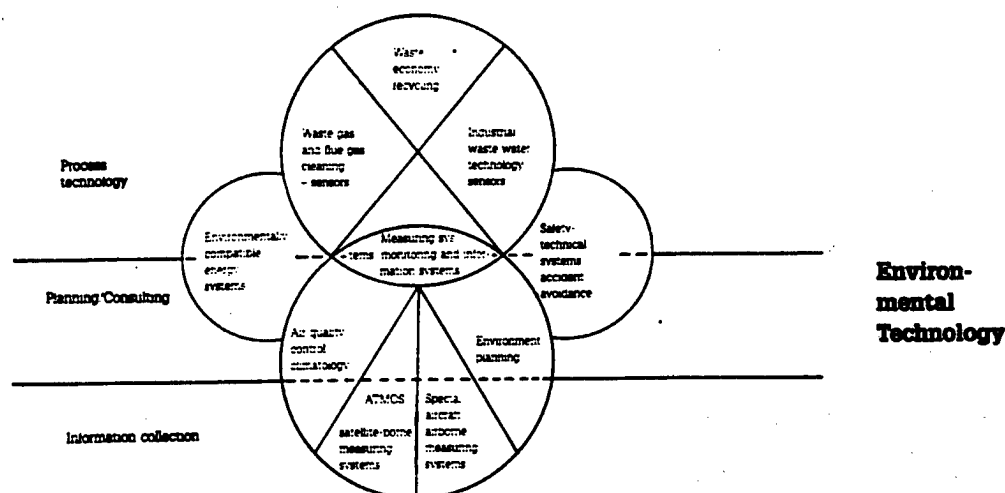
For the different terrestrial measurement tasks, Dornier has gathered years of experience in different fields like emission/immission control, air and water quality control, radiological monitoring, and the collection of meteorological parameters. Dornier concentrates on integrating these measuring tasks into area and plant related measuring systems which will permit a comprehensive and continuous registration of pollutants and their dispersion as well as the triggering and control of countermeasures when given limitations are exceeded.

Some examples for such Dornier activities are the environment and nuclear power plant monitoring systems which are operated on a supraregional basis by the German Federal States or the in-house monitoring systems of nuclear power plants and large industrial plants. In the latter case, environment-related measuring tasks are complemented by safety and security tasks, such as person-related dosimetry, access control, or perimeter monitoring. Dornier supplies modern control centres for such applications which, above all, meet the requirements for custom-made information display and problem-oriented decision support.

One example for complex interregional and inter-institutional task is the system of the Federal Ministry of the Environment called Imis (Integrated Measuring and Information System for Monitoring Environmental Radioactivity) which is being used on a Federal level. Dornier as a partner of Digital has been awarded the tasks of data collection and processing, especially inter-linkage of data and display of specific aspects in a user-friendly form. This work is based on experience with information processing and monitoring systems and on the concept of the Terra geographical information system, an independent product development for area related and environmental planning, based on years of work in this field.

Information processing and display as well as the supply of information is also gaining in importance in area-related environmental monitoring and in the interdisciplinary and overregional analysis of environmental system relations. Plant safety and safeguarding programmes are supported and complemented by years of experience in evaluation of technical risks and availability of systems and protection measures which have mainly been gained for the operation of nuclear plants and the transport of dangerous goods.

The activities of ecological planning have concentrated on programme planning preparation of project-related expertises, e.g. for environmental-impact analysis and the establishment of methods and instruments for environment-relevant planning processes. Naturally, the processing of cartographic information and their inter-linkage with, for example, statistical information from other sources is of special importance. The methodology of ecological planning takes account of all relevant environmental aspects. The requirements for precision with respect to space and facts depend on the individually given task, as for example the Corine European Environmental Information system, an ecological planning project on the level of development plans of a Federal State, or an ecological expert report on the urban



level. Due to its air quality management, Dornier can offer a large spectrum of technical-scientific services comprising the whole problem area from emission via dispersion down to deposition of airborne pollutants. This expert knowledge forms the background for the essential Dornier participation in the international Phoxa project, where pollutant transport processes over large areas are analysed and basic strategies for improving air-quality in Europe are elaborated.

Strategies for improving the situation of the environment call for suitable technologies for emission reduction and prevention. Dornier contributes to this objective by developing procedures for catalytic exhaust gas cleaning. At present, work is concentrating on the optimization of SCR processes and the cleaning of carbohydrate-containing exhaust gas flows.

An environmentally compatible, low-pollutant procedure for the disposal of critical special waste has been designed with the iron-bath process. This is a two-stage thermal process specially suited for halogen-containing special waste, destroying all organic materials in an iron melt at approximately 1500°C. The pilot plant will be built shortly by Dornier in co-operation with one of the biggest special waste disposal companies in Europe.

In industrial waste water technology, Dornier can offer many problem solutions for the metal-processing industry, using the modular RMA system and adapted total solutions. The versatile Dorys system has been conceived for use in photo and processing laboratories.

Threshold-value control, for example for cars, is obtained on modern exhaust-gas test stands designed and developed by Dornier. The vast activity range of the technology concern is clearly seen in this field as well, where the Dornier automatic pilot and the Dornier flat-track unit are steps towards fully automatic and reproducible measurement for different driving programmes with the objective of implementing most environmental and quality tests in the laboratory.

Dornier Develops Solid-Oxide Fuel Cells

90MI0240 *Friedrichshafen DORNIER POST in English*
No 1, 90 pp 40-41

[Article by Dr. Erich Erdle: "Solid-Oxide Fuel Cells—a New Technology for Future Energy Supply;" First paragraph is DORNIER POST introduction]

[Text] In the future, power plants will have to meet several new and/or increased demands, if they are to fulfil the global environment and climate requirements. Energy savings by the use of more efficient systems, reduced pollutant emission, and more decentralized implementation of combined heat and power systems are some important strategies that may be pursued. In the field of power generation, Dornier is developing a new technology, the solid-oxide fuel cell (SOFC), tailor-made for future necessities and based on system experience with fuel cells from space applications.

What is a Fuel Cell?

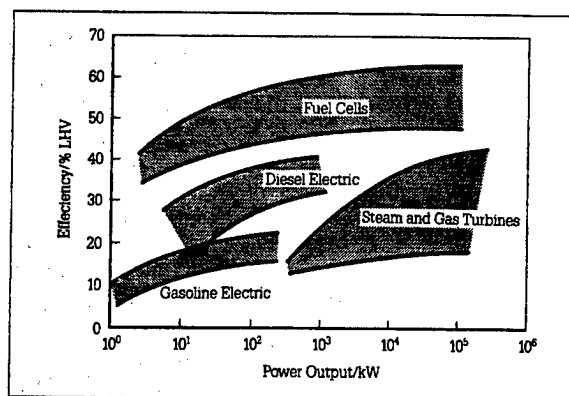
Fuel cells are energy converters which generate electric energy (low-voltage direct current) directly from the chemical energy of reactants (fuel gas and oxidant). As in familiar batteries and accumulators (lead accumulator), this energy conversion is effected via an electrochemical reaction. The systems differ in so far as the reactants are no integral system components which are gradually consumed during operation. In fact, fuel gas and oxidant are constantly supplied to the system (and the reaction products removed) with the fuel cell assuming only a converter function. An essential characteristic of electrochemical processes is that reactions comprise a current flow, with the electric charges being generally transported by ions in a part of the current circuit. In the SOFC, these are oxygen ions which diffuse to the fuel gas side through a ceramic electrolyte membrane. The driving force for this process is the difference in electrochemical potential between the air and the fuel gas side. The charge transported by the ions will be returned as electron current via an external load.

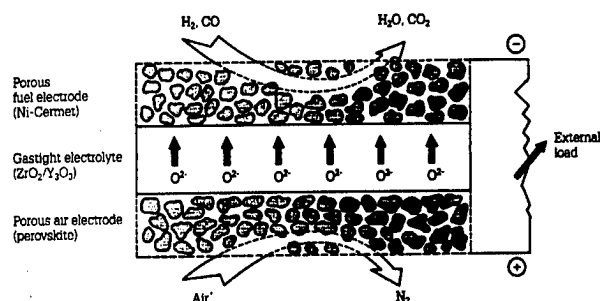
Other than thermodynamic cycles of heat engines, the reactions in fuel cells are not subject to the restrictions of Carnot efficiency. Therefore, significantly better efficiencies can be achieved than in conventional power generation processes and, consequently, correspondingly lower CO₂ emissions. But fuel cells offer more advantages still:

- lower pollutant emission
- low noise level (no rotating parts)
- excellent part-load capability (efficiency increases at partial load!)
- modular design (prefabrication possible, systems can be easily extended).

What Makes the SOFC So Special?

Efficiency and power ranges of different technologies for power generation





Functional principle of the FOBZ membrane

Compared with low-temperature fuel cells (alkaline, phosphoric acid, solid polymer fuel cells, operating temperature between 50 and 200°C) and molten carbonate fuel cells which work at about 600°C, the SOFC with its operating temperature of approximately 1000°C offers a series of specific advantages for power plants:

- genuine gas process, that is, no electrolyte management required
- air serves as oxidant (pure oxygen is not required)
- no noble-metal catalysts required
- not only pure hydrogen but also other combustible gases like CO, CH₄, natural gas, coal gas can directly be used for energy production
- favourable operating parameters for the endothermal conversion of methane/steam mixtures to obtain an H₂/CO gas mixture in the cells (internal reforming)
- high temperature of the waste heat (can be used for steam processes in major plant)
- no corroding media (such as carbonate melt)
- reverse operation possible (that is, the cells can be used for the reverse electrolysis process; Dornier has gathered considerable experience in this sector from the Hot Elly technology programme).

Technical Realization and State of the Development

As electrochemical processes take place at the surface rather than in the volume, technical units must consist of many membranes which are integrated to form so-called modules. Apart from the electrolyte, some other components are required, such as electrodes, connecting elements, and so on. In principle, the materials for all components are available today and have already been optimized and long-term tested for certain (tubular) cell configurations. New techniques had to be developed for the synthesis and processing of the—mostly ceramic—materials because of the extreme electrical and mechanical requirements of the process.

A corresponding unit has already been integrated in the Dornier laboratory and tested for the more demanding reverse electrolysis process. This lab module consisted of 1000 single cells, connected in series and in parallel, and realized one of several tubular concepts which have been the only ones to be demonstrated in significant sizes to date. Lately, however, increased efforts have been directed towards the development of SOFC units in

flat-plate design which are expected to reduce the specific investment cost due to higher power density and production advantages. While in the past mainly hydrogen or a coal gas simulating synthesis gas (H₂/CO mixture) were used in the SOFC tests as combustible gases, operation with methane or natural gas is of increasing interest now. During a test conducted by Dornier, direct conversion of methane into electric energy by an internal reforming process in a SOFC was demonstrated for the first time during several thousand hours. The fuel gas was a mixture of methane, H₂, CO, CO₂, and steam. This special gas mixture simulated the conditions during operation with partial recycle of the exhaust gas which contains the required vapour for the methane reforming process in a sufficient quantity.

Outlook

The primary objective for further work is the development of SOFC systems generating 0.1 to 1 MW of electric power and process heat from natural gas until the mid-1990s. The estimated market volume for such systems is several gigawatts per annum—corresponding to several billion U.S. Dollars for Europe alone after the year 2000. It is remarkable that such systems would face considerable interest already today in Europe as well as in the United States and in Japan if the technical production goals were achieved. The most important task for the years to come is, therefore, the development of a low-price production technology which can guarantee high reproducibility and yield for the ceramic energy converting units.

The next development step could be the implementation of big multi-megawatt plants (for example, coupled with a combined cycle bottoming system for direct power generation from coal gas. Another possibility would be the development of special power-generation units for mobile systems. And yet another application are the so-called RFCS (Regenerative Fuel Cell Systems) energy storage systems where H₂ and O₂ gases are generated by electrolysis, stored without loss, and are later converted to electricity again in a fuel cell. In the case of safe technology one could envisage to combine the electrolysis and the fuel cell system in only one unit.

Domestic Fuel Pollution Reduced

90WN0139A Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 21 May 90 p 10

[Unattributed article: "Modern Home Gas and Oil Furnaces Emit Almost No Pollutants: Researchers Investigate Nitrogen Oxide-Free Gas Furnace Rods, Atmospheric Stage-Combustion, Ceramic Panel Heating, and Catalysts"]

[Text] With respect to environmental friendliness, home heating technology with oil and gas furnaces in West Germany occupies first place in the world. When state-of-the-art technology is fully utilized, its fraction of the

total emissions picture drops to less than three percent. Whether safety technology throughout the rest of Europe catches up soon remains to be seen. To date, with the exception of Switzerland, no other country has emission control values with respect to home furnaces comparable to those in force in the Federal Republic.

Close to 90 percent of centrally heated domiciles are equipped with oil or gas furnaces. Those, together with similarly designed furnaces in the municipal and industrial sectors, account for about 35 percent of West Germany's energy needs. According to the Emissions Protection Report, five percent of the total harmful emission pollutants—sulfur dioxide, nitrogen oxides, carbon monoxide, dust, and hydrocarbons—derive from these home power sources. The degree to which the emissions from these heat furnaces—representing 35 percent of the total energy used—have already been reduced was elaborated upon by Dr. Heinz-Bernd Grabenhenrich during German Engineers Day, sponsored by the VDI (Association of German Engineers). Despite the general negligible amount of total emissions they account for, during the heating season and in municipal areas with very unfavorable local topography, home heating furnaces can at times reduce air quality. Since in the coming years it is expected that there will be a perceptible reduction in certain air pollutants from industrial and power plant emission sources, a still further decline in home emissions will be necessary in order to maintain their previous low fraction. Conversion of the all home heat furnaces to the latest state-of-the-art home heaters would all but make this sector insignificant as an emission source.

To maintain this low level of harmful pollutants, the furnaces must be serviced and inspected on a regular basis. Especially favorable values will be achieved by blue-burning oil furnaces (blue-burners, rocket burners), which have won a solid position on the furnace market in recent years. By means of combustible gas flow returned internally to the burner head, the oil droplet smoke first enters the gaseous phase before the actual combustion process occurs. In this way, soot-free combustion with low nitrogen oxide and carbon monoxide values is made possible. Presently, there are about 250,000 blue-burners in use. The situation with energy-saving and emission-free oil furnaces is currently characterized by a multitude of refinements. The blue-burn process will also be optimized in high heat-loaded combustion chambers, the startup frequency is to be reduced through appropriate systems engineering. Internal and external exhaust gas circulation will be changed in order to suppress nitrogen oxide combinations. Oil-burner value engineering, combined with multistage or modulating burner systems with a yearly utilization rate of 100 percent, will result in a reduction in nitrogen oxides and a slight decline in sulfur exhausts.

The use of secondary units to reduce sulfur emission, e.g., alkaline washers, is not considered economical below the 100-Kw power range, and the disposal of process residues has not yet been controlled. From the

economic point of view, further reductions of sulfur in light heating oil is the best approach. The use of oxidation catalyzers in modern oil furnaces is practically ineffectual, although such products have recently been made available.

With respect to gas burners having a power rating of less than 50 kW, the special gas-heating boiler with blowerless burner and the boiler heater for an entire floor of a building dominate in Europe today. Owing to their low susceptibility to failure and the low cost of maintenance as well as their quiet operation, these systems will almost certainly be used for some time yet. In atmospheric heating, the nitrogen oxide emissions are higher than in the case of gas blower heating—assuming of course the equipment has been carefully set up. The heat exchanger must also be serviced and cleaned regularly if an undesirable buildup of carbon monoxide is to be avoided.

A substantial number of the atmospheric boiler systems delivered at the present time are delivered in the "Lownox" models, which have been increasingly used in last two years. Specific cooling bodies, grids—special steel-ceramic rods may also be inserted in the flame center above the burner rods in order to suppress thermal nitrogen oxide buildup. A reduction of nitrogen oxides to 30 percent results from the precise adjustment of the geometric parameters. In favorable instances, values, which are also measurable in gas blower burners, are achieved.

Gas blower burner-boiler combinations, particularly with premix burners, have had favorable emission characteristics from the start. Through the appropriate refined technology and by combining various measures, an exhaust gas composition without undesirable exhaust gas components can be achieved. By means of load-oriented heating technology and an appropriately controlled modulating gas blower burner, the effectiveness of the boiler in the partial load realm increases, while the specific nitrogen oxide emissions drop. This is an especially economic and environmentally friendly technology for furnaces rated over 100 kW, which should gain even greater acceptance in public buildings. Research on the reduction of emissions from gas heating units is now directed to nitrogen oxide-free gas burner rods with a higher mixture or modified hole configurations, to atmospheric stage combustion, to atmospheric exhaust gas return, and gas blower burners.

Automotive Emission Standards Policy Studied
90MI0230 Bonn TECHNOLOGIE NACHRICHTEN-
MANAGEMENT INFORMATIONEN in German
12 Apr 90 pp 15-17

[Text] To date, clean air policy has concentrated on reducing mass pollutants—including dust, carbon monoxide, sulfur dioxide, and nitric oxide—and achieved remarkable results. Thanks to the introduction of the three-way catalyzer for new gas-powered vehicles as of 1991 and the denitrification of power station fumes, a drastic reduction in nitric oxide emissions is also in

sight. The drop in mass pollutant emissions means that other pollutants are gaining importance in clean air policy. A Fraunhofer Institute of System Engineering and Innovation Research (ISI) study commissioned by the Federal Research Ministry has shown to what extent emissions of some air pollutants that represent particular hazards to health and the environment could be reduced using the available technology. The study covered all sections of the national economy except transport. It will assist the research ministry in orienting its subsidies for new environmental protection technologies.

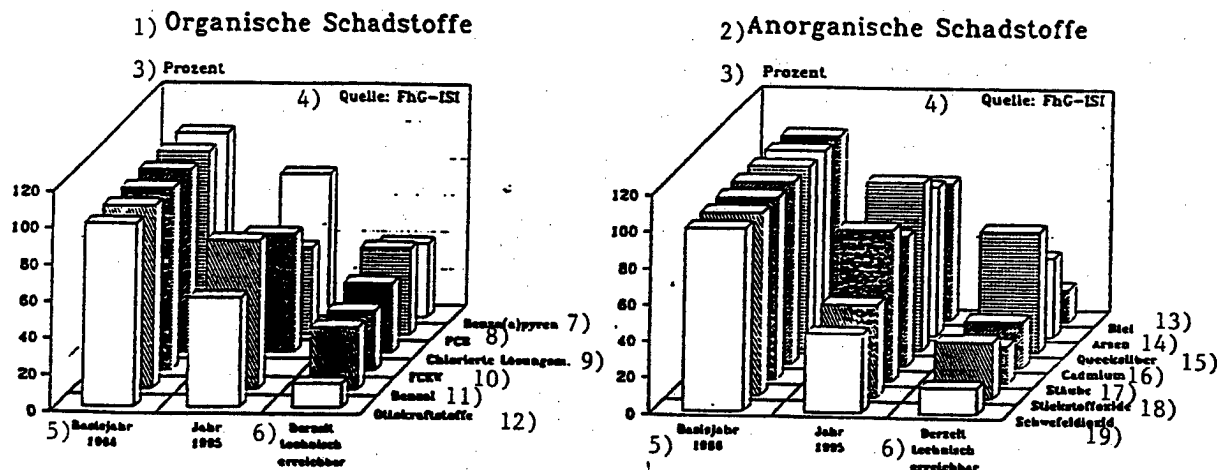
A methodical procedure for evaluating the efficiency of environmental protection technologies had to be drawn up. First of all, emissions of the selected pollutants in 1986 were estimated, grouped according to source. The expected emissions for 1995 were then forecast, taking into account the impact of the emission control laws, voluntary agreements, individual commitments, and other factors. Finally, the emission level that would result from using the best available emission reduction methods was calculated for each pollutant and each category of sources. The emission reductions that could thus be achieved were termed technical reduction potentials and the quantities discharged after their elimination were termed residual emissions. The reduction potentials identified are based on the efficiency of currently available clean air technologies. Pollutants and source categories showing only slight differences between the emissions forecast for 1995 and the residual emissions indicate areas of research and development that require more intensive study in the future. Conversely, the demand for R&D is lower where the residual emissions lie well below the emissions expected for 1995; these figures tend rather to reveal any shortfalls in exploitation of the available technology. A large difference here, however, can also indicate the need

to reduce the economic outlay involved in introducing these technologies, which would make for faster introduction on a wider scale.

The following table summarizes the main results of the study. They show that in the future, the use of new environmental protection technologies to combat air pollution should focus primarily on the chlorofluorocarbons (CFC's), followed by solvents and benzene. In addition, shortcomings are discernible in the technology used to precipitate the heavy metals that are also discharged in vapor form and so cannot be trapped in dust filters. This is the case with mercury and arsenic, for example. Highly toxic organic trace pollutants such as dioxines, furans, polychlorinated biphenyls, and polynuclear aromatic hydrocarbons having benzopyrene as a trace element must also be considered when future technologies are developed. Finally, it was confirmed that the technical feasibility of emission reduction in small and medium-sized systems often remains far below the level that can be achieved in large plants. New environmental protection technologies developed in the future should therefore take greater account of small and medium-sized systems and create efficient processes that they can use at a reasonable cost. The study also showed that currently available technologies for trapping dust and dustbound heavy metals in textile filters are extremely effective in reducing emissions. Fume desulfuration by the wash process [Waschverfahren], the selective catalytic reduction of nitric oxides in exhaust gases (SCR process), active carbon filters to trap polluting gases, controlled three-way catalyzers for motor vehicles, and gas displacement systems [Gaspendsysteme] for fuel distribution and motor vehicle refuelling can reduce emissions by up to 90 percent. These are examples of successful technical developments achieved in the past; in the future, too, environmental protection technology will play a major role in air pollution control.

Trends in Annual Pollutant Discharge and Currently Feasible Emission Levels for Selected Air Pollutants (excluding transport)

Pollutant	Unit of measurement	1986	1995	Technically feasible at present
Sulfur oxides	kt	2,120	915	300
Nitric oxides	kt	1,160	590	360
Dust	kt	480	400	100
Cadmium	t	35	25	9
Mercury	t	38	35	25
Arsenic	t	185	150	80
Lead	t	890	665	160
Gasoline	kt	100	60	13
Benzene	t	6,610	5,400	2,250
Chlorofluorocarbons ¹	kt	90	data unavailable	30
Chlorinated solvents	kt	245	160	95
Polychlorinated biphenyls	t	575	275	275
Benzopyrene	t	32	25	13
¹ Quantities consumed				
t = tonne				
kt = 1,000 tonnes				



Key: 1) Organic pollutants—2) Inorganic pollutants—3) Percent—4) Source of information: Fraunhofer Society - ISI— 5) Reference year 1986—6) Technically feasible at present—7) Benzopyrene—8) PCB's [polychlorinated biphenyls]—9) Chlorinated solvents—10) CFC's—11) Benzene—12) Gasoline-based fuels—13) Lead—14) Arsenic—15) Mercury—16) Cadmium—17) Dust—18) Nitric oxides—19) Sulfur oxides

The research report may be obtained from the Fraunhofer Institute of System Engineering and Innovation Research (ISI), Breslauer Str. 48, 7500 Karlsruhe. Tel.: 0721/6809-217

Automobile Manufacturers Control Pollution From Paint

90WN0161A Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 19 Jun 90 p 8

[Article by Dr. Hans Schaller: "Future Painting Facilities Will Be Made More Environment-Friendly Through the Expenditure of Millions: New Concepts and Processes for Low-Emission Preparatory Treatment and Painting"]

[Text] Automobile manufacturers are spending millions to develop the environment-friendly painting (lacquering) facility of the future. Involved pilot plants are providing information on a variety of different parameters, ranging from the quality of the painting, cost effectiveness, right up to the ever more stringent environmental protection requirements. New concepts and processes for low-emission preparatory treatment and painting are being tested. Thus, the Eisenmann Company in Boeblingen, an internationally renowned systems supplier in the fields of surfacing technology, environmental, conveyor, and handling-technologies, delivered to the Volkswagen Plant in Hannover a new painting facility with four modern lines, and even an intermediate base line, two final coating lines, and a multi-purpose line for specialized and touch-up jobs. The purpose of these efforts was to implement future-oriented goals like the introduction of new painting technologies, modern guidance and control technologies,

optimized material flow, observance of the permissible emission values set by TA Luft [Technical Directive Air], and extensive heat recovery measures to lower power requirements. For the first time, heat wheels in these dimensions were employed for heat recovery. For waste removal, the coagulant from the spray booths is thickened by means of external sludge removal systems with many downstream stages and a decanter. This process considerably reduces the volume of sludge. The clear water flows back into the system.

Even in its Mexican plant, VW employs the complete immersion preparatory treatment for optimal corrosion protection of the bodywork. Using a facility provided by the Eisenmann Corporation USA in Crystal Lake, Illinois, 60 units per hour—buses or private vehicles—are moved by means of a self-aligning conveyor through a 9-zone zinc phosphating facility. Two interconnected personal computers control the process technology and material flow. TEisenmann delivered "Painting Lane 2000" to VW in Wolfsburg for the experimental painting of series-produced vehicles, in which various painting systems, means of application, pretreatments, drying, material flow, and potential for automation were tested and in which the environmental strategy of "Avoidance Not Reduction" was particularly honored. According to the manufacturer, this new painting plant is considered the most modern of its kind. It has been designed to handle 3,710 automobiles per day and replaces the now 25-year old facility in VW's main operation.

For Mercedes-Benz AG in Bremen, which produces the SL and Roadster models, Eisenmann installed the complete PVC and preservation lines, including a spray booth with cross-current, Venturi gas scouring, and a dryer for catalytic immersion painting (KTL). The dryer units, which are completely preassembled in segmental

construction, shorten the assembly and startup times. Exhaust air removal with thermal afterburning (TNV) is integrated in the power concept. Goal-specific conveyor systems like Power & Free Conveyors, such as those Eisenmann delivered to BMW in Munich and Dingolfing, or robot vehicles for the supply and removal of work islands, as work bench or as goal-specific production part transport, are the prerequisites for integrating the "painting lane" into the automated production process. Driverless transporters to integrate a welding lane with downstream manual work stations and electric lines to transport mountings also serve in the assembly of the super roadsters. In close cooperation with Volkswagen AG, Duerr GmbH in Stuttgart, together with Behr Industrial Facilities GmbH & Co. in Bietigheim-Bissingen, has built a painting system with a capacity to handle 4,300 bumpers in a three-shift operation. In a preparatory treatment, the plastic bumpers pass through a four-zone washing machine, after which they are blown clean and dried. The connecting spray booths are arranged in the clean room area. Uni paints are applied with electronic two-component mixture and dosing additives. Volkswagen is currently using conventional spraying systems for metallic base painting. Again a two-component paint is used as the clear lacquer. Painting has been arranged so that VW can convert metallic base paint to water-base-coat and robot employment.

In a painting plant built by Duerr for Rolls-Royce in Crewe, England, 18 Rolls-Royce and Bentleys are lacquered daily. The quality of the work is attributable to the use of zincplated sheets and aluminum used in the body, to multistage spraying and full immersion pretreatment, and to the elaborate lacquer layering (six layers), applied manually. All peripheral equipment, including the electronic control, were included in the total painting plant package. Duerr has installed a pilot plant with exhaust air purification system in BMW AG's Munich plant, in which the amount of emissions from the automated zone of the charged spray booth has been reduced by more than three percent. At the same time, the spray booth's need for fresh air went down by about 30 percent, since the purified exhaust air, owing to its high degree of purity circulates and can be again returned to the spray booths as air supply.

This pilot plant also serves in providing basic data on which to base decisions on further investments in exhaust air purification in spray booths. The most important part of the facility is the KPR concentration rotor, which by virtue of its high efficiency makes it possible to return the purified exhaust air to the spray booths.

Institute Reports on Trash-to-Gas Test Project

90WN0152 Frankfurt/Main FRANKFURTER
ZEITUNG/BLICK DURCH DIE WIRTSCHAFT
in German 12 Jun 90 p 8

[Unattributed article: "Test Plant at the Neuss/
Holzheim Trash Landfill Was Successful: Two-Stage

Process Also Separates Pollutants Gas of Natural Gas
Quality Can Be Economically Interesting"]

[Text] Environmental contaminants produced during the decomposition of household waste in landfills can be used for the production of energy if environmentally safe conversion of landfill gases proves successful. Among the gases produced during the decomposition of trash are chlorofluorocarbons (CFCs) and hydrogen sulfide. This landfill gas is being converted into a usable form at a new pilot plant. In a two-step process, the contaminants are first separated by adsorption and then safely disposed of. Subsequently, the methane content of the landfill gas is enriched to natural gas quality in preparation for utilization of its energy potential. This facility is being operated and tested at the Neuss-Holzheim household waste landfill site by the Institute for Process Engineering (Institut fuer Verfahrenstechnik) of the Rheinisch-Westfaelische Technische Hochschule Aachen and the waste disposal firm of Trienekens Entsorgung GmbH.

The project was the focus of a symposium which, under the direction of Professor Robert Rautenbach (director of the Institute for Process Engineering), reported on experiences with the procedure. Technical and economic aspects of the new environmental technology in this pilot plant were presented. Since burning off of landfill gas without further utilization cannot be justified economically, but pretreatment is necessary for all gas utilization schemes in order to remove CFCs and hydrogen sulfide, work on utilization of energy potential is of top priority. At an average household waste landfill, 4000 cubic meters of landfill gas can be collected per hour, corresponding to a heating value of about 2200 liters of heating oil.

In order to attain this, the pilot plant in Neuss was built, operating as a central unit with a membrane step, in which separation of carbon dioxide from the biogas takes place. High purity methane is then available. In order to remove traces of contaminants, gas is pretreated before the membrane step. Hydrogen sulfide and halogenated hydrocarbons are removed in a two-step process, leaving only small amounts of residues. The trace components are primarily responsible for environmentally harmful effects of landfill gas. For example, the unpleasant odor of landfill gas is due to sulfur-containing compounds. Chlorofluorocarbons merit attention because of their toxicity. In order to reduce damage to the environment, two-step adsorption is carried out using the following approach: In the first step, hydrogen sulfide is catalytically oxidized to elemental sulfur on specially treated activated carbon and is adsorbed in the pores of the carbon. Because of the high adsorptive capacity of the carbon used here (1 kilogram sulfur per 1 kilogram of activated carbon) and the long service life which results (about one to two years), this adsorption can be carried out continuously at the Neuss pilot plant. The exhausted carbon is landfilled or regenerated following breakthrough, and under certain conditions the sulfur can even be reclaimed as raw material. After the gas is dried

(condensation point about 0 to 5 degrees Celsius at atmospheric pressure), the halogenated hydrocarbons are removed in the second purification step using, again, adsorption on activated carbon. However, because of the short breakthrough time of the volatile chlorofluorocarbons, this step must be designed as a thermal exchange process.

The regeneration of exhausted activated carbon is carried out by steam flushing, during which trace components present in the aqueous phase can be safely removed using conventional methods. Klaus Welsch and Erhard Ehresmann gave detailed reports on gas separation with membranes. Five membrane modules are used if the methane content of the landfill gas is to be enriched to about 90 to 96 percent by volume before the gas is fed into the supply network. In general, gas separation with membranes uses nonporous membranes whose separatory effect is based on a solution-diffusion mechanism: sorption of the gas onto the membrane surface, diffusion of the dissolved gas through the membrane, and desorption or evaporation of the gas out of the membrane. Mass transport of a permeating component depends on a partial pressure gradient across the membrane. Thus, gas separation is a pressure-driven process. The different transport speeds through the membrane allow selective separation of a complex mixture. Hollow fiber modules characterized by high packing density are used in this gas separation.

Five hollow fiber modules of this type are installed in Neuss for recovering 200 standard cubic meters of landfill gas per hour.

The pressure necessary for separation is produced by a three-stage piston compressor. Because of the modular construction of the facility, a one-stage as well as a two-stage process can be carried out. Preliminary operating experiences with the facility showed that membrane separation of gas is a reliable procedure for utilization of landfill gas from both ecological and economic viewpoints. The following process engineering aspects are advantageous: simple regulation of natural gas concentration under varying concentrations of landfill gas, low maintenance costs because of the simple process, and modular construction which optimizes yield by adapting to variable gas productivity of the landfill.

The strategy of the landfill gas utilization concept is that it is possible to switch from an initially one-step facility to a two-step facility if the flow of crude gas changes. At present, gas permeation has cost advantages over the gas motor technique. However, according to scientists, information on the most economical procedure can only be given in individual cases since detailed consideration of local conditions is a prerequisite.

Dornier Recycling System Presented

90MI0237 Bonn *TECHNOLOGIE NACHRICHTEN-MANAGEMENT INFORMATIONEN* in German
27 Apr 90 p 8

[Text] Friedrichshafen-based Dornier GmbH is working on many different waste water engineering programs and projects such as process-integrated waste water treatment, water recycling and the recovery of valuable substances, system development and production, and the planning, construction, and installation of complete systems for the metallurgical, electronics, and photographic industries.

The new waste water and recycling system, Dorys (Dornier Recycling System), is used primarily on the silver used to develop photographic film bases; it removes the silver from the fixing tank and the wash water, and reuses it to reactivate the processing solution.

The modular construction of the DORYS system means that it can be extended to include disposal of used developing and fixing solutions and to control the wash water in the circuit. The system can both combine several modules for different applications and use several modules of the same type, for example to increase performance.

The DORYS system provides up to 95 percent photographic silver recovery and savings of up to 80 percent in fixer solution by regeneration. The economies thus obtained by silver recovery and fixer solution savings mean that the cost of the plant can be amortized over an economical period.

Further information may be obtained from Wolfgang Buehler/Michael Hartwig, Dornier GmbH, phone: 07545-8-3893, fax: 07545-84411.

Waste Disposal, Recycling Problems Examined

90WN0139B Frankfurt/Main *FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT*
in German 25 May 90 p 8

[Unattributed article: "Too Little Acceptance for Trash Removal: Approval Procedures Take Too Long: Ifat '90 Exhibits Latest Technology"]

[Text] Everyone is for it—providing the trash treatment facilities are located somewhere else. This syndrome and other recycling problems were the main topics at a symposium sponsored by Metallgesellschaft AG, Frankfurt, where it was noted that there was an immediate need for disposal sites, running into millions of cubic meters, as well as for about 40 heat treatment facilities for household trash and 10 to 12 heat treatment facilities for special trash in order to be able ensure proper and safe treatment for today's general and special waste disposal requirements. Specialists believe that a total collapse in trash disposal can only be avoided if the above-mentioned, urgently needed disposal facilities can be planned, approved, built, and put into operation.

within the next five years. The procedures for the approval of waste disposal facilities, as currently practiced, can take ten years or more and, according to the experts, is leading inexorably to a total breakdown in the disposal industry.

In connection with the disposal question, Professor Dr. Michael Bothe spoke at Frankfurt University of the current "unacceptable legal uncertainty," whose victims even include the courts. He suggested that the prospects for resolving the difficulties in obtaining the needed trash disposal and recycling facilities would be much brighter if the legal procedures to gain approval of disposal facilities were revised completely, rather than engaging in the fine points of interpreting the current disposal procedures. Perhaps the European Community could exercise a salubrious influence in this regard.

Despite meager public acceptance and the lengthy, exhausting procedures, the surest way to take care of the especially critical special waste is still to expand the incineration capacities within the near future. The Federal Ministry of the Environment has reported that at present about 1.8 million tons of offensive special waste has to be incinerated. Available facilities can only incinerate about 700,000 tons however. There is an even more special need to handle the so-called "East-West trash tourism."

As far as the state-of-the-art of waste disposal facilities is concerned, the German Federal Republic is in a very paradoxical situation in that the technologies developed here represent the highest standards in the world—the Ifat '90 Trade Fair in Munich demonstrated this—but that it is almost impossible to use them in Germany because of political reasons and the tactics of opponents.

Engineer Udo Boin, associated with BUS Berzelius Environment Service AG, regrets the emotional reaction of the people who often "fight with all means available against the construction of a facility." Urgently needed approvals for construction are therefore often delayed so long that the recycling facility becomes unprofitable or obsolete. Despite everything, the construction companies building these facilities are pushing ahead with vigor to reduce the "remaining trash heaps." Engineer Heinz Morlet of Lurgi GmbH points out that these companies belong to the Metallgesellschaft group.

The recycling of painted automobile industry trash constitutes a particular problem. As early as 1980, Opel AG, Ruesselsheim, had converted its base paint to a water solvent. Besides converting all remaining paints to the water technology, intensive efforts today are being directed to utilizing painted debris. To be sure, the stringent requirements put on the construction and operation of the painting facilities in the automobile industry have led to a significant rise in the cost of cars.

Nowhere else in the world, Engineer Hans-Joachim Perizonius of Opel AG emphasizes has the problem of developing environment-friendly paints been worked on

so intensively and with so much success as in the West German automobile industry.

Saenger Impact on Environment Analyzed

90MI0232 Bonn WISSENSCHAFT, WIRTSCHAFT, POLITIK in German 2 May 90 p 2

[Article by Edelgard Bulmahn (SPD), deputy chairperson of the Bundestag board of inquiry set up to assess and evaluate the impact of technology, entitled: "High Acclaim for Hypersonic Technology"]

[Text] Whenever the word Saenger is mentioned, both the space lobby and the BMFT go into ecstasy. They maintain that "it will promote major, far-reaching technological advances, contribute significantly to ensuring the future of the FRG," and "set the next generation a major technological challenge." Hailed as "an outstanding means of producing technology" and as "a catalyst for new technologies," according to its supporters the Saenger pollutes "neither the environment nor the outer atmosphere," with its hydrogen propulsion. Yet the environment-friendliness of this feather in the German space community's cap is hardly sensational. In the opinion of many scientists, the Saenger project poses considerable environmental risks. According to the information currently available, neither damage to the ozone layer nor a worsening of the greenhouse effect can be ruled out. So far no reliable calculations or specific studies and tests are available on the impact that hypersonic aircraft and their exhaust gases will have on the atmosphere. Scientists are primarily worried about its allegedly environment-friendly hydrogen propulsion. The massive emission of water vapor into the stratosphere and mesosphere can considerably change the chemical composition of the air, increasing HO_x radicals and thus adversely affecting the photochemistry of the ozone. The formation of ice crystals and ice clouds as a result of water vapor emissions could also prove problematical, as they reflect not only sunlight but also the heat radiated by the earth, thus increasing the greenhouse effect. Furthermore, the combustion of hydrogen from the aircraft's tanks with atmospheric oxygen will certainly produce nitric oxide, more of which will also be generated as the Saenger's exhaust gases heat the surrounding air and the heavy compression pressure exerted by the hypersonic flows gives rise to gas kinetic heating. Nitric oxides, especially when discharged directly into the ozone layer during hypersonic flight, act as powerful catalysts in the process of ozone decomposition. The ozone layer is also damaged by the strong shock waves produced by the hypersonic aircraft along its flight path, which, at an altitude of about 25 km, is well inside the ozone layer. With flights taking place at relatively short intervals within very narrow corridors, it is only to be expected that the Saenger's detrimental effects will combine to create corridors with a drastically reduced ozone content, eventually causing permanent damage to the ozone layer.

BMFT Funds Solar, Wind Energy Development Program

*90WN0135A Duesseldorf VDI NACHRICHTEN
in German 18 May 90 p 11*

[Article by Michael Pyper: "Sun and Wind Seek Profitable Niches: Competitiveness With Traditional Energy Sources Is Sought." Danes Amass Extensive Experience Hanover]

[TEXT] Energy from wind and sun "still play practically no role in the Federal Republic of Germany," explained the Federal government, and it wants to change this with its Third Energy Research and Energy Technology Program. At the industrial fair in Hanover, manufacturers, particularly those from Germany and Denmark, demonstrated what potential lies hidden in wind energy plants and photovoltaic facilities.

Poor profitability when compared with cheaper conventional energy sources still causes great difficulties for the two forms of energy production, wind-generated and solar. However, the photovoltaic sector reported that costs for solar cells have already dropped by a factor of 10 over the last ten years, making this technique profitable for special applications. In Denmark, the limit of profitability for wind energy production is already said to have been reached. The Federal Republic is attempting to catch up with its recently passed "100 MW Program."

The goal of Federal Ministry for Research and Technology (Bundesministerium fuer Forschung und Technologie, BMFT) support is to "reduce the costs for electricity from wind power plants through larger demonstration projects and further development of key components, so that these renewable energy sources will be fully competitive by the end of the next decade." Estimated cost: approximately DM 400 million. Supporting measures should also facilitate the introduction of renewable energy. And in the meantime, for example, gentle pressure will be applied to the Electric Power Supply Companies Elektrizitaetsversorgungsunternehmen, EVU) in order to make reimbursement for power fed into to the public grid more attractive.

The German Society for Wind Energy (Deutsche Gesellschaft fuer Windenergie, DGW), is making concrete demands in this matter. At the very least, it is considered "questionable" if the EVU and their association maintain that the seven to nine pfennig/kWh paid for electricity from wind and solar power plants more than equals the avoided fuel costs. The DGW considers an average of 15 to 20 pfennig/kWh to be reasonable.

The Danes were headed into the wind earlier. Shocked by the 1973/74 oil crisis, Danish society, at that time 96 percent dependent on imported oil, unconditionally accepted wind power as an important energy source for the future. Today in Denmark there are about 2500 wind power plants with a total output of about 250 MW. They supply approximately 1.8 percent of the country's total

energy requirements. According to calculations of a consulting firm, the price for electricity in Denmark, 95 percent of which comes from coal-fired power plants, has dropped. Even without the subsidies which ran out last August, energy from wind power plants is cheaper in spring of 1990 than that from coal-fired power plants.

Denmark provides 45 percent of all wind energy plants worldwide. In an interview with VDI-nachrichten, Leif Andersen, sales manager of the Danish manufacturer Wind World in Skagen, dismissed the accusation of setting dumping prices made by many German manufacturers. "We have been building wind power plants for many years and have acquired a considerable amount of mass-production experience, so we can offer good prices."

Plants with 30 kW output represented the lower output class at this year's Hanover Fair. The majority of plants on exhibit produced 100 to 250 kW. The next jump for the middle class appears to be preprogrammed: Norbert Wippich, director of Adler Windtechnik, is certain that "in two years plants with about 400 kW will be available as mass-produced wind power plants."

Single Households Need Small Plants

Small plants are also justified. But even 30 kW plants are often too much for a single household. New Energies Wiehengebirge (Neue Energien Wiehengebirge, NEW) jumps in to fill this gap. This firm, which grew out of a consumer group, sells wind plants with an output between 150 W and 10 kW. The highlight is the generator. Instead of the usual asynchronous generator, which requires very definite, fixed rotational speeds, this works with a practically maintenance-free permanent magnet generator.

In the lower output range, people also go with Suedwind, Berlin. The spectrum extends from 5 to 45 kW. Specialty of the house: flapping hinges for installation of the three vanes. They allow flexible compensating movements of the motor blades and protect the plant from destruction.

While wind power plants use solar energy indirectly via the movements of heated air masses, solar cells convert solar energy directly into electric power. Yet they seem to be considerably further from profitable large-scale use than wind converters.

However, they have won a solid place for themselves in certain niches. "For me, the pocket calculator, which worked more economically with solar cells than with batteries, was a key experience," explained Axel Urbanek, vice-chairman of the German Solar Energy Association (Deutscher Fachverband Solarenergie, DFS) to VDI-nachrichten in Hanover. Urbanek sees the failure to achieve mass production, which could then let prices tumble, as the main problem. "The demand is there, especially in developing countries, but with today's prices one runs into problems of financing."

Even in the Federal Republic, solar power would already be economical, according to the DFS. In Hanover the association presented a study on this subject, according to which a solar generator which produced 1600 kW and thus substituted for triple the amount of conventional primary energy would have to be given an "environmental bonus" of DM 480. In the study, resultant costs of environmental pollution caused by conventional methods of power production were given major consideration. The DFS believes that, mid-term, the energy expenditure for solar cell production can be lowered with new technologies to under a year's profit.

Plans for Energy-giving Satellites MBB, together with a French firm, founded PST (Photonics Solartechnik) in Putzbrunn near Munich. At MBB they are already thinking on a grand scale. So-called energy satellites are conceivable which could collect solar energy in their geostationary orbits at an altitude of 36,000 km and direct it to photovoltaic stations on the Earth using, for example, laser beams. However, tests are still being carried out on Earth, for example on the island of Pellworm, where a 300 kW plant has been installed. While traditional solar cells are relatively thick and correspondingly expensive in terms of material and production, a definite cost reduction is expected from thin-film solar modules. They also open up new areas of application. The translucent models could, for example, be utilized as building facades. In 1991, PST plans to begin production of such elements with an initial size of 60 cm x 100 cm.

Solar Energy Research Reviewed

*90WN0135B Duesseldorf VDI NACHRICHTEN
in German 11 May 90 p 34*

[Article by Manfred Ronzheimer "Research Association Concentrates Resources"]

[Text] In the Federal Republic of Germany, solar energy utilization projects of several major research institutions will now be concentrated in a "Research Association for Solar Energy." The specific goal is greater coordination of research efforts.

Even if many experts predict a brilliant future for it, solar energy is just beginning to emerge from the shadows of research policy. Over the next few years, the Federal Government will be investing half of all funds for energy research in the field of nuclear energy. Renewable energy sources, which include solar energy, represent a mere 23 percent of the energy research program for 1990 to 1993 (total volume: DM 5.1 billion). This year about DM 300 million of the Federal Research Minister's budget is available for renewable energy and rational energy utilization.

But now, solar energy projects in the Federal Republic are to be concentrated: in a "Research Association for Solar Energy" founded at the end of last year. It includes three major research institutes financed primarily by the federal government—the German Research Institute for Aeronautics and Aerospace (Deutsche Forschungsanstalt fuer Luft) und Raumfahrt, DLR) in Cologne, the Juelich

Nuclear Research Facility (Kernforschungsanlage Juelich GmbH, KFA), and the Hahn Meitner Institute (Hahn)Meitner)Institut, HMI) in Berlin))as well as the Fraunhofer Institute for Solar Energy Systems (Fraunhofer Institut fuer Solare Energiesysteme, ISE) in Freiburg. The purpose of the association is to better coordinate these institutions' respective research projects in the field of solar energy and also to collaborate in the development of appropriate systems engineering projects.

Spokesman for the association is Professor Hans Stiller, scientific director of the Hahn Meitner Institute. The future will have to show to what extent this concentration of decentralized research resources proves fruitful. For the Federal Ministry of Research, the association is also an experiment in research organization since Bonn deliberately opposed the founding of a new major research institute for solar energy. Instead, an attempt is to be made to activate the potential of the major research institutions—sometimes quite cumbersome—for new areas of science by linking thematically related research groups. The time factor enters here. Stiller: "They see that solar research is simply too urgent" to wait for the founding of a new major institute. Thus the necessary resources of the Association's four institutes will be "made available through internal setting of priorities," as Research Minister Heinz Riesenhuber explains. His ministry will also support restructuring through limited project funds.

Research in the Field of Photovoltaics Is Being Carried Out at Juelich

At the Juelich research center, where about 50 workers are active in the field of solar energy, work is to be intensified especially on thin film techniques for the direct conversion of solar energy into electricity (photovoltaics) and on the development of more efficient fuel cells. For this purpose, about DM 38 million of funds from the Federal Ministry for Research and Technology (Bundesministerium fuer Forschung und Technologie, BMFT) will be made available to the KFA for 1990 to 1994. The Hahn Meitner Institute, whose solar division is being increased from 50 to 60 workers, is using additional funds in the amount of DM 19 million to strengthen "Materials Research and Development for Solar Energy Utilization." In Berlin, alternative photoactive materials such as pyrite (FeS_2) and copper indium sulfide (CuInS_2) are being investigated. In addition, technologies such as a "plasma deposition facility" for quality monitoring in the manufacture of solar cells are being developed at HMI. The focus of the DLR projects lies in the field of solar-thermal energy conversion, solar chemistry, and solar hydrogen technology. In addition, the Cologne research institute is also responsible for wind energy and questions of systems analysis.

Federal Republic Also Leads in Renewable Energy

In addition to working on silicon material development and cell technology, the Fraunhofer Institute in

Freiburg is also hastening efforts on thermal conversion methods (low temperature heat, passive utilization in buildings) and storage methods for hydrogen technology. The Freiburg researchers are also responsible for developing techniques for decentralized systems (electrical and thermal).

While Research Minister Riesenhuber notes with pride that the Federal Republic of Germany holds "a leading position worldwide in renewable energy research," deficiencies are much clearer to experts in the field. "Much too little money is going into solar energy," says Professor Helmut Tributsch, head of the solar energetics department at HMI in Berlin. "You have only to go into a laboratory for solar energy research and then into a laboratory for microchip development—then you can see the difference in technology."

And even in areas where public funds are already flowing, they may be going in the wrong direction. "In this way, for example, crystallized silicon, which is already very well developed, is receiving significant support," complains Tributsch. "What is neglected is the search for new systems." For example, new material combinations for solar cells, which, admittedly, could take decades to be ready for industrial applications.

According to Tributsch, who is also professor at the Freie Universitaet Berlin, the insufficient breadth of research also leads to another problem: "It so happens that, at present, young people have a hard time finding jobs in this area." Even if they were trained as specialists in solar energy engineering, after they leave the university, they find a job more quickly in fields other than their own promising specialty. Therefore, "what we would need," believes the solar researcher, "would be a broad spectrum of laboratories in which young scientists would have the chance to develop their ideas."

Berlin Chosen for Solar Energy Experiment

90WN0135C Duesseldorf VDI NACHRICHTEN
in German 11 May 90 p 35

[Berlin Wants To Become a Model City for Solar Energy

[Text] The red-green senate wants to make Berlin a "model city for solar energy" which produces 1 MW of electricity annually by photovoltaic methods using solar cells. A preliminary study conducted by the systems engineering firm of Ludwig Boelkow Systemtechnik GmbH, Ottobrunn, for the "Photovoltaic Megawatt Project Berlin" concludes that, theoretically, 15 to 30 percent of electric current now produced by the Berlin Electric Power Works Corporation (Berliner Elektrizitaetswerke Aktiengesellschaft, BEWAG) could be supplied by solar energy. In view of the northern and, from the perspective of solar energy, unfavorable position of Berlin, this finding was surprising, said Berlin's environmental senator Michael Schreyer (alternative list) at the presentation of the study.

According to the study's findings, 1000 kW of photovoltaic electricity requires an area of 10,000 square meters, which is to be provided by 80 to 100 individual grid-coupled facilities of various sizes. The second part of the study, now underway, will determine where the solar cell surfaces should be installed. As a rule, they will be on roofs and southern facades.

For reasons of consumption technology, plans call for installation of solar modules, each producing one third of the total capacity (300 to 330 kW), on three groups of buildings: business, industry, and public facilities. For private households, only 10 kW are planned initially. Photovoltaic systems with an output of 2 to 50 kW will be installed on business and public buildings, and industry will have systems of 7 to 120 kW. For each object, the solar modules are supposed to meet 10 to 30 percent of the power requirement.

Financial conditions appear favorable: According to the senate's conditions for future support of modernization and reconditioning, a subsidy of 75 percent will be paid for solar cell facilities. There is a 65 percent subsidy for solar thermal facilities to heat industrial water. Entry into the implementation phase of the project is due to begin in 1990 with the installation of a 20 kW solar plant on a commercial building in Charlottenburg's Helmholtzstrasse.

FRANCE

Industrialists Respond to Environmental Concerns

90WN0153A Paris L'USINE NOUVELLE in French
3 May 90 p 31

[Article by Loic Grasset and Pierre Laperrousaz: "Ecoproducts: Manufacturing Differently"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Ecoproducts are not just a marketing ploy. Behind the media coups lie enormous research and development efforts and a complete manufacturing makeover.

A big bowl of chlorophyll seems to have invaded the factory floors of French manufacturers. Marginal and even non-existent a year or two ago, "ecoproducts" (products which respect the environment) have shot to the top of the consumer hit parade. Lead-free gasoline, phosphate-free detergents, oxygen-whitened diapers, and batteries without mercury are indisputable commercial successes.

According to a Ministry of the Environment poll, half of all manufacturers believe ecology to be a burgeoning vehicle of communication. Distributors are jumping on the bandwagon: Monoprix has just launched, with much advertising fanfare, a line of "green" products in its outlets. The products are items it is marketing under its own name and which will be manufactured by several small and medium businesses, such as the Jolda and

Saint Jean-de-Luz firms (green batteries), or the Intimie Company (diapers) at La Ciotat.

Stung, the state is setting itself up as conciliation judge. It wants to police this craze for "clean" products, which specialists have already dubbed "ecolomarketing." Alain Brune, Jura deputy, has just submitted a report to the offices of Brice Lalande and Veronique Neiertz recommending the institution of a green standard. As the little sister of the NF (French Standards), it would be overseen by Afnor and would certify membership in the caste of ecoproducts.

So much for the decor. But behind this media hubbub, kept alive by much ballyhooed legal-advertising squabbles (Henkel/Rhone-Poulenc for phosphate detergents), huge research and development efforts and challenges to production systems are taking shape. Ecoproducts do not just mean marketing; they also often involve a proper overhaul of product manufacturing and development.

An example: Last year, the German chemicals maker Henkel invested nearly 90 million French francs to promote its phosphate-free detergent Le Chat Machine in France. If the curtly announced sum seems large, it looks like nothing next to the funds invested in research.

Two Years of Testing

For the studies conducted to development zeolith (the phosphate substitute) cost Henkel 350 million francs. "A long, drawn-out process," according to Michel Riviere, in charge of detergent research, "Besides devising the formula, it involves a battery of eco-toxicological tests, a veritable two-year marathon." Not to mention the fact that Henkel had to acquire a raw-material plant that supplies 80,000 metric tons a year....

The German group spends 850 million French francs each year on environmental and consumer protection. The chemicals manufacturer is in the process of conducting a "green audit": A team is touring European factories, going over products and manufacturing tools with a fine-tooth comb. In its latest initiative, Henkel, world leader in adhesives, is focusing its efforts on substitutes for toxic solvents.

Another commercial success is lead-free gas. Since last July the share of this type of fuel at Elf has jumped from seven to 17 percent. This success masks technical and industrial prowess. Besides the cost of research, estimated at 30 million French francs, the group has reorganized production. At the top of its production line, the firm has had to add a few steps in the refining process, install additional quality controls, and stand its logistical organization on its head. Oil companies exchange their fuels. The dawn of the "leadless" generation, products of house research, make this practice impossible.

Development of substitutes and redesign of the manufacturing process: These seem to be the manufacturing side of the "greening" of products. Producers and users of CFC, the purported ozone-killer gas, are learning this

the hard way. Aerosol packagers have been forced to shell out 600 million French francs to adapt their installations to new gas propellents.

Jean-Marc Courseaux, consulting engineer with Alizol (300 million in sales), a Normand company in that line, is in a good position to tell the tale: "Replacing CFC with butane or propane alters the manufacturing process; these inflammable gases require that cans be filled in a separate room." An operation that "stiffens" the bill by 50 percent....

Refrigerator makers must also pay the purety ransom, under orders as they are (European regulatory requirements) to eliminate the CFC involved in the manufacture of commercial refrigerator insulation foam. Electrolux has already spent 60 million French francs to adapt its factories to this new requirement; Selnor, a subsidiary of Thomson Electromenager (household appliances) is doing the best it can. Besides the extra cost, Selnor is running up against technical problems, such as a drop in the insulating properties of CFC-free refrigerators.

Influence Battles

Ecoproducts, a technical headache and a financial gamble, conceal a few hidden vices. Especially as manufacturers are no longer concentrating their thirst for cleanness on content alone: Wrapping and packaging are also caught up in green fever. Procter & Gamble has just launched in France a detergent-refill system that the company with Henkel has already marketed in Germany, the cradle and laboratory for ecological products. These products, which resemble the milk bricks well-known to housewives, are presumed to eliminate plastic, non-degradable packaging. So much for marketing and ecological clear conscience. As for manufacturing, a model for production must, of course, be adopted. Manufacturers surely still have a ways to go in repainting marketing and production plants green: The NF ecoproducts standard project has barely gotten underway and already Brussels is testifying on a European standard. The latter is the cause of a furious battle for influence among Germans, who have had their green label (Blue Angel) since 1983, and French, English, and Dutch, who are getting ready to launch their own standards.

Phosphate Ban To Affect Rhone-Poulenc

90WN0160 Paris *L'USINE NOUVELLE* in French
7 Jun 90 p 31

[Article by Pierre Laperrousaz: "Rhone-Poulenc Getting Ready for 'Post-Phosphates'"]

[Text] While Rhone-Poulenc is already entrenched in the fabrication of one substitute, zeolite, it is also working on other substances that will take their place in the laundry of the future. But its competitors have already built up a lead.

Rhone-Poulenc's battle for phosphates will ultimately have been in vain. Following the example of most of its neighbors, France has started along a path that in the relatively near future will lead to the elimination of tripolyphosphates (TPP) in laundry soaps.

The measures announced by Brice Lalonde after the report delivered by Pr Roland Carbiener are still quite timid, to be sure: within one year, French producers will have to reduce the TPP content of their laundry soaps by 20 percent, a concentration that had already dropped by 22 percent on the average. But for the Secretary of State for Environment, this is only a start: "In the nearest possible future, phosphates will have to be replaced," he says.

Despite these serious drawbacks, Rhone-Poulenc is undisturbed. "I want to state that the decisions reached by Brice Lalonde seem entirely satisfactory," points out Jean-Marc Bruel, director-general of the company, who at the same time is ready to participate in the new program undertaken by the ministries of the Environment and of Research on the effects of all laundry products (and of phosphate substitutes in particular) on aquatic environments. But this is only a respite; although phosphates are not yet banned, the movement appears to be irreversible. Phosphate-free products have already captured 20 percent of the laundry soap market in France (Rhone-Poulenc's TPP sales dropped by 20 percent in three years). And faced with the collapse of the Belgian market, it had to close its Rieme plant in March.

The stakes might seem minor for the leading French chemical manufacturer; laundry soap phosphates sales (1 billion francs) represent only 0.5 percent of its revenues and one-third of its total phosphate sales. But you don't readily drop a profitable activity, especially if you are forced to do it by a campaign which in your opinion is based on rather unscientific arguments. Not to mention that 900 jobs are thus threatened in the two French company plants that produce TPP: Rouen (150,000 tons per year) and Les Roches-de-Condrieu (25,000 tons). Should they be converted to the production of zeolites or other phosphate substitutes? The word reconversion has not yet been voiced. But when the research program started by the ministry will have been completed, "Rhone-Poulenc will do whatever is necessary if needed, to adapt its industrial equipment and product line to its conclusions," indicates Mr Bruel. The company is already strong in zeolite manufacturing technologies, having recently built a 20,000 ton per year plant in Italy, where TPP content is limited to 4 percent in laundry soaps.

"It's somewhat less complicated than the fabrication of tripolyphosphates," explains Rene Riu, director of detergent activities. Rhone-Poulenc is the leading European producer of sodium silicate, one of the raw materials in the production of zeolites (which are silico-aluminates), and "has a reserve of production capabilities." The industrial equipment remains to be converted; zeolites cannot be manufactured in the same installations as

phosphates, and no more than 10 percent of the present equipment is expected to be recovered.

Rhone-Poulenc's research laboratories are already working on other substances that will be used with future laundry products, because zeolites cannot replace TPP by themselves. Thanks to their microporous structure and their ion-exchange properties, they can capture calcium from laundry water and thus play the role of softeners. By the same token they do not prevent the redeposition of dirt on the laundry; other substances, such as polycarboxylates which are not very biodegradable, must therefore be used as additives. That is why Rhone-Poulenc is working on the development of other polymers which will not have this drawback. But given that the competition has already built up a lead, is this not coming up a little too late?

ITALY

Fiat Launches Environmental Projects

Waste Disposal

90MI0244 Milan *ITALIA OGGI* in Italian 18 May 90
p 30

[Article by Paolo Giovanelli: "It Will Be Quality Waste"]

[Text] A new project called "Phoenix System" for the disposal of industrial waste from Fiat's entire production cycle was presented yesterday at Marentino, a few kilometers from Turin. Currently, 80 percent of industrial waste from the Turin-based company is recycled, while the remaining 20 percent is disposed of in controlled dumps equipped with waterproof bottoms to prevent the dispersion of polluting materials.

With the Phoenix project, the recycled waste should rise to 90 percent and all waste will consist of inert materials that can be sent to normal public dumps without any problem. The development of the new system will involve 300 billion lire in investments and three years' work, once the competent authorities have approved the project. "Fiat produces eight percent of GNP but only one percent of all waste," stated Paolo Cantarella, director of Fiat Auto. He also stated that Italian industries produce only 43 percent of all waste against the 57 percent produced in the civilian sector.

The industrial waste from the Fiat group amounts to approximately 800,000 tonnes per year: four-fifths is composed of cardboard, scrap, waste, used oil, and solvents. These are used for new production after appropriate recycling. The last fifth is made up of various kinds of slush and mud. However, the Turin-based company has decided to expand its field of action; its suppliers will also be included in the Phoenix program, and they will be able to use Fiat systems to dispose of their waste.

"There is a basic philosophy behind the entire project," stated Cesare Annibaldi, Fiat's public relations director, "and it is not to pollute, not to waste, and to optimize resources." By doing so, nonpollution and recycling become a part of the production cycle. Fiat will invest 1.5 trillion lire in this field over the next three years.

"We started to face the problem 20 years ago and have made a great deal of progress. We have greatly decreased our water requirements by recycling, with reductions ranging from 50 percent in Pomigliano d'Arco, to 97 percent in our Florence plant. In the energy sector, our energy production rate has increased from 12 percent to 40 percent over 10 years, and we have started using methane gas as a fuel almost exclusively, while a minimum amount of coal is used in our foundries," stated Enrico Dorigo, in charge of Fiat Auto's energy and ecology division.

Phoenix will be developed using only those technologies that have been tested, and which are safe and quick to apply. Phoenix will be divided into three main areas: The establishment of peripheral centers (called ecological islands) for waste pretreatment; a logistics system for waste transport; and the construction of integrated platforms for the destruction, recovery, and disposal of materials that cannot be recycled. Approximately 100 ecological islands are planned that will be closely connected to production centers, and will depend on five platforms located where they can function as collectors. The Phoenix system should be able to handle 200,000 tonnes of waste per year. At the island level, this waste will be divided into disposable waste and secondary raw materials that can be recycled. One-third of all materials entering the ecological platforms will leave them as inert waste. According to Fiat experts, the effect on the environment is practically nil. The company foresees that the project will be carried out in a little less than three years.

Catalytic Converters

90MI0244 Milan *ITALIA OGGI* in Italian 14 May 90
p 8

[Text] A million lire more for every Fiat automobile: This is the average price increase predicted for cars with catalytic converters. The catalytic converter is already obligatory for the big cylinder models. It will be required for all models beginning in 1993, when the European antipollution regulations go into effect, setting severe limits within the EEC similar to those currently in effect in the United States.

The clean car is the new technological front on which European and Japanese automobile manufacturers are competing. In Italy, the stakes have not gone unnoticed.

Fiat has been selling the "Europa" series for a year. These are automobiles and commercial vehicles with the brand names Fiat, Lancia, and Alfa Romeo, which are capable of meeting the "American" limits defined in advance by the EEC. For cars with cylinders greater than

1.4 liters, engines are equipped with catalytic converters, a lambda probe, and electronic fuel injection. It is the most advanced technological solution for the time being. For smaller cylinder models, the "Ecobox" device has been adopted. This ensures compliance with the less rigorous limits established by the EEC for cars with cylinders under 1.4 liters. Using unleaded gasoline, it is already possible at present to reduce the noxious exhaust fumes of carbon monoxide (CO), hydrocarbons (HC), and nitrogen oxides (NOx) to minimum levels. However, notwithstanding the sensitivity of public opinion for the environment, the demand for "green" cars has not been enthusiastic. Nor is it expected that the demand for automobiles with catalytic converters will explode as long as the law does not make these devices obligatory.

It remains to be seen if the electric Panda, which is now coming on the market after an experimental phase, will have more success; sales will begin in June. In July 1989, Fiat signed a letter of intent to undertake a series of ecological commitments along with the Minister for the Environment. In addition to selling cars equipped with catalytic converters (the "Europa" series), Fiat committed itself to marketing the necessary parts to equip a number of automobiles already in circulation with catalytic converters. The medium-term commitments involve promoting the research and development of more advanced clean engine technologies, studying forms of alternative motor vehicles (urban buses in particular), and promoting solutions to lower industrial vehicle emissions.

The investment planned by Fiat is 1,200 billion lire over three years. Half of this sum, or 600 billion lire, is intended for the production of new automobile models capable of respecting even the strictest limits established by the EEC. h1

Ansaldo's Research, Development Projects Outlined

Research Centers, Projects

90MI0250 Rome *FINMECCANICA NOTIZIE*
in Italian 31 Mar 90 pp 18-19

[Text] By availing itself of the financial incentives under the program contract stipulated between IRI [Institute for the Reconstruction of Industry] and the Ministry for Special Intervention in the South, Ansaldo is investing more than 57 billion lire for the establishment of research centers and approximately 120 billion lire for research projects. The following is an outline of the principal initiatives planned:

"Combustion and the Environment" research center in Gioia del Colle (Bari), for the testing and qualification of high-performance innovative systems with an environmental impact, established at Termosud.

"Transport and Superconductivity" research center in Naples, designed and currently being completed at

Ansaldo Trasporti, will perform research and experiments on components, equipment, and systems for electrified public transport and for the development of superconductivity and its applications.

Research project on new combustion systems, to be developed at the Gioia del Colle center.

Research project on transport, to be developed at the Naples center, covering: Functional vehicle qualification, the application of artificial intelligence technologies, vehicles and systems for signaling and automation used in advanced urban transport systems, signaling and automation systems for lines with low traffic, and innovative materials and technologies for vehicles.

Superconductivity research project, to be developed at the Naples center, covering: Feasibility studies, materials and semifinished products, magnetic levitation, electromagnetic accumulation, filtration and separation, and magnets for spectroscopy.

In addition, other R&D activities to be set up in southern Italy are being identified within CRIS—Innovative Research Consortium for the South (composed of Ansaldo, Ansaldo ABB Componenti, Ansaldo Trasporti, Ansaldo Industria, Aerimpianti, and Termosud). These include combustion, railroad signaling, power activation, and combustible cells, to be developed in collaboration with the Sicilian Mineral Agency and with the participation of ENEA [Italian Committee for R&D of Nuclear and Alternative Energies], and the CNR [National Research Council].

All these initiatives will provide Ansaldo with infrastructures and skills that are unique in Italy and in the forefront in Europe, and that are also of great interest to Italian industry and the principal suppliers of services.

Environmental Project

90MI0250 Rome *FINMECCANICA NOTIZIE*
in Italian 31 Mar 90 pp 19-20

[Text] An agreement has been signed between Ansaldo and Agensud (Agency for the Promotion of the Development of Southern Italy) to develop the operational project for an integrated system to monitor air quality and environmental radioactivity in southern Italy.

The system has the following functions: To monitor the quality of the air and the evolution of acute polluting phenomena, both chemical and radioactive; set up a data base of the air's chemical, physical, and meteorological parameters and provide forecasts on the evolution of the phenomena; monitor the state of the environment, act as a support in planning protective measures and improvements; support protective measures for the health of the population, even in abnormal situations; and act as an interconnecting and integrating system for existing and projected local air monitoring networks, by organizing and integrating the currently available data.

The network will be based on three levels of data centralization: A provincial level, responsible for the collection, preprocessing, and transmission of data; a regional level, responsible for the management of outlying stations, data processing, and interface functions with local users as well as communications with the national center; a central level, in which the interregional operations center will form the basis of southern Italy's environmental observatory, with the function of obtaining preprocessed data from the regional centers, organizing it in a data base, processing it, and managing the user interface. The central level will therefore assume a technical support role in environmental planning and monitoring.

NETHERLANDS

Minister Presents New Environmental Program

90WN0186A Amsterdam *DE TELEGRAAF* in Dutch
13 Jun 90 p 9

[Text] The Hague—The National Environmental Policy Plan (NMP) Plus, which is to be presented tomorrow by Minister for Housing, Physical Planning and Environment Alders, contains a number of strengthened measures in regard to the matter of reducing carbon dioxide emissions, as well as taxes on substances that pollute the environment. The row between the Ministry of Housing, Physical Planning, and Environment and the Ministry of Economic Affairs over the issue of how rapidly CO₂ emissions can be reduced, has been resolved. The NMP Plus is now based on a stabilization of CO₂ emissions in 1994-95 at the level of 1989-90. That amounts to 182 million tons annually. Consequently, in the year 2000, a reduction of three to five percent must be achieved. The Ministry of the Environment had wanted to see it reduced somewhat more rapidly. According to the Ministry of Economic Affairs, it cannot be done that rapidly because of expected strong economic growth.

Measures

In order to bring CO₂ emissions to the desired level, a number of supplemental measures have been included. The most important of them are:

- There will be a program of supplemental insulation for existing housing which can save on heating;
- There will be a program for improving the efficiency of electrical appliances so that lower electricity consumption will be achieved;
- There will be a program to discourage the use of heavily polluting fuels, such as coal; and
- Public transportation will be improved and automobile use will continue to be discouraged.

These latter measures are to be financed by a tax on fossil fuels as well as on all petroleum-based products. The yield from this tax should be 150 million guilders in 1994.

Refuse

Goals have been ambitiously set in regard to the flood of refuse. The growth of the overall flood of refuse that we produce daily is now two percent per year. That means that this flood will grow by 20 million tons in the year 2000. The NMP Plus seeks to cut back this growth to 12 million tons. Bold intensification measures for land reclamation are also in the program, and some 350 million guilders have been set aside for the period up to 1994. Of the total land reclamation program, 720 million guilders are to be financed by making use of voluntary land reclamation, through the recovery of damages from the original polluter, and through taxes on the users of polluted land.

Acidification

In addition, there will be a number of so-called regulatory taxes on "mineral emissions" (acidification) in agriculture, an energy tax, and a tax on raw materials. Additionally, in the short term a study will be initiated into the possibility of taxes on nonrecyclable packaging and the like. h1

Chemical Firms Accused of Leaking Dioxin

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Jun 90 p 9

[Text] Arnhem—High dioxin concentrations are found in the waste water that four chemical companies are discharging into the Rhine. The large quantity of the highly toxic substances is evident from measurements by the Clean Water Foundation at nine chemical companies in the Netherlands, Germany, and France.

The foundation submitted the report on its findings to Minister for Transport and Public Works Maij-Weggen at a symposium on the ecological restoration of the Rhine yesterday in Arnhem. The minister spoke of an

alarming investigation and promised to study the conclusions in greater detail. According to Clean Water, the companies where there are inadmissible concentrations of dioxins are Shell Netherlands Chemical, Hoechst Griesheim, Solvay Rheinberg, and Cellulose de Strasbourg.

"We took samples of Rhine water up- and downstream from the discharge points. The river water appears to contain 10 times the [normal] amount of dioxins as a result of discharging by the companies named. Dioxins have been connected to cancer, growth disorders, and infertility, and do not belong in the Rhine. Humans come in contact with the poison in drinking water and by eating fish," says Ruud Teunissen of the Clean Water Foundation. Clean Water advocates including dioxins in the licensing system for waste water discharging. "The authorities must establish stricter requirements with regard to the discharging of harmful substances. We want to show with this sampling that the authorities cannot both permit companies to dump these substances into the Rhine and strive for a living Rhine," says Teunissen.

Shell and Solvay questioned the measurements made in 1988, and additional research took a full one-and-one-half years. Shell undertook further measurements itself and believes that the study by Clean Water has to be more subtly interpreted. The German company Solvay calls Clean Water's figures unreliable and says it does not believe that the foundation was capable of taking samples from a discharge pipe that is located deep down on the bottom of the Rhine.

Minister Maij-Weggen alleged yesterday in Arnhem that highly desirable policy measures are lacking due to the large number of organizations that are concerned with Rhine water quality on a daily basis. She feels that the cleanup program for the Rhine should be applied to the likewise seriously polluted Meuse and Scheldt Rivers.