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JPRS Report

Environmental Issues

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JPRS-TEN-90-015 *14 November 1990*

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Leaders To Ask Bush To Help End French Nuclear Tests

BK1810032490 Hong Kong AFP in English 0133 GMT 18 Oct 90

[Text] Wellington, Oct 18 (AFP)—Pacific leaders will ask U.S. President George Bush to pressure France to stop nuclear testing in the South Pacific, Kiribati's President Ieremia Tabai said here Thursday.

Mr. Bush is to meet with 13 Pacific leaders, including Mr. Tabai, in Hawaii on October 27.

"With the easing of tension between East and West, it will be a good opportunity to talk to the Americans about applying pressure on the French," he said.

Mr. Tabai said it was understandable that France wanted nuclear capabilities, but the rationale was now less valid given the end of the cold war.

France conducts five or six underground nuclear tests annually at its test site at Mururoa Atoll in French Polynesia. Pacific nations, through the South Pacific Forum, have repeatedly asked Paris to stop.

On the planned destruction of German-based chemical and nerve gas weapons on Johnston Island, 1,130 kilometres (700 miles) south of Hawaii, Mr. Tabai said he believed the president knew of the Pacific's opposition and had assured them the site would only be used for the German weapons.

"My preference is the chemicals should not be coming from Europe (but) we have to accept now there is no way we are going to change the mind of the Americans," he said.

"They are committed to the programme. The best position is to hold the Americans to their word, that this will be a one-off," Mr. Tabai said. "We don't want it to be a permanent site."

Soviet Comment on U.S. Johnston Atoll Chemical Weapons Destruction Plan

90SV0022A Moscow IZVESTIYA in Russian 1 Sep 90 Morning Edition p 5

[Article by V. Mikheyev (Sydney): "Heading for Johnston Atoll]

[Text] Dangerous cargo which belongs to the U.S. Army is being evacuated from the storage facilities near Klausen (FRG): about 100,000 units of ammunition stuffed with toxic substances. It is intended that in September transport ships will deliver this batch of NATO "weapons of deterrence" to the Pacific Ocean's Johnston Atoll, 1,100 kilometers southeast of the Hawaiian Islands. The work for constructing seven new crematorium bunkers for burning chemical agents (BOV) is in full swing there.

The sentence for a "silent death" was signed during the course of the summit meeting between the USSR and the United States in June of this year. The powers agreed to begin destroying their chemical war arsenals even before the conclusion of the general international convention in order to give a push to the process of disarmament in this strategically important section and provide an example to others. The United States intends to destroy from six to seven percent of its BOV's right here on the Johnston Atoll.

Why precisely here? In keeping with the program for destroying chemical weapons, eight complexes are being constructed in the continental part of the United States and they are quite capable of handling this task, the more so since the solid wastes remaining after the burning will be sent there from the atoll—for burial. The official explanations amount to the following: Congressmen in Washington have arrived at the opinion that it is too risky to ship this deadly cargo to the United States. Yet according to the 1986 agreement with Bonn, the United States must relieve its ally of this heavy load. A quite important proviso is added to this: on Johnston Atoll there are already "production capacities" for deactivation or, rather, destruction of the chemical ammunition.

The prospect of delivering a large batch of weapons of mass destruction to the atoll from Europe could not but evoke energetic and vigorous opposition from the countries of the region.

First. Even if Washington admits that shipping chemical ammunition across the Atlantic is not without danger, what can it say about the southern part of the Pacific Ocean where the hurricane season lasts from July through October? True, the Army command asserts that even if the ship sinks the design of the charges will enable them to withstand the pressure of the sea water to a depth of 2,500 meters, and if they become unsealed, the leaking will be in small portions, which will not lead to significant pollution of the environment.

The next "risk zone" is the unloading. The ammunition will be on the dock for a long time, up to 120 days, until it is placed in the storage bunkers that are now being constructed. Military specialists see a real threat in this stage. As a result of fire, detonation, or other things the toxic substances could be released (some in liquid, others in gaseous form) into the water or air. If one accounts for the prevailing winds, their force, and their direction, the deadly fumes could be carried over a distance of from 23 to 123 kilometers, destroying every living thing in their path.

Second, how reliable is the technology? The eternal question. And it is not an idle one in this concrete situation since beginning on 30 June, when the first trial charges were started in the furnace, this complex has already been shut down twice. After they got rid of 15 missiles stuffed with nerve gas there were signs of its leaking into the atmosphere. The shutdowns lasted from 4 through 14 July and then from 21 July through 2

August. In principle, in order to check the reliability of a system it is necessary to perform these tests, and the very fact of the rapid reaction of both the corresponding monitoring equipment and the service personnel must be regarded as a merit rather than a shortcoming. But the small failures only reinforce the probability of a larger emergency. What then?

Third, although the State Department assured all interested parties that the program for eliminating chemical ammunition was strictly limited in volume (only the arsenals that are now on the atoll plus the cargo from the Klausen region) as well as in terms of time periods (only up until 1994), skeptics—and there are many of them in the region—do not rule out a "long future" for the crematorium located right next to them. They ask how they can make sure that the United States, not wanting to throw money to the wind, will not preserve a complex that is so convenient for them, on whose expansion they have already spent $310 million.

Fourth, after the August recess the U.S. Congress will begin discussing legislative changes proposed by the member of the House of Representatives from the State of Maryland, Roy Dyson, who is proposing that they revoke the decision to destroy the chemical weapons stored at the present time in Aberdeen. The proposal goes further: The Aberdeen arsenal should be shipped to another place, an "alternative," but the main thing is to get it out of the territory of Maryland. According to calculations of the team of experts with whom the congressman consulted, in the event of a mishap during the burning of the ammunition up to 50,000 Americans could suffer.

The opponents of transforming the southern Pacific Ocean into a chemical weapon arsenal have influential allies—the international ecology organization Greenpeace, the Institute for Studying Problems of the Hawaiian Islands, and the World Council of Indigenous Peoples of the Hawaiian Islands, who have filed a joint suit calling the U.S. Defense Department and the U.S. Army to account.

Greenpeace, which is actively looking out for the Asian-Pacific Ocean region, as one of the least spoiled by the "costs of civilization," is seriously criticizing the method of eliminating chemical ammunition selected by the Americans. The Greenpeace expert in these problems, Doctor Paul Johnston, who shares the same name with the atoll, considers the following methods to be more ecologically reliable: chemical neutralization, an electrochemical operation, and photo- or simply biodegradation. Their main advantage over burning, the expert asserts, is the possibility of containing these processes within an enclosed space, avoiding even small discharges into the atmosphere.

As we can see, the problem is not simple, but it can be solved. One can agree only that the furnace pipes on Johnston Atoll should not poison the lives of the residents of this "sparsely populated region."

South Pacific Ministers Meet on Driftnetting, Global Warming

BK2910101890 Hong Kong AFP in English 0957 GMT 29 Oct 90

[Text] Noumea, Oct 29 (AFP)—The South Pacific Commission (SPC) opened a ministerial conference here Monday with talks on driftnet fishing and the effects of global warming on sea levels.

The conference hailed the agreement of Japan, Taiwan and South Korea to abandon driftnet fishing by July in line with a December 1989 UN General Assembly resolution.

Fiji chief representative Berenado Vunibobo said the rise in sea levels threatening South Pacific island nations was a direct result of the "lifestyle" of Western industrialized nations. He warned that if a solution to global warming, which is melting the icecaps and raising the planet's sea levels, were not found soon, "island nations won't be here to discuss it anymore."

French representative Philippe Baude, permanent secretary for the South Pacific, said that Paris planned to host a seminar next year or early the following year on global warming.

Delegation heads from the 27 governments and territorial administrations at the conference also gave brief opening speeches before settling down to work on next year's budget and programs.

The conference, due to end Wednesday, was also expected to focus on halting the spread of Acquired Immune Deficiency Syndrome (AIDS) in the South Pacific, SPC officials said. The issue was to be discussed Tuesday.

Driftnet fishing and global warming are regarded as two of the most important issues for Oceania countries.

The delegates were also slated to make a decision on rebuilding the CPS headquarters in this capital of New Caledonia, informed sources said.

East-West Environmental Conference Opens in Vienna

AU2410105390 Vienna WIENER ZEITUNG in German 24 Oct 90 p 2

[Unattributed report: "First Pan-European East-West Environmental Conference Opens in Vienna; Vranitzky: Remission of Third World Debts"]

[Text] On Tuesday [23 October] the opening speeches of the first pan-European environmental protection conference, which will be held in the parliament building in Vienna until Thursday [25 October], focused on emphasizing global attempts at solutions and the "right to an intact environment."

The meeting in which parliamentarians from Western, Central, and Eastern Europe are participating, is organized by the Parliamentary Assembly of the Council of Europe.

The environment must be regarded as an "essential part of human rights," said Anders Bjorck, president of the Parliamentary Assembly. A necessary prerequisite for the improvement of the—especially critical—environmental situation in Eastern Europe is a "rapid democratization process" in countries that used to have a planned economy. "Even one year ago," Bjorck said, "it would have been impossible to hold this conference." Bjorck said that environmental problems will "certainly become an important element of the second CSCE basket."

The future membership of East European countries in the Council of Europe—Hungary will presumably become a full member on 6 November—will facilitate the work of this institution in this field.

In her speech, [Austrian] Environment Minister Marilies Flemming stressed Austria's efforts for cooperation in environmental protection with its neighboring countries in the East. She referred in particular to the talks on the outdated nuclear power plants in the CSFR, which Austria regards as a threat. In this context, Flemming stated that Vienna is prepared to support Prague in the development of an ecologically beneficial energy policy and she reaffirmed her objective of a "nuclear-free Central Europe."

The main points in Flemming's environmental policy concept are the mastering of waste problems, the struggle against air pollution, the reduction of chlorofluorocarbons, and nature protection. According to Flemming, there are already projects for the harmonization of waste economy data within the framework of the Pentagonal Organization. Moreover, the minister advocated a 30-percent reduction in nitrogen oxide emissions and the reduction of carbon dioxide emissions by at least 20 percent by 2005. In connection with the transit problems, Flemming stressed the necessity of a pan-European traffic concept.

Chancellor Franz Vranizky announced an "International Environment Charter," with the development of which he had entrusted scientists from several disciplines last year. According to Vranitzky, the discussion on the destruction of the tropical rain forests was the impetus for this project. In the industrial countries, which spent "a large part of the ecological capital," there are "patronizing" tendencies to dictate an environmental policy to the Third World, he said.

Vranitzky advocated the creation of an international environment fund and partnerships between industrial and developing countries. This proposal is to be presented at the UN environmental conference planned for 1992 in Rio de Janeiro, he said. Moreover, the chancellor announced that Austria's contribution to environmental protection in the Third World will be its "trailblazing role" in reducing the debts of these countries.

EUREKA Projects Open to CEMA Participation

90MI0384A Bonn BMFT JOURNAL in German Aug 90 p 3

[Text] The 8th EUREKA [European Research Coordination Agency] Ministers' Conference in Rome has decided on a wider opening towards the CEMA states in central and east Europe. As a result, research institutes and commercial companies in the GDR too will enjoy new opportunities for cooperation with West European partners. With this new opening a further significant contribution can be made toward the gradual integration and economic growth of the whole European continent. Many scientists from the GDR and central and east Europe has already been present at the EUROTRAC [European Experiment on Transport and Transformation of Environmentally Relevant Trace Constituents in the Troposphere Over Europe] symposium held in Garmisch-Partenkirchen in early April. Another two EUREKA forums with participants from the GDR and countries in central and east Europe will be held under German chairmanship: the EUREKA forum on Treatment of Industrial Waste in Bonn in October 1990, and the EUREKA forum on Laser Safety in Hannover in October 1990. The Rome ministers' conference again announced nearly 100 new joint projects. This increases the total number of EUREKA projects to 369; the funding level increases from 13 billion Deutsche marks [DM] to roughly DM15 billion.

Among the 40 new projects with German participation, the environment sector shows a particularly high growth rate; with a current total of 30 projects, it now ranks above the areas of information and communications technology (28), manufacturing engineering (24), and materials research (24). The total number of projects with German participation increases to 142 with a funding level of more than DM6 billion. The German contribution to this total amounts to more than DM2.2 billion, of which approximately DM800 million in subsidy funds have been allocated to date from BMFT [FRG Ministry of Research and Technology] programs.

Commission Report Finds Baltic Pollution Worsening

90WN0281B Helsinki HELSINGIN SANOMAT in Finnish 30 Aug 90 p 2

[Article by Jaakko Hautamaki: "Scientists Think Condition of Baltic Is Still Poor; According to Baltic Commission Report, Third of Seafloor Is Without Oxygen and Dead"]

[Text] Visby (HS)—"People must not be scared to death, but the condition of the Baltic is still poor," a scientist in the laboratory onboard the marine research ship said.

The Baltic Commission published its report on the condition of the sea a few days before the Baltic Ecology Conference. The scientists' message to the decision-makers was simple: A third of the floor of the Baltic is without oxygen and dead.

Between 1984 and 1988, 70 scientists from the Baltic countries participated in the drafting of the report.

This week the scientists went through the waters surrounding the island of Gotland in Sweden on seven ships.

They are a surprisingly coolheaded group. They tell politicians about reports of people's indifference, but they do not regard the situation as hopeless. They say that the only way to clean up the Baltic is to reduce discharges.

If they wanted to, the scientists could formulate the results of their studies in a way that would be easier for people to read. Models translated into displays made of wire would be comprehensible to both politicians and ordinary citizens.

Over a million tons of organic compounds are dumped yearly into the Baltic. The host country for the conference dumps 0.3 million tons of them into the sea. One hundred thousand tons of phosphorus flow into the Baltic, and enough nitrogen to fertilize Sweden's fields for two years. The mercury discharged into it would fill 2.5 million thermometers. We could go on playing this game with cadmium, arsenic, and lead.

Gap Between East and West

The scientists have made their report. They ended their celebration in the port of Visby. There was a reception every evening in the week. Subordinate to the Communications Ministry, the Marine Research Institute of Finland had received a limited amount of money from the government for Finnish beer, Scotch whisky, and Finnish meatballs. The hosts proudly displayed their state-of-the-art gadgets. Scientists who had arrived from Eastern Europe looked them over admiringly.

A line can be drawn between the West and the East and between the level of research and the volume of discharges. On one side of the line the equipment is better and the volume of discharges lower. No one says this outright.

In the middle of the celebration the scientists opened up to us. A scientist can make mistakes, too. We even saw a broadly grinning cod appear in the middle of a videotape showing the dead seafloor.

Baltic Conference in Ronneby

Whereas the average depth of the Baltic is 60 meters, the average depth of the Mediterranean, for example, is 1,400 meters. Politicians from the nations that use the lakelike Baltic as a garbage can will ponder the condition of the Baltic on Sunday and Monday at the prime minister and environment minister level in the small town of Ronneby on the west coast of Sweden. No one expects a breakthrough at the conference that would lead to swift actions to benefit the Baltic.

Of the Baltic countries, Estonia and Latvia will participate in the conference to be held on the initiative of Sweden and Poland. According to the Swedish Foreign Ministry, Estonia and Latvia can appear at the conference site under their own flags. The Baltic countries could be invited when the prime ministers of Sweden and Poland extended those countries personal invitations.

'Politicians Are Inactive'

Finnish Marine Research Institute researcher Ann-Brit Andersin was raising a clump of subsoil from the side of the island of Gotland with a winch. She has no illusions about politicians' capabilities. "The politicians won't save the Baltic," she said. Andersin said that every politician thinks of his voters: It is not enough for all of them to be jointly concerned while no one does anything about it.

Nature is also needed to save the Baltic, in addition to politicians and citizens. Since the 1970's, currents containing salt entering the Baltic from the North Sea have diminished. Salt water could at one stroke transform the dead seafloor into a live one, but the oxygen-depleted water that has to be removed poses new problems.

In any event, an abundant flow of salt water would make those parties responsible for the government great friends of the environment for some time to come.

Powerful Toxins Under Control

The participants in the Ronneby conference can rejoice over the drop in DDT [dichlorodiphenyltrichloroethane (insecticide)] and PCB [polychlorinated biphenyl] content to low and stable levels. These toxins are under control, but we have had to fight them since as far back as the 1970's.

The volume of chlorinated organic compounds like cadmium, zinc, and copper has been steadily increasing. In some areas the volume of hydrogen sulfide is higher than ever before.

Among the reasons for rejoicing may be counted a drop in lead content, which can at least in part be explained as being due to the adoption of unleaded gasoline. The volume of chlorinated hydrocarbons, used in pesticides, is declining. Scientists have discovered new organic substances classifiable as toxic, in addition to the older ones. In addition to the toxic substances, the Baltic is increasingly more often being plagued by recurrent algae florescence.

The report prepared by 70 scientists last Wednesday made for sad reading for the conference participants in Ronneby.

At the port of Visby, scientists exchanged data and attempted to combine their measuring methods to create a standard by which to compare them. The Finnish Marine Research Institute ship Aranda is one of the most up-to-date of its kind. The neglected splotches of rust on the fairly new ship make it look old.

The ship's course is determined by the particular research project. Last Wednesday the Aranda measured plant and animal plankton and underwater solar radiation volumes and conducted tests of water salinity, temperature, and oxygen content.

The Aranda sailed along the coast of Gotland. Life aboard the vessel seemed to be unhurried. The ship's captain could not be more specific about the duration of the trip than within a few hours' time. The ship arrived in Visby harbor with plenty of time to spare because it was known that there was going to be a Danish reception.

Conference of Nordic Prime Ministers

The prime ministers of the Nordic countries are holding their own conference in conjunction with the Baltic conference in Ronneby.

One of the key topics of the prime ministers' conference is expected to be what kind of cooperation the Nordic countries can offer the Soviet Union to reduce sulfur discharges on the Kola Peninsula.

Finland and the Soviet Union are already quarreling about how the polluting nickel smelteries can be cleaned up. The smeltery pollutants that are destroying Lapland, in addition to Finland, most directly affect Norway, but Denmark is scarcely likely to care enough about the matter to be prepared to pay even part of the bill, which will be a costly one.

Norwegians Irritated by Soviet Kola Peninsula Pollution

90WN0307A Stockholm DAGENS NYHETER in Swedish 2 Sep 90 p 7

[Article by DAGENS NYHETER correspondent Bjorn Lindahl: "Ecological Wasteland on Norway's Border"]

[Text] Nikel—Anya Rochenko is 25 years old and works for the undertaker in the Soviet industrial town of Nikel on the Kola Peninsula. She makes flower wreathes out of wax paper.

"No flowers grow in Nikel, that is why people buy paper flowers," she says, looking at me with her sad, dark eyes.

She has lived in Nikel for five years and comes originally from Kaliningrad on the Baltic Sea.

"There were many flowers there. I don't know which I miss most. Perhaps the yellow ones we braided into garlands and wore in our hair."

Anya and I are walking around in Nikel late in the evening. The streets are broad but there is almost no automobile traffic. The town of 20,000 inhabitants consists mainly of rows of five-story houses. Some of them were built by Canadians back in the 1930's when they helped Finland build up a smelting plant for the nickel deposits that had been found here. For this is old Finnish territory, part of the corridor Finland had to the port of Petsamo on the Barents Sea before the war.

Neglected Appearance

The houses are dilapidated and the whole town has a neglected appearance. Some kind of grass grows meter-high alongside the main street. The sun is still sliding slowly along the horizon, reflected in Kuetsyarv Lake. Beyond that we can glimpse the dammed Pasvik River and Norway. The border is just a mile away.

I try to understand what it is like to live in one of the world's most polluted towns. If one scrambles up along the ridge that lies behind the town one is confronted by a dead landscape. The tree stumps stand in an ecological wasteland where all life has disappeared, poisoned by the smoke from the three high factory smokestacks at the Nikel plant. The scene continues in the prevailing wind directions, toward Zapolyarnyy farther to the east. One can travel through a dead landscape for half an hour or more by car.

Frightening

I myself saw the landscape for the first time on a winter night in 1984 on my way to Murmansk by train. It looked even more frightening by moonlight. Since then I have felt that I ought to return some day and write about it.

A few days ago I got the opportunity. A Norwegian environmental group in Kirkenes had received permission to come over at the invitation of an official regional environmental organization. A number of journalists were able to accompany them. Anya Rochenko is one of the interpreters who met us. She speaks good English and would like to go on interpreting. This is her first assignment.

"I came here because my husband got a good job in town. He is a policeman and works as a detective."

That is how it is in Nikel. It is a place where people come for a few years, from central Russia, Kirghizia, Armenia, or some other part of the far-flung Soviet Union.

Savings

People hold out 10-15 years and then move back, hopefully with some money they have saved up, for wages this far north are at least twice as high as they are in other areas. No one knows what heavy metals and poisons have been stored in the body during this time.

Isn't she worried about the poisoned environment? Yes, but the most common cause of death, at any rate among men, is alcoholism, she has seen that herself at the undertaker's.

Perverse Attraction

Anya thinks we are too preoccupied with just seeing the negative side of Nikel.

It is true. The moonscape and the factory have an almost perverse attraction. It is as if the border between life and death runs through the town. Toward the west the landscape is still green, toward the east the wasteland begins. The older people of the town still remember that the hillsides used to be covered with trees.

The environmental pollution has accelerated since the 1970's. That is when the Nikel plant started using ore from Norilsk in Siberia to meet production quotas. It has a sulfur content of 20-30 percent compared with three to five percent in the local ore. Today the factory emits 190,000 tons of sulfur dioxide a year, twice Norway's total emission.

"It is as if you do not care about those of us who live here," Anya complains and wants to show us the positive side of Nikel too. She has been told to do this by the authorities in Nikel and the responsibility rests heavily on her shoulders. The task is quite impossible. Most people would not want to move to this town for anything in the world.

Tug of War

Ever since the Norwegian environmentalists arrived in town there has been a tug of war over the program.

The environmental group, which calls itself "Stop the Deadly Cloud From the Soviet Union," asks to be allowed to visit the factory and discuss how to clean up the emission. The official program is full of visits to the library, the museum, a beautiful waterfall several kilometers from town, even a small zoo. In addition three-course meals must be consumed at close intervals.

The environmental group is led by the rather anarchistic Kare Tannvik. He is already notorious among the factory managers for pouring dirty water into the brandy glasses when a delegation from the factory visited Kirkenes and was wined and dined at a restaurant by the city.

Nightmare

The factory management does not put in an appearance but neither does it prevent the environmental group and the journalists from going into the smelting shed and other parts of the factory on their own and taking samples of the water and soil.

The doctors in the Nikel hospital are used to being asked how dangerous it is to live there, especially by anxious parents.

"There is no sharp increase in the number of illnesses here compared with the rest of the Soviet Union. But the distribution of illness is different. There are more allergies, especially among children under the age of one," says one of the women doctors with the surprising name of Lydia Andersson.

She originally came from Latvia and had a Swedish grandmother.

"We do not really have any statistics concerning the long-term effects of the emissions on human beings. We are not getting any funds for conducting a proper investigation either."

Special Issue

In contrast to other places in the Soviet Union, no independent environmental movement has yet been formed. The protests that have been made have consisted of the official environmental organization printing a special issue on the factory which was distributed in the local newspaper. The issue included a printed protest card to be sent to Premier Ryzhkov. Some 3,000 people have sent in cards.

The last meeting between the Norwegian and Soviet environmental organizations was also attended by the nucleus of what could become an independent environmental group, a half dozen men with various independent occupations.

I have never considered Kirkenes a particularly beautiful city. But after we crossed the border and I woke up at the hotel the next day, the view from the room was a delightful shock. Every house had its own trees, flower beds made a dazzling display, the sky was clear and the sea outside Varanger Fjord had a fresh appearance.

The difference is just four miles.

Air Pollution From USSR's Kola Peninsula Frustrates Nordic Governments

90WN0281A Helsinki HELSINGIN SANOMAT in Finnish 26 Aug 90 pp C1-2

[Article by Matti Klemola: "Kola's Political Discharges"—first paragraph is HELSINGIN SANOMAT introduction]

[Text] Neither the money nor the political zeal to clean up the nickel smelters that are polluting Finland is to be found in Moscow. Finland has to more firmly apply pressure to its neighbor.

The sulfur discharges from the smelters on the Kola Peninsula are giving rise to a mercilessly harsh dispute between Finland and the Soviet Union.

In addition to the fact that it will be very expensive to modernize the smelters, Soviet decisionmakers are expected to constantly press for a reduction of the discharges, the so-called Vanyukov method. The Finns, on the other hand, are offering the technology that has

been tested at Outokumpu so that the destruction that extends into Finnish and Norwegian Lapland may be stopped.

The Finns are worried about the situation because they have known for months that the Vanyukov method does not exist. It is just an idea, a false front, which the Soviets hope will blind the Finns to the truth.

The Soviet Union's determination to resolve the Kola problem will be sounded out when the chairmen of the Finnish-Soviet Economic Commission meet this fall.

A committee of experts representing the Kola Peninsula smelters and Outokumpu will submit a grim report to politicians at the end of September: If the polluting production processes employed at Nikel' near Petsamo, which is right on the border, and at Monchegorsk, which is just under 200 km from the border, are repeated, the bill will amount to about 3 billion markkas.

"Only this June we could talk of one and a half billion, but now that Monchegorsk is also included in the technical plan, it means a doubling of our financial needs," the chairman of the technical committee that is drafting the plan for modernizing the smelters, Outokumpu general manager Pertti Voutilainen, said.

This is not a matter of pocket money inasmuch as the Soviet Union's total annual bill for imports comes to about 12 billion markkas.

There is no information on who is to pay for this because, so far, it has not been determined where the decisions are to be made: Does the Soviet Government have the power to decide, or does the Russian Federated Republic—to which the Kola area belongs—headed by Boris Yeltsin, have the power?

It is highly unlikely that the chairmen of the Economic Commission, Prime Minister Harri Holkeri and Soviet Deputy Chairman Stepan Sitaryan, will be able to decide on the modernization of the smelters by this fall. Petrozavodsk notwithstanding, the Soviet decision-making machinery is still as fast-moving as a snail bogged down in tar.

Besides, the danger to the environment posed by Kola industry is far from being the biggest Soviet environmental problem, although the sulfur discharges produced at Nikel' near Petsamo and Monchegorsk do amount to 470,000 tons a year. All of Finland is capable of spewing into the air something over only 200,000 tons a year.

However, Holkeri and Sitaryan ought to have information and their own views on the subject. They visited Kola together in May and saw a landscape reminiscent of hell.

There are much greater environmental problems in the Soviet Union: "And they are as enormous as one, as a rule, would care to imagine," an official said.

He noted, however, that the industrial discharges on Kola fall into a special category inasmuch as they also drift over the territories of other nations.

While the reduction of discharges seems, at least so far, to be a fifth-rate issue for the Soviets, for Finland it is very important both ecologically and politically.

Finland's quarrelsome, rancorous, and cautious scientific community is finally beginning to be of one mind on the fact that the damage to the forests of Eastern Lapland is at least in part attributable to Kola's industrial discharges. Delay in dealing with it is increasing the damage literally day by day, Assistant Professor Satu Huttunen of the Oulu University Botany Institute assured us.

Politically speaking, the Conservative Party and the Social Democrats especially need to be concerned over the natural environment of Eastern Lapland right now because the parliamentary elections are to be held in the spring of 1991.

Finland's Center Party, the Greens, and the Left Alliance, which are in the opposition, will surely use the destruction of the environment as a heavy election weapon.

Partner in Discussion Has No Money

Outokumpu general manager Voutilainen said that the committee he heads is at present putting in long days so that it can finish the technical study by the second half of September.

"These problems can't be taken care of by putting a filter into a smokestack. Now, it's a matter of rebuilding the whole production process. They're using 1940's technology in the Kola Peninsula smelters. These problems won't be solved with that."

Pertti Voutilainen said that the local Soviet experts fully realize that they need Outokumpu to help them now, and quickly.

But the farther from the Kola Peninsula toward Moscow one goes, the more frequently the Soviets offer their Vaynukov method to limit the discharges.

Outokumpu could modernize the Kola nickel smelters in about four years. After that, sulfur discharges would be reduced by from 90 to 95 percent. Still talking about the Vanyukov method, the Soviets say that they need seven to 10 years' time. From 80 to 85 percent of the discharges would be recovered.

Pertti Voutilainen said he feared that the official Soviet stand would not change yet, even though the Finnish-Soviet committee feels that the Outokumpu solution is the best one.

In August, highly regarded Norwegian peace scholar Johan Galtung proposed that the Nordic countries make a gift to the Soviet Union of the technology needed to reduce sulfur discharges.

Both Finnish politicians and officials are horrified at the thought.

"If we take that course of action, afterwards we may modernize all of their production plants free of charge," an official predicted.

General manager Voutilainen is of the same opinion. He said that even the technical discussions are difficult in view of the fact that Kola industry has no money.

"Because our partner at the negotiating table has no money, we'll certainly need to go to the political decisionmaking level soon to find the money.

"It's obvious that Outokumpu won't be making any gifts. We now play two roles. Up to now, Outokumpu has served as a consultant to the Finnish Government in the planning phase, but, of course, doing business is foremost in our minds. When you think about this affair as a businessman, of course, every item of merchandise has to be properly priced—I'm saying this even though I do understand Galtung's basic assumption.

"How prices relate to goods will be distorted if we start to make gifts of this magnitude. Although it's now a question of avoiding a catastrophe, just the same it's also a question of business and getting the Soviet Union's economic affairs onto a sound basis. That's why goods and equipment should be properly priced.

"Of course, it'll be a different matter if, for one reason or another, the Soviet Union is officially declared to be a developing country. However, the Soviet Union at least used to be regarded as an industrialized or to some extent industrialized country. Because of this, it's not easy to find any international mechanism that would even permit donations to go too far—unless the partner in the affair asserts that it is completely incapable of taking care of itself. In that event, the question of appointing a guardian would arise," Pertti Voutilainen said.

Kola Pollution Will Set a Precedent

Although Finnish scientists have been warning us about the damage to the forests of Lapland for years now and have suspected that the smelters on the Kola Peninsula constitute one of the important causes of it, as is usual in this country, the Republic's politicians have been cautious and hesitant about it.

Only last fall an Environment Ministry official issued a memo to Finnish scientists participating in the international environmental conference held in Rovaniemi in which they were advised to keep their mouths shut when talk of the Kola Peninsula discharges came up.

However, Environment Minister Kay Barlund (Social Democrat) immediately said that he had had nothing to do with the document. He assured those present that the Kola discharges are not a sensitive issue for Finland.

Shortly after the Rovaniemi conference, the Finns did begin to pressure the Soviet Union for a solution. Kola will set a precedent that will have far-reaching consequences whether it is successful or not.

According to one Foreign Affairs Ministry official, Finland is now playing a rough historical game because Finland has not pressured the Soviet Union on any issue as doggedly as it has on this one since the war. Adding to the drama of the situation is the fact that what is at issue is an area bulging with military bases and, in addition, nickel, which is a strategically important metal. Only a decade ago Finland would not even have contemplated hinting that it wanted to find fault with the peninsula's industry. The alarming situation on Kola was spoken of only in whispers.

Environment Ministry office chief Lauri Tarasti complained that the "wrong basic assumption" has constantly been made in public discussion of the matter.

"People imagine that this is a matter to be decided on by Finland. In reality, the power to decide on it lies entirely with the Soviet Union. This is also why the speed with which it is handled depends entirely on the Soviets. We're ready to discuss the matter constantly and continually, but everything nonetheless depends on how fast the Soviets decide," Tarasti said.

The Soviet Union cannot, however, ignore the agreement concluded just under a year ago in which it pledges to reduce sulfur discharges produced by its industry in areas close to the border by half of the 1980 level by 1995.

This does not even begin to satisfy our scientists. Like Assistant Professor Satu Huttunen, Professor Jari Parviainen, the research director of the Forest Research Institute, said that resolution of the matter is now extremely urgent and that Kola is not the only problem.

According to Parviainen, Finland should invest in an extensive measuring network so that the effect of Kostamus discharges on the ecology of southeastern Finland, for example, could be reliably demonstrated.

"The entire eastern border is involved. Whereas right now there's a lot of talk about the forests of Eastern Lapland, in the future the damage may be much greater and more serious in the south," he warned.

Joint Nordic Funding?

Nothing concrete has yet been done to clean up the nickel smelters on the Kola Peninsula, even though the matter has been hotly debated for a year now.

Assistant department head Leif Fagernas of the Foreign Affairs Ministry's Trade Policy Department, to be sure, said that Finland is prepared to view the funds needed to clean up Kola industry as domestic investments in protection of the environment.

But this is all that has been done. Timo Repo, the first secretary of the Finnish-Soviet Economic Commission, said that everything is only in the preliminary phase.

"We don't yet know anything about the technology to be applied, and we can't talk of funding because we don't know how much will have to be built and how," he said.

We will have to try to settle funding for the Kola pollution problem is such a way that at least Finland and Norway, which are directly affected by the problem, pay part of the bill.

A meeting of the Nordic prime ministers is to be organized in early September, and at it—perhaps—the general principles of joint Nordic funding will be agreed on.

However, those who have been closely following the many catastrophic attempts at Nordic cooperation say that brotherhood will be a long way off when, for example, we try to ask NATO and Denmark, which is firmly attached to Continental Europe, for money to meet the needs of the Kola nickel smelters.

UN Five-Year Soil Conservation Plan Outlined

91WN0009A Paris JEUNE AFRIQUE ECONOMIE in French Sep 90 pp 64-65

[Article by Assou Massou: "In Search of the Lost Ecosystem; the FAO [Food and Agriculture Organization] Has Given Itself Five Years To Carry Out a Vast Soil Conservation Program"]

[Text] In Africa, more than one-third of the productive land is threatened by desertification. This was the sad conclusion reached recently by the Food and Agriculture Organization (FAO) of the United Nations at its 16th biennial conference on Africa held in Marrakech (Morocco). The FAO stressed that in the past 50 years, 650,000 square km of formerly productive land situated at the southern tip of the Sahara have been turned into desert. Furthermore, each year 50,000 to 70,000 square km of worn-out land are taken out of production.

The causes of desertification are well known. If drought brought about by inadequate rains sets off the process, it is not the basic cause of the disaster. In fact new rains would not be sufficient to solve Africa's problems. That is to say that the origins of the problem are entirely different. In fact the effects of drought on land and agricultural production are the end result of long-term trends. In Africa, where farming still predominates, the traditional methods of working the land have lost their efficacy due to demographic growth. Migratory farmers and herders once used to clear forest areas and farm the land for two or three years. When the fertilizing elements present in the soil gave out, the people moved to till a new parcel of land, leaving the first to regenerate itself with natural vegetation. Nomads most often moved from one grazing area to another with their small herds. Given the low population densities using the soil, these nomads and their herds were able to leave for new areas before the grazing areas' reserves were exhausted and the soils had been stripped.

With the demographic rise and the expansion of cash and subsistence agriculture, nomadic farmers found themselves living in ever smaller grazing areas. Desertification through overgrazing then became unavoidable: During the 1968-73 drought, for example, the surplus animal population was such that "goats alone were pushing the desert further south at the rate of 15 km annually."

The scarcity of grazing areas and the constant clearing of land for agriculture present serious risks to tropical forests, the FAO has stated. At present deforestation is advancing 30 times faster than reforestation. Every year 7.5 million hectares of dense forest and 3.8 million hectares of open forest are cleared in the countries of the tropics.

This decimation of the forests is all the more alarming inasmuch as the dependence of rural populations on wood as an energy source is total. In the Arsi region of Ethiopia, 200,000 hectares of wooded land a year are cleared in order to obtain fuel.

As is known, clearing the land and deforestation lead to erosion. As the FAO makes clear, "given the slightest ground cover to protect the soil from surface sealing brought about by the impact of rain drops, less water penetrates the soil, there is more run-off, the rate of flow in rivers fluctuates more than before, flooding is more frequent and more extensive, and rivers and wells become sporadic." It is already known that poverty, malnutrition, and the environment are closely linked in Africa. The continent's well being certainly rests on the reestablishment of its ecosystems. This is what the various international agencies and nongovernmental organizations that have intervened are attempting to do.

Ten years ago, the FAO, the World Bank, the UNDP (UN Development Program), and the World Resources Institute (WRI) launched a tropical forest action plan. This plan is the "keystone in a new coordinated approach aimed at solving the crisis of the tropical forests." On the basis of past experience, particularly traditional soil management techniques, the plan is trying to identify what needs to be done to solve systematically the problem of deforestation. The program's main points focus on conserving forests for agricultural purposes, developing forest industries, restoring firewood resources in countries suffering from a shortage of wood fuel, and encouraging the private sector and local organizations by reinforcing public information and research.

To be sure, it is too early to judge how effective this plan will be, because its effects will only be felt in the long term. But the seriousness of the situation in Africa is such that last June the FAO unveiled an international program to conserve and restore the land on the African continent. "Sporadic action," said Edouard Saouma, the

FAO's director general, "and short-term projects are not enough to regenerate or conserve the land; to do that, you need long-term programs based on rational policies for land use and strategies for developing them." In contrast to earlier projects, this plan stresses the role that must be played by national governments. It is they, the FAO notes, "who have the first obligation to put an end to the continual wearing out of the land in Africa." International agencies and nongovernmental organizations can step in only when these governments ask them to. The proposed FAO program, which will run for five years (1991-96), is supposed to integrate work at the national, regional, and international levels.

The countries of Africa have been asked to improve soil use by surveying their land resources and doing research into the reasons these have been poorly used. Furthermore, appeals have been made to them to encourage participation by helping users "plan their futures and apply solutions that offer short-term advantages." All this can only happen if specialized national institutions are set up. This being the case, setting up new networks at the regional level and strengthening existing organizations (SADCC [South Africa Development Coordination Committee], ICDCS [Interstate Committee for Drought Control in the Sahel]) are still the best way of promoting long-term training, the exchange of information, and scientific research.

Without the help of nongovernmental organizations and international finance organizations, the work of governments and regional authorities would be in vain.

The FAO has given itself five years to carry out its program and persuade Africans that the fight against desertification and the advance of the desert will influence their very survival. It will also try to persuade them that they themselves are responsible for a certain number of calamities.

Japan To Extend Loan to Mexico To Fight Air Pollution

OW1910002590 Tokyo KYODO in English 0209 GMT 18 Oct 90

[Text] Tokyo, Oct. 18 KYODO—Japan exchanged notes with Mexico on Thursday (Japan time) on extending 75.5 billion yen in yen loans for a program to cut air pollution in Mexico City, the Foreign Ministry said.

The exchange of notes in Mexico City follows a pledge by Prime Minister Toshiki Kaifu to make the 25-year yen loans. He gave the pledge in June, when Mexican President Carlos Salinas de Gortari visited Tokyo.

The Mexican capital is polluted by smog and sulfur dioxide emissions from traffic and oil refineries, ministry officials said.

Of the total, 69.3 billion yen will be set aside for installing equipment in oil refineries to cut sulfur-dioxide emissions, they said.

The remainder will be used for a project to repair locomotives to help switch from road to rail transportation in order to cut exhaust emissions from trucks, they said.

The yen loans will be provided under Japan's Official Development Assistance program, carrying a reduced interest rate of 2.9 percent a year.

NIGERIA

FEPA To Ban 18 Dangerous Chemicals

91WN0028A Lagos THE GUARDIAN in English 20 Sep 90 pp 1-2

[Article by Tunde Akingbade]

[Text] About 18 dangerous chemicals banned or restricted in 60 countries but still exported to Nigeria and other developing countries will soon be banned by the government.

The notorious chemicals—advertised in Nigeria and used by ignorant farmers and others as either worm expeller or to treat infected mouth and lice in infested head—are environmentally unsafe in Nigeria, according to the Federal Environmental Protection Agency (FEPA).

Some of the dangerous chemicals fall into the category which the JOURNAL OF PESTICIDES REFORM, a foreign publication, refers to as the "dirty dozen."

The notorious chemicals are: DDT, Aldrin, Dieldrin, Endrin, Chlordane and Heptachlor (already banned in USA and placed under restriction in Britain) Aldicarb (Temik) Camphechlor (Toxaphone), Chlordine form, DBCP, EDB, HCH/BHC and Lindane (Gamalin 20), Paraquat (Gramozone) ethyl and methy/parathion, pentachloro phenol and 2,4,5-T.

Contamination of food by any of the dangerous chemicals, experts said, affects the lungs and the nervous system, causing dizziness and eventually death.

According to experts, Lindane (Gamalin 20) extensively used in cocoa and cotton plantation, may have been responsible for the death of many farmers in the villages.

Adrin (Aldrex 40) and Dieldrin (Dieldrex 20), used in tsetse fly eradication, are also dangerous to human health. There are indications that 2,4,5-T (a tree killer), which was used during the Vietnam war to defoliate forests, resulted in increasing cancer rates, birth defects, genetic damage and even death in Vietnam.

Perenox, according to FEPA experts, is being used as worm expeller and the treatment of sores in Nigeria, although it can cause internal damage to human beings and result in death.

Some of the poisonous chemicals initially cause vomitting of food when ingested and later lead to death.

Twelve persons died in August 1982 in Central Java after eating DDT-contaminated food. Two months later, 19 persons died after eating DDT-contaminated snacks.

In Iran, in 1972, 500 people died after eating food poisoned by fungicides used in farming. Eating fish killed by such chemicals is dangerous and the poison is easily passed on to human beings, causing serious complications and ailments.

Dr. Olu Aina, director of FEPA, said the chemicals now being dumped in Nigeria would be banned. FEPA will also strictly monitor chemicals used as weed killers.

Experts are mapping out strategies to enlighten the populace about the dangers of the chemicals advertised daily in the media.

Professor S.O. Adesiyan of the Department of Agricultural Biology, University of Ibadan, supporting the ban of dangerous chemicals urged the government to monitor all chemicals banned elsewhere.

Nigeria, he said, could afford to wait until her environmental problems escalate to such levels as now experienced by the developed world.

Already, DDT has been banned in countries such as Belgium, Canada, Cyprus, Denmark, Egypt, El Salvador, Finland, USSR and Turkey.

Paraquat (Gramozone) has been banned in Finland, the Netherlands, and Sweden, and Lindane is banned in Bolivia, Ecuador, and Egypt, among others. A lung specialist at the University of Florida, United States, Edward Block, said last year that Paraquat (Gramozone), a weed killer, is probably "the most effective herbicide that exists right now on the earth and one of the world's worst poisons."

SOUTH AFRICA

Minister Issues 'Strong Warning' on Gill Nets

MB1810172090 Johannesburg Domestic Service in English 1600 GMT 18 Oct 90

[Text] The minister of environment affairs, Mr. Gert Kotze, has issued a strong warning to all countries whose fishing vessels use gill or drift nets that South Africa will make every effort to arrest such vessels in its waters, irrespective of their nationality.

Opening a fishing and marine exhibition in Table Bay harbor, Mr. Kotze emphasized that vessels with gill nets aboard, whether in use or not, would not be welcome in South African waters, no matter how much the country's harbors lost in revenue as a result.

South Africa would also pursue the strongest measures to have gill netting abolished internationally.

Health Minister on Plan for Protection of Ozone Layer

MB1810183690 Johannesburg SAPA in English 1819 GMT 18 Oct 90

[Text] Johannesburg Oct 18 SAPA—A national action plan to protect the ozone layer, in accordance with prescriptions of the Montreal Protocol, was revealed on Thursday by Health Minister Dr. Rina Venter.

South Africa is one of the 60 signitories of the Montreal Protocol for the protection of the ozone layer adopted in June 1990 in London, prescribing stricter use of CFCs [Chloro Fluoro Hydrocarbons].

Dr. Venter said the strategy was compiled in collaboration with industry to restrict the consumption of CFCs, adding this "phasing-out" programme would be based on the best practical technology with measures to reduce an unreasonable economic impact.

South Africa was the only producer of CFCs in Africa and probably in the southern hemisphere, said Dr. Venter. She added the country consumed about 12,000 [metric] tons of the product annually.

The largest "users" of CFCs were propellants in spray cans (50 percent), and foam plastics (30 percent), as well as refrigerators, freezers and air-conditioners.

Dr. Venter stressed enviromental-friendly systems for the disposal of waste products and materials that contained CFCs had to be developed.

The cost of the reduction in use of ozone-depleting compounds would be borne by industry and the end-user, in line with the internationally-accepted principle of the "polluter pays", said the minister.

The control of production, import and export was the most effective method of controlling the phasing-out process, said Dr. Venter, together with the following measures:

- The education of lay-people and industry.
- A prohibition of products and manufacturing processes that contained or used ozone-depleting substances.
- Restrictions on the installation and use of products containing ozone-depleting substances.
- The labelling of products containing ozone-depleting substances to allow the public to make informed decisions.
- Training and possible accreditation of service personnel to prevent the unnecessary release of ozone-depleting substances.
- Possible reclamation, recycling, reprocessing and disposal of ozone-depleting substances.

Dr. Venter said legislation would be promulgated if needed to support the strategy.

The implication of the plan was that "certain processes and products will become more expensive, and we must do without certain luxuries", Dr. Venter concluded.

ZIMBABWE

Group Criticizes Mobil's Rushed Environmental Impact Study

MB2010142090 Johannesburg SAPA in English 1339 GMT 20 Oct 90

[Text] Harare Oct 20 SAPA—A team of experts from the University of Zimbabwe has accused Mobil Oil, which is responsible for the exploration of oil in the Zambezi valley, of rushing an environmental impact study of the area and doing it as an afterthought.

According to the latest issue of the magazine AFRICA SOUTH, the experts in a report questioned Mobil's environmental consciousness, especially in view of the fact that the oil giant went ahead and concluded the agreement with government before the environmental assessment was done.

The team said they had expected Mobil Oil to initiate an environmental impact assessment of the proposed exploration activities well in advance of the signing of the agreement or the commencement of the activities.

"Instead, Mobil has rushed an environmental impact study over a two month period, giving the impression that the study is an afterthought, or a response to public and media pressure," the team said.

The university report addressed other areas of concern including erosion, which will be the most visible impact of oil exploration. The soil erosion will be brought about by clearing of landing sites and drilling.

In addition to clearing, the exploration will necessitate pumping chemicals down a hole during drilling.

Environmentalists are concerned that oil and other unspecified chemicals will be introduced into ground water.

The report suggests that under no circumstances should post-exploration phases be allowed to proceed without a thorough and more acceptable environmental impact assessment, the magazine said.

INTER-ASIAN

Asia-Pacific Ministers Adopt Environment Declaration

BK1710083390 Bangkok BANGKOK POST in English 17 Oct 90 p 2

[Text] Environment ministers of Asia and the Pacific yesterday adopted a wide-ranging declaration on environmentally sound and sustainable development in the region.

The 32-point declaration aims to protect the environment on national, regional, as well as global levels with all donor governments and agencies to make appropriate voluntary contributions so that actions identified can be implemented.

Forty-one countries deliberated over the declaration which was adopted on the final day of the ministerial-level conference on Environment and Development.

The declaration recognises the urgent need for all countries to intensify efforts to protect and improve the quality of the environment by adopting an approach in which economic growth should be directed towards environmentally sound and sustainable development.

Acknowledging that the major cause of the continuing deterioration of the global environment is the unsustainable pattern of production and consumption, particularly in the industrialised countries, the declaration stresses that the responsibility for containing, reducing and eliminating environmental damage must be borne by the countries causing such damage in accordance with their capabilities and responsibilities.

Another point in the declaration, which was heatedly debated before reaching an agreement, is recognition of the sovereign right of individual states to exploit their own resources pursuant to their social, economic and environment policies, ensuring that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.

The ministers pledged full support for the UN Conference on Environment and Development to be held in Brazil in 1992 and called on ESCAP [Economic and Social Commission for Asia and the Pacific] to prepare the regional contribution to it.

Vietnamese Delegation Attends Bangkok Environment Conference

BK2410142490 Hanoi Domestic Service in Vietnamese 2300 GMT 22 Oct 90

[Text] As we have already reported, nearly 500 delegates from 52 countries and 32 international and regional organizations recently attended a ministerial conference in Bangkok, Thailand on Asia-Pacific environment and regional development. The Vietnamese delegation was led by Professor Dang Huu, chairman of the State Science Commission. His Excellency Smith, representative of the UN Development Program in Hanoi, also attended.

The conference adopted a report on the status of environment in the Asia-Pacific region, which highlighted the phenomena of forest depletion, desertification, the decline of river basins, soil erosion, waterlogging and flooding, salinization, destruction of mangrove forests, water and air pollution, and so forth. These phenomena are a real threat to the steady development of the region. The conference also dealt with the harmful effects of climatic anomalies, depletion of the ozone, and the possible rising of the sea water level in the coming period. The conference adopted main measures aimed at increasing regional cooperation in environment, contributing to resolving global environmental problems, and actively preparing for participation in the UN conference on environment and development scheduled for 1992 on the occasion of the 20th anniversary of the UN Environmental Program.

SOUTH KOREA

Government To Strengthen Environmental Law

SK1910011790 Seoul THE KOREA HERALD in English 19 Oct 90 p 3

[Text] The Environment Ministry yesterday announced a draft implementation decree for the Environment Policy Law which calls for the strengthening of the environmental impact assessment process for new development projects.

Under the proposed decree, developers would be required to reflect residents' opinions on their projects when they draw up a written environmental impact assessment.

The number of projects subject to the environmental impact assessment process would be increased to 68 in 20 categories from 44 in 11 fields.

The law on environmental policies is one of the sixth environment-related laws which received approval from the 150th extraordinary session of the National Assembly last June and were promulgated last Aug. 1.

The implementation decree will go into effect Feb. 1 next year after consultations between the ministry and other relevant government agencies, Environment Ministry officials said.

Developers would be required to submit to the environment agency an initial and final version of the environmental impact assessment to detect possible consequences in the planning stage. Currently, they have presented only a final one.

The draft version of environmental impact assessment will be put on public notice for more than 20 days to sound out involved residents' opinions.

Developers would then draw up a final version, based on the views of residents.

The environment minister would have the authority to order relevant government agencies to halt development when developers do not submit a prior environmental impact assessment or when they do not follow an order from the environment agency to establish antipollution measures.

The new projects subject to prior environmental impact assessment include those related to development of forest areas, streams and hot spas as well as installment of sports facilities and waste treatment plants.

As a result, plans to dredge sand and pebbles from riverbeds would be strictly restricted.

The Kyonggi-to provincial government has recently come under sever criticism over its plan to dredge sand and pebbles upstream of the Paldang Piped Water Plant. Environmentalists claim the project could bring about possible consequences on the quality of tap water for residents in the Seoul area.

Also under scrutiny of the environment assessment would be a plan to develop Mt. Sorak, the site of the World Scout Jamboree to be slated for next Sept. 8-16.

Relevant government agencies would be allowed to ask for prior assessment of projects if they would have a great impact on the environment in the affected areas even though they are small in scale and are not the mandatory subject of such assessment.

The decree stipulates that the environment minister is able to order other government agencies to carry out measures the environment agency has established to preserve the environment in a comprehensive and systematic way.

LAOS

Stumbling Blocks Obstruct Government's Forest Plan

BK2210051490 Bangkok BANGKOK POST in English 22 Oct 90 p 2

[By Tunya Sukphanit]

[Text] Laos has run into problems conserving dwindling forest reserves since it began a campaign in May last year.

Laotian Vice-Minister for Agriculture and Forestry Noulin Sinbandit told the BANGKOK POST that because forests belong to the people and the nation, it is the government's responsibility to look after the important natural resource.

Since May last year, logging concessions had to be approved by the government. Previously, from 1975 Thai logging firms needed approval only from Laotian provincial authorities, which were authorised to make profits from forests.

After Thailand introduced its logging ban in 1988, the number of sawmills operating in land-locked Laos increased about 30 percent. There are now about 600 small and medium-size sawmills operated by Thais and Laotians in the country.

Exports of forestry products, mostly logs, to Thailand, Taiwan, Japan and South Korea have increased.

Laos, meanwhile, has sought help from various United Nations' agencies to work out a development plan to conserve its forests.

Phase one of a Tropical Forest Action Plan (TFAP) on forest management has been completed with support from the UN Development Programme (UNDP), the Food and Agriculture Organisation (FAO), the Swedish International Development Agency (SIDA), the World Bank and the Asia Development Bank (ADB).

The plan now needs approval by the government, which has to work out how the plan will fit the country's overall national development scheme.

But problems and constraints remain. One is the question of accurate data on remaining natural forests.

Current data is based on a 1981 survey sponsored by the Soviet Union, which shows that sizeable tracts of forest remain in the central and southern region, particularly Savannakhet, Vientiane and Champassak. Most northern forests have been damaged severely since then.

Minister Noulin said information on logging is incomplete and confusing but the new policy will make things more systematic.

"The ministry is surveying logging in Laos at national and local levels," he said. State enterprises of Laos and the USSR are logging jointly in Savannakhet province.

Another problem faced by the government is abuse of commercial logging and the problem of shifting cultivation.

A rough estimate shows logging in forests nationwide should be kept to about 270,000 cubic metres per year but it is estimated to be between 350,000 and 450.000.

One diplomat said that while the central government wants control of logging concessions and forest management it still demands that provincial authorities generate their own income. Provincial authorities, therefore, have relied on logging as a revenue earner.

The minister said that prior to the decision to place more emphasis on forest conservation, Laotian income from forest products made up 40 percent of the country's total income from exports.

"Roughly speaking, income from timber was about U.S. $20 million a year. But since the government has tried to reorganise things income has dropped," Minister Noulin said.

Another problem is shifting cultivation.

"It is likely that illegal logging is carried out by shifting cultivators or encroachers in cooperation with foreign industry and log buyers.

"The volumes involved in these activities may be at a level of 100,000 to 150,000 cubic metres per year," Noulin said.

According to the TFAP report, about 253,000 Laotian families are involved in shifting cultivation in the highlands and in the lowlands.

The report said a total of 300,000 hectares of land is affected by shifting cultivation, of which about 100,000 is forested—an estimated loss of U.S. $25 million a year.

Minister Noulin said it will take time to manage shifting cultivation as local residents use the practice to survive. To date there is no suitable alternative for them.

"The project needs huge amounts of money. There is a pilot project managed by the UNDP and EC in the northern part of Luang Prabang."

Under the TFAP plan, about U.S. $230 million is needed to implement several resource management projects of which U.S. $120 million is recommended for projects to give Laotians an alternative to shifting cultivation.

The Laotian government has already obtained some funds to implement alternative projects and a number of international organisations and countries, such as the UNDP, FAO, World Bank, ADB, Australia, Japan, Sweden and the United States are involved in a number of projects in the country.

While Laos has lost some income with logging concessions having to be approved by the central government, it has tried improve the manufacture of its timber products to increase income and provide employment.

But again, there are obstacles.

According to the Ministry of Agriculture and Forestry's director of soil erosion control, Chanthaviphon Inthavong, it appears the Thai government and private sector are interested only in importing Laotian logs while the government wants to export processed timber products.

"The Thai government has set regulations stating that goods from Laos must be transported by the Express Transport Organisation (ETO).

MALAYSIA

Government To Ratify Marine Pollution Conventions

BK2910083890 Kuala Lumpur BERNAMA in English 0738 GMT 29 Oct 90

[Text] Kuala Lumpur, Oct 29 (OANA-BERNAMA)—Malaysia will be ratifying conventions related to the prevention of marine pollution like the Marpol Convention, Intervention Convention, London Dumping Convention, and the Civil Liability Convention.

Transport Minister Dr. Ling Liong Sik said Monday [29 October] this would be done once the legislative and administrative groundwork, which included amending the Malaysian Shipping Ordinance 1952, was completed.

Launching the four-day ASEAN seminar on reception facilities in ports here, he said [words indistinct] the Interational Convention for the Prevention of Pollution From Ships 1973 and its protocol of 1978 (Marpol Convention) had already been accepted internationally.

Malaysia would ratify this convention as it showed that it could be implemented in this part of the region, he said.

Ling said the ministry would give due emphasis to environmental issues in the overall planning and development of the maritime industry.

He said many of the issues related to upgrading safety and protection of the marine environment in this region needed a regional or international approach.

He also said the Side-Looking Airbone Radar (SLAR), based at the Kuala Lumpur International Airport, which has been used for the ASEAN region since a year ago, was monitoring the illegal operational discharges in the ASEAN waters.

Penang Leader Under Opposition Fire Over Environment

BK1710103090 Bangkok THE NATION in English 15 Oct 90 P A9

[By Sonny Inbaraj: "Penang Hill Issue May Cost Mahathir Associate Dearly"]

[Text] The day Penang Chief Minister Dr. Lim Chong Eu filed his candidacy papers to defend his state assembly seat at the Malaysian general election on October 20, environmentalists held an emergency meeting to defend one of the last remaining tracts of rainforest on the island.

On Sept 1 this year, the state government headed by Dr. Lim's Gerakan party—a component of Prime Minister Mahathir Mohamad's ruling National Front coalition—signed a memorandum of understanding with Bukit Pinang Leisure Sdn Bhd for the building of a shopping centre, indoor sports stadium, night-clubs and discos

and a golf course on top of the Penang Hill at the expense of several hundred thousand hectares of rainforest.

"The people of Penang never knew the plans of the state government, until the memorandum of understanding was signed," said a spokesman from Aliran, a social reform group here.

Observers in Penang say that Dr. Lim signed the intent to enter into a contract to "develop" Penang Hill, not knowing Mahathir would call for the elections so soon.

But Mahathir's United Malays National Organization (UMNO)—of which the prime minister is the president—involvement is also seen in the project with the inclusion of Berjaya Corporation, who are acting as advisers to the developers.

Berjaya Corportion is headed by Vincent Tan, who acts as one of the corporate wizards for UMNO and Finance Minister Daim Zainuddin.

Environmentalists says the projects will cause disturbance of many critical water catchment areas in the island.

"The impact of the activities, including tree-cutting, land-clearance, transport and construction work, will have extensive adverse effects on the soil, vegetation and water of the hills and catchment areas," said Friends of the Earth Malaysia in a statement.

"There is a danger that the reservoirs which collect most of Penang's drinking water would be affected by siltation and less water intake, thus increasing the possibility of water scarcity," added the statement.

Besides acknowledging the ecological importance of the rainforest on Penang Hill, Penangites also hold very fond memories of the area.

"Please keep these monstrosities (the shopping centres, night-clubs etc...), if they must come into being, away from the hill. I bring my children to the hill as often and as regularly as possible so that they can enjoy the natural free and pure delights it offers," said Xu Guoqing, a long-time resident.

With obvious reference to Chief Minister Dr. Lim, Xu said: "It is difficult to imagine how any older generation Penangites could find it in themselves to authorize such desecration."

While the rain forest on Penang Hill might be at stake for Penangites and environmentalists, the signing of the memorandum of understanding with the developer could spell the end of Dr. Lim's career as Penang chief minister, which has spanned two decades.

Dr. Lim's challenger in the Padang Kota state constituency is the Democratic Action Party (DAP) fireband, Lim Kit Siang, who told reporters he was going for broke and risking his political career when he filed his nomination papers on Thursday.

The multi-racial pro-Chinese rights DAP has teamed up with Mahathir arch-rival Tengku Razaleigh Hamzah's Spirit of '46 in a pact which is called Gagasan Rakyat (People's Might). Also in Gagasan are the All-Malaysian Indian Progressive Front, Parti Rakyat Malaysia and the Malaysian Solidarity Party.

Razaleigh has also managed to unite Islamic fundamentalists Parti Islam Malaysia (PAS), Muslim moderates Hamim and Berjasa in another pact called the Angkatan Perpaduan Ummah (Muslim Solidarity).

Razaleigh fell out of Mahathir's favour in 1987 when he challenged the prime minister for UMNO's president post and lost by a slim majority. The same year, the High Court dissolved UMNO in a dispute over party polls.

A wing led by Mahathir formed UMNO Baru, which now dominates the National Front coalition. The other UMNO faction led by Razaleigh formed the Spirit of '46.

For the first time since independence in 1957, the National Front is faced with an alternative multi-racial opposition representing the three main ethnic groups and the Islamic fundamentalists in Malaysia.

Lim, who is the secretary-general of the DAP, has made it very clear that the party wants to wrest control of the Penang state government from the National Front coalition.

The Penang Hill issue could very well serve to enhance Lim's political ambitions, with DAP insiders saying that the controversy will be made the party's main campaign issue on the island.

In the 33-seat state assembly, the DAP holds 10, UMNO 12, Gerakan 9, and the Malaysian Chinese Association (also a National Front component) two.

To form the next state government, the party needs to secure at least 18 seats in this election to form a working majority.

Lim says the DAP's pact with Spirit of '46 is workable and at least eight Malay majority seats could be captured with just a 500 votes swing in each constituency.

"The Penang Hill issue and several other projects carried out by Dr. Lim's state government, clearly shows the people of Penang that the National Front is only preoccupied with making the rich become richer. In the end it's always the poor that suffer," said a DAP source.

When the Gerakan party was questioned by the environmentalists on why the Penang Hill was approved without the prior knowledge of Panangites, Dr. Choong Sim Poey, the party's secretary to the political strategy committee said: "We have to make it clear at the outset that the Penang State government's decision was not discussed with the party at all."

Dr. Choong agreed that it was the state government's responsibility to see that the interest of the public is protected in the approval and implementation of this (the Penang Hill) project.

A middle-aged taxi driver, however, found Dr. Choong's statement hard to swallow.

"Of course the Gerakan knows of the project. Trying to abrogate responsibility by claiming ignorance cannot fool the people. Dr. Lim has been chief minister since 1969, and it's high time we say we've had enough of this nonsense. Old Penangites with sentimental reasons might vote for him, but the younger ones are saying enough is enough. They want a change," he said.

INTRABLOC

Energy Sector Conference Views Fossil Fuels, Acid Rain Problems

AU2610122090 Warsaw RZECZPOSPOLITA Economy and Law Section in Polish 22 Oct 90 p 2

[Krystyna Forowicz report: "Ecologists Seek a Solution—Does the Energy Sector Have To Pollute the Environment?"]

[Text] The countries of Eastern and Central Europe are heading for an ecological disaster. The emission of sulfur dioxide produced by coal burning is becoming an acute international problem. Many innocent countries are having to pay the price for this, because their neighbors produce great quantities of this poisonous pollution which is subsequently blown across their borders by prevailing winds.

The most polluted regions—where sulfur fallout exceeds 1,000 milligrams per square meter—are in northern Czechoslovakia, the Donetsk Basin in the USSR, and the Upper Silesia and Krakow regions in Poland. Annual losses in Europe caused by acid rain are estimated to be billions of dollars. How to prevent an ecological disaster? This was the question discussed by various government, parliamentary, and environment organization representatives, as well as environment experts from Czechoslovakia, Germany, and Poland who attended the three day conference entitled "New Energy Policy in Eastern and Central Europe," held in Serock [Poland] on 19-21 October.

One of the points that everyone agreed on was the project to create an energy conservation center. Such a center would contribute to the protection of the environment and would help to limit harmful emissions from the energy producing sector. At present this is the sole way out for Poland and the other countries that are completely reliant on an energy producing sector that is totally environment-hostile.

The energy-saving potential of our energy producing sector, a sector that is three times as inefficient as in other countries, is therefore great. Some examples readily illustrate this state of affairs. The inability to utilize blast furnace exhaust-heat means that for every unit of production the Katowice Steel Works consumes 30 percent more heat than other steelworks. Losses in the electricity grid network amount to 10 percent. The energy efficiency of our public lighting is approximately 10 times less than elsewhere. The poor state of the municipal hot-water supply networks accounts for another 15 percent of lost heat. Desulfurization of emissions is the second way to cut down pollution of the environment. However, this method is much more expensive and difficult. In reality, only Japan has mastered the problem this way. The FRG has spent $20 billion on the installation of desulfurization equipment. In Poland, the cost of installing similar equipment would total $11 billion. That is the reason why Poland has declined to join the "30 Percent Club" (members of the club are countries that have committed themselves to reducing sulfur dioxide emissions by 30 percent by 1993).

Another way of alleviating the linked problems of energy and pollution would be to use other sources of primary energy and reduce our dependency on coal. But this too poses difficulties. These were the ecological questions that were raised at the Serock conference on protecting the environment from the negative effects produced by a coal-based energy sector.

CSFR Difference With Hungary on Danube Project 'Irreconcilable'

AU2310174490 Prague CTK in English 1913 GMT 19 Oct 90

[Text] Prague Oct 19 (CTK)—Czechoslovak Minister for the Environment Josef Vavrousek told journalists today that the Czechoslovak and Hungarian stands on the Gabcikovo-Nagymaros project of waterworks on the Danube were irreconcilable and excluded compromise.

The only option now is to involve the two governments in the discussion on the future of the project and form a government consultative commission in which European Community (EC) experts would participate.

Hungary unilaterally suspended work on the Nagymaros part of the water system in 1988. The project has drawn strong protests from environmentalists who fear pollution to drinking water and complete change of the environment which would destroy the fauna and flora in the area. Czechoslovakia has argued that the present state in which the building site finds itself may be dangerous.

Journalists were also informed that Czechoslovakia did not have an emergency protection system for the event of a nuclear power plant accident (the country has two such plants, one being fully and the other partially operational, and another two are being built) and of a natural disaster. A construction of such a system has only just began.

Minister Vavrousek said that Czechoslovakia is to get 30 million ECU from the European Community for the realization of 12 projects within the first stage of the PHARE program in the next two years. PHARE is a special program cosponsored by the European Community and the group of 24 advanced states and aimed at giving quick assistance in economic and environmental reconstruction to the former East European communist countries.

Josef Vavrousek also told journalists that an international conference of environment ministers will be held at Dobris, central Bohemia, in April 1991, which will follow up a similar meeting in Dublin last June. Ministers from states of the European Community, Central and Eastern Europe, and the European Free Trade

Association (EFTA) will seek creation of a system of ecological security in Europe.

Romanian Communique on Environmental Dispute With Bulgaria

AU1710131490 Bucharest ROMPRES in English 0936 GMT 17 Oct 90

[Text] Bucharest ROMPRES 17/10/1990—A communique relayed to ROMPRES news agency from Mr. Valeriu Eugen Pop, minister of the environment, in connection with the ecologic controversies in the Giurgiu-Ruse zone reads:

In Giurgiu and Ruse there is a special situation due to the existence both in Romania and in Bulgaria of sources of pollution of the air in particular. The controversies on the effects of the pollution sources in Giurgiu on the town of Ruse started some eight years ago.

Under the new circumstances after the revolution, the Romanian side tried to solve them during the meeting between the prime ministers of the two countries, Petre Roman and Andrey Lukanov, of 4 July when a recourse to international experts was agreed upon.

Consequently, over July-August, Romania closed the chemical combine in Giurgiu for overhauling and repair operations to cut the emission of noxae under the admissible limits.

At the beginning of September the chemical combine started operating the measurements made by the Romanian side showing no excess of noxae above the acceptable limits. [sentence as received]

Despite the insistence of the Romanian side the Bulgarian experts refused to take part in both the checking of the overhauled equipment before being put into operation, and in the measurements made in Romania of the concentration of the main emissions of noxae. According to data supplied by Bulgarian experts in connection with the measurements made in the Ruse area the concentration does not exceed the admissible limits.

In this context we are surprised by the assessments made in the Bulgarian press in connection with the excess concentration beyond admissible limits.

To show the inhabitants of Ruse the real situation, the Ministry of the Environment extended to the Bulgarian authorities, through the Romanian Embassy in Sofia, the invitation that a representative group of Bulgarian citizens visit the town of Giurgiu.

Likewise, the pollution in the Turnu Magurele-Nikopol area signalled by the Bulgarian press is a new element not notified through the official channel agreed upon between the mayorships of the two towns.

In connection with this aspect the Ministry of the Environment ordered that its territorial office make systematic measurements of the quality of the air in the respective area.

As a special problem we find ourselves compelled to notify the great danger posed by the operation of the 440 MW generators of the nuclear power plant at Kozloduy, similar to those that caused the disaster at Chernobyl, located on the Bulgarian bank of the Danube, vis-a-vis the town of Bechet.

In connection with the operation of that nuclear power plant the Romanian side requested an expertise [evaluation] by the International Atomic Energy Agency.

Moreover, Romania is concerned with the growing risk of locating another large nuclear plant in Bulgaria in the close vicinity of the Romanian territory.

In consideration of the complex character of the problems concerning environmental protection in the border zones, the population should be correctly informed and responsible measures should be taken by both sides to eliminate the causes and the risk regarding the location of new plants.

We wish that these problems be solved in a spirit of cooperation on the basis of unanimously acceptable accords and conventions.

Bulgaria's Ruse Salvation Committee Appeals to Perez de Cuellar

AU1810205890 Sofia BTA in English 1907 GMT 18 Oct 90

[Text] Ruse, October 18 (BTA)—The 250,000 residents of Ruse today warned the government that they may emigrate and seek ecological asylum.

At a rally the Ruse Salvation Committee made public a declaration saying that the people of Ruse will leave their native city in protest against the "chemical warfare" which the Chemical Combined Works in Giurgiu, Romania, across the Danube, has been waging for years on the Bulgarian city, if within one month the government does not take effective measures to stop the chlorine gas attacks from the opposite river bank.

If this protest proves ineffective, the people of Ruse will relinquish their Bulgarian citizenship en masse and will seek ecological asylum for the entire city in another country or community of countries.

The residents of Ruse called on Mr. Javier Perez de Cuellar, secretary general of the United Nations, to launch a diplomatic initiative and to use his political influence for the settlement of their vital environmental problem.

"Let the United Nations spread the news that Romania owes 250,000 Bulgarians the right to ecological security," the people of Ruse write in their message to Mr. Perez de Cuellar.

Bulgarian Diplomatic Efforts To Resolve Ruse-Giurgiu Issue

AU2410203190 Sofia BTA in English 1837 GMT 24 Oct 90

["Diplomatic Aspects of Giurgiu-Ruse Ecoproblem"—BTA headline]

[Text] Sofia, October 24 (BTA)—Mr. Ivan Kandradzhiev, chief of Department Two of the Ministry of Foreign Affairs, singled out the Giurgiu-Ruse ecological problem as the number one problem in Bulgaro-Romanian relations. "Without a durable solution to this problem, progress in our relations with neighboring Romania is hardly imaginable," he said, speaking at a regular press briefing on the steps taken by the Bulgarian diplomacy for an international expert inquiry into the more than nine-year-long gassing of the city of Ruse from the Chemical Works in Giurgiu. The inquiry will be organized by the United Nations Environment Program (UNEP) in mid-November and will involve, among others, Bulgarian and Romanian experts. In addition, Bulgaria has agreed through diplomatic channels that Romania take part in the international expert examination on the site of the Kozloduy Nuclear Power Plant between November 11 and 23, which will be conducted by representatives of the International Atomic Energy Agency (IAEA). Mr. Kandradzhiev said that a good atmosphere has been created in the diplomatic channels between the two countries, so as to make the best possible use of the assessments and recommendations of the UNEP experts. The diplomat identified two periods in the efforts to solve this serious and intricate problem: before and after November 10, 1989. He said that during the first period the main reason for the failure to find a solution was the totalitarian approach taken by the former leaders of the two countries. It was mentioned that between 1965 and 1987 Todor Zhivkov and Nicolae Ceausescu met 39 times.

Under the circumstances, the new leaderships of the two countries are seeking opportunities for an objective settlement of the problem. Following a meeting between Prime Ministers Andrey Lukanov of Bulgaria and Petre Roman of Romania, a common understanding was reached on the formation of a group of experts to draft all recommendations for the conduct of an international expert examination.

BULGARIA

Radiation Effects Assessed at News Conference

AU2210205390 Sofia Domestic Service in Bulgarian 1830 GMT 22 Oct 90

[Text] Today the leadership of the National Program for the Protection of the Population against Radiation held a news conference which was devoted to problems of the population's protection against the effects of radiation in connection with the existence of nuclear power plants in our country. It was announced that the investigation into the results of the Chernobyl accident affecting our country and into those responsible for them has been completed and a trial is envisaged to take place in the near future.

It was further reported at the news conference that the results of the radiation tests conducted at the Kozloduy Nuclear Power Plant have been published and that this plant does not represent any immediate danger either for our own population, or for Romania. It was, however, pointed out that radioactive fallout is a serious problem and that the conditions under which the people in the Kozloduy Nuclear Power Plant work and live are a cause for concern.

The requirement of establishing a uniform system for the population's protection against the effects of radiation which should join together the efforts of all departments engaged in the solution of such problems was stressed.

On this occasion the representatives of the mass media were informed about the stand of Premier Andrey Lukanov, who shares the principle on the priority of ecological and humanitarian values prevailing over economic interests in connection with the population's protection against radiation effects. The premier confirmed the government's readiness to wholeheartedly accept the evaluations of competent experts and recommended following the instructions of the International Atomic Energy Agency, even if they should require decisions involving extremely negative consequences for the country's energy supply.

Ivaylo Trifonov, head of the president's office, also attended the news conference. He announced that the president of the Republic intends to appoint a non-governmental experts' commission in charge of fully assessing the state of our comprehensive nuclear energy installations.

IAEA Experts Criticize Kozloduy Nuclear Plant

AU2510192690 Sofia BTA in English 1829 GMT 25 Oct 90

[Text] Sofia, October 25 (BTA)—After two weeks of work, the inspection of the nuclear power plant in the town of Kozloduy carried out by the Osart minimission under an agreement between the Bulgarian Government and the International Atomic Energy Agency [IAEA] was completed today.

The experts checked up the exploitation, the technical maintenance and the repair of the 1000-megawatt Generating Unit 5.

The leader of the mission, Mr. Ferdinand Franzen, summarized the results and said that to make a fuller

technical evaluation one should know the on-spot conditions of work and the life in Bulgaria in general and in Kozloduy in particular. "The conditions of life and work here resulted in an almost dramatic brain drain which poses a threat to the safe commission of Generating Unit 6 and could possibly lead to forcibly closing Generating Unit 5 which is now serviced by a small number of senior operators and engineers. The labour available now can be encouraged to stay at their workplace and new experienced engineers, technicians and workers can be enrolled only by creating attractive conditions of life and work comparable to those in the other high technology and well developed industries," he said. "Besides while it is managed according to the principles of the morally outdated civil administration with its rigid rules for funds, structures, personnel and separation of the services (the production of electric power and heating) from the manufacturing costs (construction and exploitation of the equipment), the Kozloduy Nuclear Plant cannot function as a modern industrial enterprise. The utterly complicated and inefficient organizational structures within the framework of the plant and the deformed distribution of power and responsibility hinder the application of modern methods and means of management, the optimal usage of resources, the establishment of productive contacts beyond the limits of the separate departments and workshops and the cultivation of a spirit of collectivism that would unite leadership and workers," Mr. Franzen went on to say.

The mission insists on adhering to and extending the recently adopted "open-doors" policy face-to-face with the international nuclear community and face-to-face with the broad public". The Kozloduy Nuclear Plant in general and Generating Unit 5 in particular are obviously passing through a critical phase in their exploitation life. The seriousness of the situation should not be underestimated; things should be got properly under control through the resolution and the goodwill of all concerned and their ensuing coordinated action.

The report stating the results of the inspection will be submitted to the Bulgarian Government.

The date of the real Osart mission was specified: June 18, 1991. At that time inspection will be carried out of Generating Unit 5 according to the following plan: preparation and qualification of the personnel, radiation protection, chemistry, breakdown planning, organization, production and administration.

CZECHOSLOVAKIA

Mission Finds Bohunice Nuclear Power Plant Poses No Danger

AU1710151390 Prague CTK in English 1849 GMT 12 Oct 90

[Text] Bratislava Oct 12 (CTK)—None of the defects registered during analyses conducted at the Jaslovske Bohunice Nuclear Power Plant in West Slovakia by the Assessment of Safety Significant Events Team (ASSET) were characterized as an accident that could threaten the plant's neighborhood.

The ten-member ASSET mission, one of the forms of aid given by the International Atomic Energy Agency (IAEA) to its member states, has just finished one of the seven expertises [evaluations], conducted at Czechoslovakia's request.

At a press conference today, Maurice Rosen of the Vienna-based IAEA, who headed the expertise, stated that 183 of the total of 1,523 defects registered during the mission's activities were related to safety, while over 50 percent of them can be ranked in spheres such as radiation protection and minor leaks of primary coolant from technological systems.

The ASSET mission recommended the drawing up of a comprehensive defects and accidents prevention program for both units of the V-1 power plant and installing more modern fire-extinguishing equipment.

HUNGARY

Institute Develops System for Nuclear Plant Fault Detection

25020018A Budapest COMPUTERWORLD/ SZAMITASTECHNIKA in Hungarian 24 May 90 p 17

[Article by Gabor Moray: "Heart Murmurs in a Nuclear Power Plant"]

[Excerpts] The Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences is one of the most productive workshops for domestic artificial intelligence research. The most recent result of the work being done there is a computerized system for fault detection and diagnosis at nuclear power plants. It will soon go into operation in the new three-four block at the Paks Power Plant.

Every layman knows that you cannot fool around with a nuclear power plant. So it is desirable for the operators to have continual precise data about the status of the subunits, to be informed in time when and where the danger of a failure exists. [passage omitted]

Perhaps the most effective and widespread method for early fault recognition is based on an analysis of reactor noises. The noises indicate well small changes in the system which cannot yet be sensed in its global operation but which could become sources of serious failures later. [passage omitted]

The system planned for the new block at Paks has about 100-140 sensors collecting various signals and the data registered by them go to a signal processing system. Fault detection is performed here, seeing whether the signals measured deviate from the normal. This signal processing is basically procedural, based on non-symbolic information.

The really artificial intelligence component is the fault diagnosis part which is next in the whole system. It has the task of providing the operator with advice pertaining to the cause and character of the possible fault and preparing for him a possible plan of action or making recommendations on what should be done. But before looking into the mind of this component we should devote a few words to the mind of the operator.

The big problem with the work of those running nuclear power plants is that—with some exageration—they have nothing to do. If everything is in order they need not intervene, but if there is trouble they are deluged with various messages and indicators, they are overwhelmed by the data flooding from the screens, and so they become incapable of effective action.

This effect was seen at Chernobyl and Three Mile Island, and it contributed greatly to the catastrophes. So it is very important that the messages reaching the operator should go through an intelligent filter so that only the essential messages reach the decision points. [passage omitted]

Diagnostic knowledge is based on experience, on rules, taking the form: "If we see this and this here and here, then this unit is failing with a certain probability." Most of these rules do not indicate an immediate cause of failure, we can reach this point only by considering many rules together, at the end of an inference chain.

The knowledge base of the system contains these rules. According to those who developed the system (Jozsef Bokor and his team) even when fully developed such a knowledge base should not contain more than a thousand rules; above this number the system becomes difficult to test and maintain.

The diagnostic expert system is in direct contact with the signal processing part, not only in that it gets data from it but also in that it can give various measurement instructions. [passage omitted]

Development of the system is presently at the prototype stage; experimental operation will begin this year at the Paks Power Plant. But the product has already aroused interest abroad as it could be adapted to other nuclear power plants or even other systems. The most obvious applications area would be the Soviet pressure water power plants similar to Paks, but in principle the French power plants of this type might be considered as well. Mixed enterprise discussions about marketing it are under way.

The system runs on two 386 computers linked by Ethernet. Obviously a computer developed for this purpose (such as a LISP machine) could evaluate the knowledge base of the expert system much more quickly and efficiently; but for the time being the COCOM rules prohibit the import of one of these. In any case the developers designed their system so that when the ban is lifted, one of the 386 computers can be replaced by such a special purpose computer. This will improve the chances for selling the system in the West. [passage omitted]

INTER-AMERICAN AFFAIRS

Environmental Expert Addresses Caribbean Regional Development

FL2010184690 Bridgetown CANA in English 1811 GMT 20 Oct 90

[Text] Port of Spain, Trinidad, Oct 20, CANA—A Barbadian environmental expert said here on Saturday that the environment should be an integral part of the development process of the Caribbean.

"In all development activities, whether agriculture, tourism, or industry, the environment should feature prominently," Dr. Mark Griffith suggested.

Griffith, head of the Barbados Environmental Unit, told CANA [CARIBBEAN NEWS AGENCY]: "We need as a region to be more aware of the importance of the environment to development and with the mass media, the people of the Caribbean are becoming more aware of the importance of the environment.

"As they become more aware I anticipate the political directorate in the region would have to respond.

"I would prefer at this stage if the political directorate would also come to grips with the fact that the environment is important and put mechanisms in place to assist that process in sensitizing the general public."

Dr. Griffith said the major environmental problems in Barbados are coastal erosion and coastal zone management. Bad land planning, soil erosion, drainage, and factory pollution are also problems.

Griffith is attending a Latin American and Caribbean environmental meeting in Trinidad.

Trinidad PM Addresses Caribbean Environment Conference

FL2310153090 Bridgetown CANA in English 2235 GMT 22 Oct 90

[Text] Port of Spain, Trinidad, Oct 22, CANA—Trinidad and Tobago's Prime Minister A.N.R. Robinson on Monday said the Caribbean could be a barometer for measuring environmental concerns because of the region's vulnerability to ecological imbalances.

"...The environment of small island and coastal states is markedly more vulnerable to environmental imbalances than large continental states," he told the opening of a two-day Latin American and Caribbean ministerial conference on the environment here.

"Our countries have little room for mistakes and also little time to put mechanisms in place to protect our limited resources. We fully recognise the fact that we are a microcosm of the region, and any failure on our part to protect our environment would have detrimental effects in a short time."

Robinson said Latin America and the Caribbean had a strategic and leading role to play in forging a "new global ethic" for the use of natural resources, for equitable distribution of wealth, and for ensuring healthy and fulfilling lifestyles for future generations.

He said a balance between a desirable quality of life, population growth, and resource exploitation must be attained within the next century, "if life on earth, as we know it, is to be sustained."

"The task before us therefore entails a re-examination of human values of life and of the desirable quality of life," he said. "It requires a change in attitude to the environment. It requires an acknowledgement that air, water, and earth are all essential to life and that ongoing care and protection of these elements are necessary prerequisites for the survival of all life forms on planet earth."

He urged countries not to pay "lip service" to environmental issues but to make necessary decisions and devise options leading to the best solutions to environmental problems. "The environment is our main lifeline. We neglect it to our detriment and imperil as well the livelihood of generations to come," he said.

The 33 Caribbean and Latin American environment ministers are expected to adopt an environmental action plan as a common position for a global conference on the environment to be held in Brazil in 1992.

Cuba Signs Pesticides Agreement With Pan-American Body

FL2510212090 Havana Radio Reloj Network in Spanish 2037 GMT 25 Oct 90

[Text] Vice Public Health Minister Dr. Hector Terry and (Jacobo Finkelman), director of the Pan-American Center for Human Ecology and Health, signed a draft agreement today in Havana on pesticides. This agreement will make it possible to create important technical information bases, develop analytical methodology, and evaluate the health risks of pesticides. This is all aimed at developing new and more effective measures of prevention and control.

The contract is part of the strategy of expansion in the field of international environmental health, since the Pan-American Center for Human Ecology has agreements with Brazil, Bolivia, Costa Rica, Mexico, and Argentina. The signing of the document marks an important point in the search for new areas of dialogue in the control of pesticides, and also allows the center to act as a reference point for technical guidance.

BRAZIL

Sao Paulo Plant Closed for Polluting Air

PY1710182590 Rio de Janeiro Rede Globo Television in Portuguese 1600 GMT 17 Oct 90

[Text] A plant in the Santista flatland region of Sao Paulo was closed down today because it was polluting the

air. The (Uniata) company, which manufactures and markets fertilizers, has been receiving complaints from the residents of the region since 1974.

The company has been releasing amounts of gas into the atmosphere that have exceeded the legal level.

According to Emilio Grande Galo, an expert of the CETESME [expansion unknown] regional office, the company had been given several deadlines by which to modernize its gas control equipment.

GRENADA

Alternative Energy Sources Considered

FL2910163090 Bridgetown CANA in English 2121 GMT 27 Oct 90

[Text] St. George's, Grenada, Oct 27, CANA—The Caribbean needs to diversify its sources of energy if it is to cushion the impact on it of crises in the oil industry, according to Gabriel Sanchez of the Latin American Energy Organisation (OLADE).

Sanchez told reporters here: "The Caribbean should have a combination of different sources of energy so the problem you are having in the Caribbean is not unique. We estimate that 52 percent of the total energy that we consume is hydrocarbons (oil based), and it's too high for the region; we need to diversify," he remarked.

Sanchez said "at the regional level, we need to use more coal, more hydro-electricity, and reduce the consumption of hydrocarbons." He suggested the Caribbean use more renewable sources of energy in place of oil which is non-renewable. The OLADE official says the region should reduce its dependence on oil because of its high cost, and the effects of crises on the industry.

Sanchez visited Grenada to discuss how his organisation can help the island to cushion the effects of the Gulf crisis on the pricing of petroleum products. The price of petroleum products here has moved up at least four times since the Gulf crisis began, with a gallon of gas now being sold for between 7.89 dollars and 8.21 dollars (one EC dollar = 37 U.S. cents). It has triggered increases in transportation and electricity.

Head of the Energy Division of the Ministry of Finance, Vaughn Renwick, says Grenada can save about four million dollars by developing other sources of energy. He said, "Grenada spends about fourteen million dollars annually on fuel imports, with about eight million used for the generation of electricity."

According to Renwick: "Our potential hydropower generation capability right now is about 50 percent of that, so we are looking at about four million dollars' savings if we can develop our small hydro potential."

Renwick reported the island is also looking at harnessing wind power to generate electricity. "We now have a wind study going on.... We have measuring stations at various sites in Grenada, and the sister island of Carriacou," he said.

INDIA

Conference on Safe Water, Sanitation Opens in Delhi

91WD0059A Bombay THE TIMES OF INDIA in English 11 Sep 90 p 7

[Text] The vice-president, Dr. Shankar Dayal Sharma, today opened a global consultation meeting here on safe water and sanitation, with a call for enhanced international support for such national schemes.

The five-day meeting, sponsored by the United Nations Development Programme and hosted by the government of India, is an exercise in evaluating the gains and shortcomings of the UN International Drinking Water Supply and Sanitation Decade (IDWSSD) (1980-90).

The vice-president noted that though there were significant achievements, particularly in developing countries, in providing safe water and sanitation, much more remained to be done.

He was certain that the meeting would help devise a future strategy to tackle the safe water and sanitary problems.

The outcome of the consultation will go before the 45th session of the UN general assembly in November for suggesting a future international scheme action.

The vice-president felt the drinking water and sanitation schemes should get the same urgency and priority assigned to combating illiteracy or safeguarding public security.

The urban development minister, Mr. Murasoli Maran, in his presidential address said that all developing countries faced the common problem of growing population in metropolitan cities.

Mr. Maran said during the decade the government had launched massive efforts for improving water supply. It had also taken advantage of the International Development Agency (IDA) credit from the World Bank for augmenting water supply in Bombay, Calcutta and Madras, as well as several state-level projects in Kerala, Tamil Nadu and Uttar Pradesh.

Mr. Maran said it was alarming that nearly a third of the drinking water in the country went to waste due to leaking taps and carelessness. Therefore, efforts should be stepped up to conserve resources.

Mr. William H. Draper, administrator, UNDP in his address said that during the past ten years, more than 1.3 billion new users had been supplied with uncontaminated drinking water and 700 million with sanitary facilities.

He said of the 15 million child deaths that occur every year, one third stem from diarrhea. Without clean water and decent sanitation, they had little chance of better health and a better life that economic development could bring, he warned.

In his welcome address, the Union minister of state for rural development, Mr. Upendranath Verma, pointed out that India had been able to provide safe drinking water to 98 percent of the 600,000 problem villages.

Mr. S.R. Sankaran, secretary of the department of rural development, said nearly 5 percent of India's total rural water supply finance of about $60 million came from international agencies.

He added that the government was committed to providing a basic minimum of 40 litres per capita of water daily to the rural areas. International support was crucial to the national funding in India, he added.

Steps Advised To Penalize Environment Polluters

91WD0060A Bombay THE TIMES OF INDIA in English 19 Sep 90 p 16

[Text] Stiff penalties for polluting industries and the introduction of an environmental audit system have been proposed in a draft policy paper awaiting cabinet approval.

Prepared by the environment and forest ministry, the policy will give higher priority to anticipatory and preventive measures than to correcting the immediate environmental problems.

It seeks to introduce economic instruments to restructure the energy, urban development, tourism, transportation, chemicals, agriculture and particularly small-scale industry sectors through charges.

The policy also seeks a 25 percent reduction in the consumption and use of industrial water as also cleaning of river systems and promotion of environmentally clean technologies during the next five years.

It aims at regulating the use of non-biodegradable products, developing a preventive framework for carcinogenic chemicals and bio-organisms and controlling the disposal of hazardous wastes.

An official spokesman said the concept of pollution control would evolve from the present narrow focus of regulatory control of pollution to the management of environmental resources.

Standards

The policy would also impose standards restricting land disposal, surface impoundment, storage in tanks, providing for corrective action as well as financial responsibility.

The policy also provides for assessment of the environmental impact of government projects and projects

receiving state subsidies internally by an environmental cell in the concerned ministry before any decision in principle is made on them.

It also proposed to adopt a code of stewardship with specific goals and operating procedures to strengthen the central-state and local co- operation to avoid duplication and increase the effectiveness of efforts.

Stringent measures will be provided to regulate industries which use toxic chemicals and generate hazardous wastes. For effective enforcement, continuous monitoring devices are proposed to be made mandatory for large-scale industrial units.

Mandating public involvement in decision-making as a means of promoting dialogue, participation and responsible care, particularly in controversial programmes that involve uncertainties and judgment, will be done, the policy paper states.

The draft policy also provides for the creation of a central pool of environmental experts and managers for deputation to the states for effective co-ordination and acceleration of environment protection programmes over the entire country.

It also provides for the incorporation of concepts related to pollution in the engineering curricula and managerial training institutions and grants to students in IITs and regional engineering colleges.

A reorientation of central and state pollution control boards to include development strategies in the existing regulatory responsibilities is also suggested.

Expansion of the environmental information service network to include universities and other institutions of higher education has been recommended.

Financial assistance for structural reorganisation of state pollution control boards is also provided for in the policy.

ISRAEL

Water Quality Said Deteriorating

91WN0024A Tel Aviv HA'ARETZ in Hebrew 11 Sep 90 p 7a

[Article by Eli El'ad]

[Text] The annual report on environmental quality in Israel, which is being issued today by the Ministry for Environmental Quality, includes a situation estimate that states, "the quality of the water in Israel is deteriorating. This is a continuing deterioration, and it is doubtful whether it will be possible to arrest it in the near future."

In the introduction to the report, which contains 990 pages, the Director-General of the Ministry for Environmental Quality, Dr. Uri Marinov, writes that "the ministry was established and was organized, and, despite the gloomy prophecies, the government transferred to it responsibilities and areas of operations from other ministries...The ministry has scored a success in the area of its activities, but at the same time, it cannot be denied that the most serious environmental problem in the country, water pollution, has not been solved...Authority for handling sewage, which is the main pollutant of ground water, is still divided between various government ministries...Most of the waste water, both household and industrial, is not purified. Entire areas of the country do not have sewage systems, and the raw sewage flows directly into the ground water. Since the summer of 1988, the polio period, almost nothing has been done to correct these deficiencies. On the contrary, the situation continues to deteriorate."

It is stated in the report itself that, "It has become clear that estimates from previous years regarding the risks of pollution and the possible impairment of water quality in Israel were correct. This is shown by the repeated findings of pollution in ground water. The estimate of the situation is that pollution will increase. A substantial portion of the pollutants are still in the unsaturated stratum, so that water resources that are available today are liable to be found in the future to be polluted or unsuitable for drinking."

The Coastal Aquifer is Dwindling

The report asserts further that, "While an optimistic estimate that the country has sufficient water resources of suitable quality to supply total household requirements is heard over and over again from those who are responsible for the water system, they, too, do not dispute the fact that serious investments are required in order to connect all the household consumers to these sources, and the state is not prepared for that at this stage."

The report warns that the continuing salinization of the ground water, which is the result both of human actions and of natural processes, has brought about and will also bring about in the future the closing of wells that provide drinking water. Also, the continuing rise in the level of nitrates in the ground water in various regions is liable to impair the possibility of utilizing well water for drinking.

The report warns further that the inability to supply water from the Sea of Galilee is liable to cause an increase in the serious deficit in the balance of the coastal aquifer (more than one billion cubic meters). The continuation of pumping at the present level is liable to cause already in the year 2000 the salinization of 20 percent of all the water that is pumped from this aquifer. The realization of the dream of mass immigration in the present decade will increase the rate of household consumption of good water at the expense of the supply to agriculture.

In the recommendations, it is stated that the situation requires a change in policy and the implementation of radical measures in order to halt the continuing process of pollution and in order to reduce the damage that has already been done. The report recommends separating the activity of those who are involved in ensuring water quality from the activity of those who are appointed over the allocation, production, and delivery of water.

Concentrations of Sulfur Dioxide

In the chapter that deals with air quality, it is stated that, "There has been no significant improvement or deterioration. This year, as in previous years, high levels of sulfur dioxide were found in the Haifa and Ashdod regions, and ozone concentrations were found in the coastal plain." The report reveals that following a striking decline in the quantities of sulfur dioxide released into the atmosphere during the years 1980-1985, an upward trend in the quantities released has again been perceived since 1985. The quantities of carbon monoxide are also increasing each year, and since 1980 they have almost doubled. The same holds for nitrous oxide. In contrast, there was a slight decline in the emissions of particles, and a significant decline in the emissions of lead particles.

The report recommends that the Law for the Prevention of Nuisances (the Kanovitz Law) be amended, and that it be adapted to the needs of the '90's, mainly in the areas of inspection and the granting of authority for the setting of emission standards. It is also recommended that the use of fuel oil with a sulfur content of more than one percent be forbidden in industrial plants that are located near residential areas, and to establish a system of control and policing for the measurement of the quantities of pollutants that are released from the Reading power station in Tel Aviv.

In the chapter that deals with the sea and the beaches, it is noted that there was only a small improvement in 1989. The main problems have not yet been solved, despite great efforts. In the last two years, there has been a deterioration in the quality of sea water and the levels of bacterial pollution, which are generally due to urban sewage.

LIBYA

Tripoli Water Capacity Less Than 50 Percent of Need

90WN0297A Tripoli AL-MUWAZZAF in Arabic 9 Aug 90 p 12

[Article: "Is There No Solution to the Water Problem?"]

[Text] AL-JAMAHIRIYYAH newspaper, in one of its recent issues, published an investigative report on the water problem in Tripoli based on a long interview with the chairman of the People's Committee for Utilities at the Tripoli city hall who gave a lengthy talk about the problem based on historical data which by now every citizen knows by heart because this information has been repeated with or without reason. The surprise in the chairman's talk, however, was that the utilities committee has no solution, no plan, and no workable scientific program save for the advice to leave Tripoli. We also discovered that the chairman is suffering from the same problem as we are because the Department of Utilities is powerless and paralyzed. And despite the very large number of municipal guards stationed inside and in front of its building and the fleet of cars assigned to it, the municipal Department of Utilities has failed to pursue, uncover, prosecute, restrain or even stop those people who set up in their homes suction pumps connected to the public water system and those who drill wells inside their homes.

As for the desalination plants that can be set up to solve the water problem, the secretary of utilities raised a thousand and one problems as if we are the only country to use such plants and to adopt this solution. The secretary asked that we wait until Arab research came up with an Arab desalination technology that considers environmental and natural factors, a wait that might extend to the middle or end of the 21st century when most of the residents of Tripoli would have either passed away unmourned or developed a chronic disease requiring them to frequent urinary tract clinics or check into al-Zahra' Hospital to await their death. As for what the secretary of utilities said about Tripoli designing its utilities for 750,000 people, when the total population is 2 million, I believe that first, the amount of salty water being pumped is not enough for either number, and second, Tripoli's plans have been designed and drawn up by Tripoli Utilities and the Tripoli expansions have been done with approvals and permits issued by the Tripoli Department of Utilities. So why have these approvals and permits been issued? This is a question neither we nor the Tripoli Department of Utilities can answer.

Finally, we would like to emphasize that science is not incapable of solving this problem and we do not think that the shortage of water, on the one hand, and its salinity and pollution, on the other hand, are a simple and ordinary fleeting matter while citizens are anguished and tormented by anxiety, distress, grief, and sleeplessness, paying for this problem with their health and lives.

The water problem in Tripoli is bigger than its utilities and its municipality and calls for an initiative by the General People's Committee for Agricultural Reclamation and Land Reconstruction, by the Public Power Company, and by our expert universities' professors aimed at drawing up a scientific plan.

One advice to the Tripoli Department of Utilities and its secretary: do not publish any more interviews that drive us to more pessimism, uncertainty, and anxiety.

Tripoli Faces Severe Water Shortage, Pollution

91WN0007A Tripoli AL-SHATT in Arabic
21 Aug 90 pp 2-3

[Article: "AL-SHATT Reopens File on Critical Water Situation in Tripoli Municipality"]

[Text] The city of Tripoli these days is facing an acute crisis arising from dwindling water supplies and higher salinity and pollution levels that have rendered the water issue the chief concern and daily worry of the city's dwellers. The Tripoli municipal people's committee has been compelled to form a water emergency committee and adopt quick remedies based on available water figures, consumption rates, and water shortages illustrating the city's water situation. [The water supply] has been severely disrupted in recent times, which has created many problems related to the quality and quantity of water and has had a direct and indirect impact on life in the city whose population has risen to over 1.4 million.

Water Situation (1978-1989)

All studies conducted to date agree on the seriousness of the shortage that reached a dangerous peak in 1985. The current shortage (1990) is actually more serious than the comprehensive advisory plan had projected. The depletion of the groundwater reserve without compensation and the increase in salt water has raised the water supply's salinity rate. Consequently, legislation has been enacted to grant drilling permits to prohibit the drilling of surface water wells in al-Jafarah and other regions, except under certain conditions and specifications that may be inconsistent with the Tripoli Municipality requirements, thus contributing to supply shortages.

A comparison between the actual water output curve, based on flow readings and calculations, and the average and peak consumption demand shows that the shortage had been consistently growing, dropping a little in 1983-84 when the Wadi al-Rabi' water field was first activated but going up again and then down a little toward the end of 1988 and the beginning of 1989 when corporate and public wells were annexed and certain producing wells were upgraded and new ones added as part of the well-maintenance project.

One characteristic of the situation in the past was the increase in the salinity level at plant wells to the point where, at one of the most important plants, the Suwani Plant, it exceeded the internationally allowable rate of 1500th per million to 3800th per million. The Wadi al-Rabi' output curve (figure No 2) shows that output has dropped enough to arouse fears that surface wells would cease production in the not-too-distant future, before the year 2000, and, consequently, deep wells could not be used by themselves because of their health hazards.

Impact, Shortage

In view of the discrepancy between supply and demand, the city of Tripoli has been suffering a water shortage that has caused the water pressure to drop, thus cutting off the water supply to certain regions. This shortage became manifest first in somewhat high regions and in summer especially (al-Zahrah, Zawiyat al-Dahmani, al-Mansurah, al-Qubbah reservoir in the old city, and al-Kushayk Division in al-Andalus District).

Salinity

The city of Tripoli has different levels of salinity that in certain areas are up to 23000th per million. This has created serious hazards to the public health and to rundown water systems.

Current Water Supply Situation (1990)

Population Growth:

Based on a study of the population growth rates and estimates contained in a comprehensive water plan for 1978, prepared by the advisory office, and based on a study of the 1984 statistical handbook put out by the Statistics and Census Authority, and considering that the ratio of the Tripoli population density to the Tripoli Municipality population is 83 percent, a projected population curve shows that:

Tripoli's 1990 population is 1 million persons.

Criteria:

The criteria cited in some water demand studies differ according to urban growth, social and health awareness, and domestic, commercial, and industrial consumption, including:

- 229 liters per capita per day average demand for 1978 (comprehensive water plan).
- 315 liters/capita/day average demand for 1990 (comprehensive water plan).
- 300 liters/capita/day (operation and maintenance bureau, 1988 study).

Since the city of Tripoli is now full of installations and factories that are a production source at the national level and in view of the overconsumption by citizens and public agencies, including watering parks with drinking water, the criterion we will use in this study is 300 liters/capita/day.

Reasons for Present and Future Shortage:

- I. Population growth and urban sprawl and the subsequent higher demand and dwindling supplies.
- II. Higher salinity level and lower groundwater level and the subsequent lower supplies and the unfeasibility of drilling new wells in the [salt] contaminated area.

Production, Demand, and Shortage:

1. With the maximum number of wells, including saltwater wells, in operation:

- The total maximum output would be 213,000 cubic meters per day.
- The total actual output (with 15 percent loss through seepage) would be 181,050 cubic meters per day.
- The average demand for water would be 300,000 cubic meters per day.
- The ratio of shortage to average demand would be about 40 percent.

If the peak demand in summer is 50 percent greater than the average demand:

- The peak demand would be 450,000 cubic meters per day.
- The peak demand shortage would be 268,950 cubic meters per day.
- The ratio of shortage to peak demand would be 60 percent.

If wells with salinity above the allowable level were shut down:

- The total actual output (drinking water) would be 119,000 cubic meters per day.
- The ratio of shortage to average demand would be 60 percent.
- The average demand shortage would be 181,000 cubic meters per day.
- The ratio of shortage to average demand would be 60 percent.
- The peak demand shortage would be 331,000 cubic meters per day.
- The ratio of shortage to peak demand would be 74 percent.

III. Domestic and public water waste besides using drinking water to water parks.

IV. Loss through seepage from the public water system and the delay in improving and upgrading the system.

V. Massive expansion of well drilling in farms around Tripoli with or without permits, thus causing a sharp drop in the groundwater surface level. Several attempts have been made to shut them down, but to no avail (for example, the wells drilled in the Wadi al-Rabi' field).

VI. Failure to implement the two seawater desalination projects included in the comprehensive water plan east and west of Tripoli, each with a maximum capacity of 230,000 cubic meters per day.

VII. The General Power Company's failure to fulfill its obligations to supply the Tripoli utilities with up to 12,000 cubic meters per day of desalinated water in summer from the West Tripoli power plant.

Current Situation of Upper Underground Reservoir:

We cite the warnings contained in the comprehensive water plan drawing attention to the average drop in the groundwater level in the Qasir Bin-Ghashir region to 5m/year and the consequent diversion of the water course and the seawater contamination at the coastline, projecting that the salty front would be diverted toward the sea at an average of 450 m/year and, therefore, attempts to improve the situation ought to be focused on reducing the output by searching for alternative sources of drinking water.

Realistic Confrontation of Current Situation:

Option No 1:

Whereas the comprehensive water plan for the city of Tripoli recommended the construction of two desalination plants east and west of Tripoli with a maximum capacity of 220,000 cubic meters per day to feed the two pumping stations and the new major systems east and west of Tripoli that were completed in 1983-84, the emergence of the Great Man-Made River Project led to the reconsideration of these two major plants to feed the city from this river during the second phase scheduled for completion in 1996.

Accordingly, the confrontation stage dictates that from now until 1996 necessary measures ought to be adopted to save the situation and guarantee human stability in the city of Tripoli. Such measures may be summed up as follows:

- 1. Coordination with the executive body of the Great Man-Made River of the works that are needed to use the existing water and link the comprehensive water plan to this project.
- 2. The immediate shutdown of saltwater wells that are detrimental to the public health, to the public interest, and to the water system, whose operation used to be an urgent necessity but is now intolerable, thereby lowering the output from 213,000 cubic meters per day to about 140,000 cubic meters per day, or speeding up the implementation of the wellwater desalination project that was recently studied.
- 3. A study of alternative solutions to make up for the average and peak demand shortages by obtaining permits from the Water and Land Authority to drill wells in new unsalty cooperative fields similar to the 'Ayn Zarah fields for 6 years, when the Great Man-Made River would be in operation, or by building seawater desalination plants.
- 4. Revival of the preventive-well project submitted by the advisory office to the Water and Land Authority to put a stop to the saltwater invasion.
- 5. Curb overconsumption of water and immediate implementation of the General People's Committee's decision of 20 April 1980 to use sewage water to water parks and refrain from using drinking water for this purpose.
- 6. Ensuring that the power company fulfill its obligations to supply Tripoli utilities with desalinated water from the West Tripoli power plant in the amount of 5,000 cubic meters per day at ordinary hours and 12,000 cubic meters per day in summertime.

Option No 2:

If it is not possible to supply the city of Tripoli with the drinking water it needs from the second phase of the Great Man-Made River, it will be necessary to implement all the aforementioned measures and carry out the desalination project recommended in the comprehensive water plan study in East and West Tripoli.

Option No 3:

Put a stop to industrial and residential urban sprawl in the city and promote reverse migration by building new locations outside the salt contaminated area that has water sources large enough to meet present and future needs.

Water Situation in Municipal Subdivisions

The water supply in these subdivisions depends on wells and, therefore, subdivisions located near the sea (Janzur, Tajura', al-Qurrah Bulalli) are advised to conduct a prompt and comprehensive study of the population, water demand, and urban growth rates and to determine the agricultural use of water.

As for the other inland subdivisions whose only source is groundwater, they can conduct a study of the population, the urban growth level, and the current supply to compare them to the demand and to regulate the water output to match the hydraulic balance.

Current Situation of Water Utility General Structure

The municipal water sector is currently suffering from the absence of a specialized central authority that includes planning, study, oversight, and documentation departments. These functions are now under the jurisdiction of the Studies, Design, and Urban Planning Bureau. Also, the operation and maintenance arm of the drinking water utility department, represented in the water section of the Operations and Maintenance Agency, besides 14 other sections, not counting the administrative and fiscal ones, do not receive the attention and operational and maintenance support it needs from the sector amid the meager annual appropriations compared to the magnitude of the work and responsibility placed on the agency.

Therefore, to raise the level of services in this sector and to prepare good scientific statistics and studies to gain knowledge about the various facets of this sector, and since drinking water is very important to people's lives psychologically, societally, and in terms of their existence in this part of the country, not to mention the major role it plays in correcting the general image of municipal services, there has to be a specialized scientific administration for the water utility department that answers directly to the muncipality's people's committee.

Based on the above and given the current water situation, the most important recommendations are:

Regarding quality and quantity:

- Prompt agreement with the General People's Committee for Land Reclamation and Construction and the management of the Great Man-Made River on the amount of water that will be supplied to the city of Tripoli for drinking and urban use and, therefore, the required time.
- Cover the water shortage during the time needed to complete the second phase of the Great Man-Made River.
- Treat the high salinity level of the drinking water to the allowable limits.
- Prepare a comprehensive plan for water supplies to subdivisions outside the city's limits.

Regarding the protection of ground water against pollution:

- Put an immediate halt to drawing water from the underground reservoir and around the contaminated area.
- Implement the preventive well dike project to stop salt water contamination.
- Halt the drilling of additional wells for agricultural purposes and consider the idea of bringing together all existing wells under the central irrigation program to have control over water output.

PAKISTAN

Water-Borne Diseases Afflict One-Third in Lahore

91WD0049A Lahore THE PAKISTAN TIMES in English 26 Aug 90 p 4

[Text] The threat to public health arising from polluted drinking water supply in Lahore can be gauged from the fact that about one-third of the city's population suffers from water-borne diseases. According to a report filed by our Staff Reporter, the water supplied in the city through tubewells is not only contaminated but also lacks many essential salts and minerals vital to building up body resistance. It is said that the underground water reservoir in parts of the city continues to be contaminated on account of seepages from the river Ravi which used to flow through them in the past and which has always been a favourite site for dumping garbage and human and animal excreta as well as the city's sewage. Another factor responsible for the contamination is the persistent cracks and leaks in the worn-out water supply pipelines through which slushy water enters them. The unsupervised chlorination of city's water supply through WASA tubewells is also to blame for the situation.

The people of Lahore face health hazard from several sources, not the least from environmental pollution, adulterated foodstuffs and spurious drugs. Water-borne diseases represent another facet of the problem. The situation not only causes a lot of human suffering but also

long-termeconomic damage in the shape of countless man-hours lost. It is high time the concerned authorities woke up to the gravity of the situation and took measures on war-footing to contain the menace. A comprehensive plan should be evolved to repair or replace the leaking water supply pipelines in the city immediately and WASA must ensure controlled chlorination of water supply through its tubewells. Further, arrangements be made for periodic cleaning of the supply lines and controlled disposal of garbage in the city. And last but not least, a campaign be launched to create awareness among the public to use boiled water, where possible.

1991-95 State Environmental Protection, Resource Use Program

91WN0019A Moscow EKONOMIKA I ZHIZN in Russian No 41, Oct 90 Supplement pp 1-8

[State Program for the Protection of the Environment and the Intelligent Use of the Natural Resources of the USSR in 1991-1995 and over the Long Range up to 2005]

[Text]

Introduction

The maintenance of steady rates of economic and social development in the country is connected to a considerable extent with the state of the environment and the level of the use of our natural resource potential. In this connection, questions connected with the protection of the environment and the intelligent use of natural resources are viewed as priorities by the Government of the USSR. As a result of measures taken between 1976 and 1988, atmospheric pollution from permanent sources was reduced by 15 percent. The amount of recycled water increased by 144 cubic kilometers. As a result of this, the annual savings in fresh water from natural sources amounts to more than 274 cubic kilometers, exceeding the average annual run-off of the Volga. The recultivation of land is being practiced on a broader scale, and the network of nature preserves has grown much larger. Total expenditures on environmental protection exceed 100 billion rubles, including 30 billion in capital investments.

An analysis of the results of conservation efforts and the state of the environment indicates, however, that there have been no significant positive changes in the ecological situation in our country.

The continued development and distribution of productive forces without the necessary investigation and consideration of ecological factors could cause the deterioration of ecological, economic, and sociopolitical conditions in the country in the future.

The State Program for the Protection of the Environment and the Intelligent Use of Natural Resources is being adopted during the period of transition to a regulated market economy, the fundamental restructuring of national economic management, and the redistribution of rights and functions among union, republic, and local agencies in line with recently passed fundamental laws.

The State Program for the Protection of the Environment and the Intelligent Use of the Natural Resources of the USSR in 1991-1995 and over the Long Range up to 2005 sets forth a precise conservation theory, long-range strategic objectives, and the basic guidelines of their attainment. Its implementation will allow us to improve the ecological state of the country, alleviate tension in many cities and regions of the country, and normalize the state of their environment.

Republic, regional, kray, oblast, and municipal conservation programs and the programs of different branches and enterprises should be drawn up on the basis of the state program and in accordance with it.

The program was drafted by the USSR State Environmental Protection Committee with the assistance of the State Committee of the USSR for Science and Technology, the USSR Academy of Sciences, the State Committee of the USSR for Hydrometeorology, the USSR Ministry of Health, and union republic councils of ministers and was subjected to a preliminary examination at a meeting of the Presidium of the USSR Council of Ministers.

Section 1. The State of the Environment in the Country

The pollution of the air, water, and land by substances dangerous to the health of the human being and of plants and animals is the most acute and urgent of all our environmental problems.

The main sources of atmospheric pollution are industry and transportation, which emit around 100 million tons of pollutants into the air each year. In the last three years incidents of the maximum concentration of pollutants, exceeding 10 times the MPC [maximum permissible concentration] have been recorded in more than 100 cities in the country. Most of these cities are concentrated in the Donetsk- Pridneprovskiy region of the Ukraine, in the Urals, in the Kuzbass, in the Transcaucasus, and in East Kazakhstan. The list includes such large industrial centers as Arkhangelsk, Berezniki, Volgograd, Donetsk, Dushanbe, Yerevan, Krasnoyarsk, Kemerovo, Kuybyshev, Novokuznetsk, Omsk, Sverdlovsk, Tashkent, Khabarovsk, and others.

Recently there has been a tendency toward increased incidents of extreme atmospheric pollution. A high level of systematic atmospheric pollution has been recorded in around 70 cities in the country, and it was recorded each year in the last five years in 30 cities (Addendum 1).

More than 150 billion cubic meters of effluent from sewers and other sources are dumped into bodies of water in the country each year, carrying more than 30 million tons of pollutants into reservoirs and channels.

The highest levels of water pollution have been recorded in the Danube, the Western Bug, the Northern Donets, the Tom, the rivers of the Central Urals, East Kazakhstan Oblast, and the island of Sakhalin, the rivers and lakes of the western Kola peninsula, and the lower reaches of the Volga and Amur. Many internal bodies of water have been polluted with biogenic substances, mineral fertilizers, and pesticides. Levels far in excess of the permissible concentration have been recorded in many bodies of water in the Turkmen SSR, Uzbek SSR, Moldavian Republic, Krasnodar Kray, and other parts of the country.

Oil and gas exploratory and drilling operations in the Caspian, Ob- Irtysh, and Pechora basins and on the

Yamal peninsula have led to the mass pollution of major fishing areas with petroleum products. If conservation efforts should be continued at their present rate, the exploitation of oil and gas deposits in the cis-Caspian region will create a precarious ecological situation in the lower Volga and northern Caspian zones.

Timber drift has a negative effect on the state of ecosystems in waterways.

The water of the Syrdarya and Amu-Darya is severely polluted and has been almost depleted by irrigation systems. The level of the Aral Sea has dropped more than 14 meters since the beginning of the 1960's and has ceased to be a valuable fishing area. The unique ecosystem of the Aral Sea has been destroyed.

The depletion of water resources in the basins of the Kuban, Don, Ural, Terek, Kura, and other rivers has passed the ecologically dangerous point. The situation is still critical in Baykal, Balkhash, Ladoga, and several other large lakes.

The marine ecosystems of the USSR are being subjected to intense and increasingly pronounced anthropogenic strain. The most unfavorable conditions are taking shape in the northwestern part of the Black Sea, in the Sea of Azov, in the Baku bay of the Caspian, and in the Kursk and Riga gulfs and Neva bay in the Baltic Sea.

As a result of years of violations of fishing limits, the fish resources of the Barents Sea have been depleted.

Around 400 million hectares of kolkhoz and sovkhoz lands are eroded, 157 million hectares of agricultural land are highly salinized, 36 million hectares are waterlogged or swampy, and 68 million hectares are excessively acidic. The construction of reservoirs flooded around 7 million hectares of bottomland. Soils in different parts of the country have lost from 8 to 40 percent of their humus in the last 15 years. The soil is too compact on 187 million hectares of plowland, and 50-55 million hectares have been polluted with pesticides. The appropriation of land for non-agricultural purposes is inflicting heavy losses on the national economy.

The overall level of the use of mineral resources in the national economy is still unsatisfactory. Mining losses amounted to the following just in 1988-1989: 189 million tons of coal, 49 million tons of iron ore, 2.4 million tons of manganese ore, 7.4 million tons of apatite-nepheline ore, 3.3 million tons of phosphoritic ore, and 138 million tons of potash salt. More than 50 billion tons of unutilized strip and enclosing rock and concentration by-products have accumulated in slagheaps.

Around 30 million tons of toxic industrial waste and around 57 million tons of solid household waste are created each year, and only a small portion reaches sewage treatment facilities.

The country's timber resources are being used inefficiently. The heavy equipment used in logging operations does not meet present ecological requirements. Large quantities of timber are lost during logging and processing operations. Forests in vast areas are undergoing negative changes. From 10,000 to 30,000 forest fires, covering an area of 0.5- 2.1 million hectares are recorded each year. Forest pests and diseases have been observed in an area of 1-2 million hectares. More than a million hectares of forests have been injured by industrial pollution. Dead and burned-out forests cover a total area of around 30 million hectares.

The present situation with regard to the protection of animals and the progressive destruction of wildlife habitats are reducing the variety of species, destroying natural animal communities, and reducing the total number of animals.

Many plant species are disappearing.

Many recreation areas and bodies of water have not been protected adequately, are deteriorating, and have ceased to perform their restorative functions.

Vast regions of the Ukrainian SSR, Belorussian SSR, and RSFSR suffered from the accident at the Chernobyl AES. High levels of radioactive pollution have been recorded in Mogilev, Gomel, Bryansk, Kiev, and Zhitomir Oblasts in addition to the areas surrounding the plant.

The unsatisfactory procedure of recording and monitoring the use of sources of ionizing radiation and radioactive substances in the national economy and the violations of disposal regulations have created dangerous sources of radiation.

Environmental pollution is one of the main factors influencing the longevity and health of people and increasing the danger of birth defects.

The intensive development of industrial and agricultural production in the world and the tendency to burn more and more organic fuel are beginning to have a significant impact on the earth's climate. These changes in climate could affect agriculture and many other branches of the economy—power engineering, water management, forestry, construction, and transportation. This will affect human health and the state of the environment.

The most critical ecological situation has taken shape in the zone affected by the Chernobyl accident, the cis-Aral zone, the northwestern part of the Black Sea and Azov Sea, the cis-Caspian region, especially the lower Volga, the Black Lands and Kizlyar Pastures, the Kuzbass, the Barents Sea and several other parts of the Arctic, the Baltic Sea basin, the northern and southern Urals, and East Kazakhstan. The Chernobyl accident zone and the cis-Aral territory can be categorized as ecological disaster zones.

Section 2. The Strategic Goals and Objectives of the Soviet State in the Sphere of Environmental Protection and Resource Conservation

The Soviet State's strategic goals in environmental protection and resource conservation are the following:

The maintenance of a healthy and ecologically safe environment to secure the physical, psychological, and social well-being of the population of the entire country;

The conservation and intelligent use of natural resources for the effective and steady socioeconomic development of the country;

The regulation of the balanced reproduction and use of renewable natural resources and the efficient use of non-renewable resources with the extensive use of by-products in the national economy;

The maintenance of a balanced biosphere on the local, regional, and global levels;

The protection of the gene pool, range of species, and regional diversity of wildlife and the territorial and architectural distinctions of rural and urban locations as the priceless and inherent property of the people of our country and the basis of the national cultures and spiritual life of all members of society.

The ecological safety of the country and the whole planet is one of the priority objectives of our state.

During the first phase, between 1991 and 1995, steps will be taken to prevent the deterioration of the environment throughout the country and improve the environment considerably in the zones and cities with the most critical ecological conditions. The average content of substances posing the greatest threat to human health in the atmosphere of cities and in bodies of water should be reduced to permissible limits by the year 2000, and the ecological situation in the country should be improved considerably by 2005; special programs will be carried out to restore disrupted ecosystems and heal damaged elements of the natural environment.

The attainment of these goals will necessitate the following:

The planning and implementation of consistent measures to conserve resources and observe all ecological requirements in all areas of national production and consumption and the active transfer of industry to low-waste technological processes and waste-free production units;

The establishment of a single system of conservation laws, standards, and requirements for economic activity, anthropogenic capacity, and environmental conditions;

The ecologically sound distribution of productive forces and the use and reproduction of natural resources in line with the criteria of permissible anthropogenic pressure on the environment;

The development and start-up of a new economic mechanism for the efficient use of resources on the basis of primarily economic methods of management combined with legal and educational methods;

The institution of measures to prevent accidents in ecologically dangerous production facilities leading to the abrupt deterioration of the state of the environment;

The reduction of the amounts of gaseous, liquid, and solid pollutants discharged into the atmosphere by enterprises, organizations, transportation vehicles, and other facilities to permissible levels;

The organization of effective ecological appraisals of programs and plans for all types of economic activity, including the projected basic guidelines of national economic and social development;

The planning of a group of measures to eliminate the negative effects of environmental pollution on people, animals, plants, the earth's ozone layer, and the climate and the protection of the range of species of living organisms and natural ecosystems;

The establishment of a single automated system for the ecological monitoring and observation of environmental conditions and environmental pollution;

The priority development of research in the main scientific fields of conservation, including basic research;

The guarantee of a higher level of ecological education and training and the dissemination of environmental information on a broader scale;

The assignment of a more important role to the public and to mass propaganda in environmental protection;

The guarantee of international ecological security and the preservation and conservation of the earth's natural resources as part of international security in general.

During the first phase, financial and material resources will be used primarily for priority projects in the construction of conservation facilities, the renovation of technological processes and production units in industry, agriculture, and public utilities, and the closure of obsolete and ecologically hazardous production units and enterprises to secure a significant reduction in pollution and reduce the use of natural resources in ecologically critical zones.

In 1991 and 1992, all existing reserves will have to be employed to enhance the effectiveness of conservation efforts by instituting and enforcing stricter technological requirements. An essential condition for this will be the recording (inventory) of pollutants, the identification of sources of sewage and emissions, the establishment of standard permissible emission and sewage limits, the institution of fines for emissions of pollutants, and the reinforcement of the material and technical base of monitoring agencies.

During the second phase of the program, the attainment of all of the projected indicators will entail the concentration of financial and material resources in the intensification of conservation and restoration efforts between 1996 and 2005.

The practice of developing resource-extractive branches will have to be radically revised during this period. The satisfaction of the rising national economic demand for raw materials should be secured primarily through conservation efforts entailing the comprehensive use of raw materials, the intensive processing of production and consumption waste, and the broad-scale substitution of energy- and resource-saving equipment and technology for earlier types. This is the most essential condition for the resolution of environmental problems.

Section 3. Imperative Measures To Improve the Environment in 1991- 1995

3.1. Ecological safety

The following measures will have to be taken to reduce the probability of ecologically dangerous situations, minimize the scales of their influence, and guarantee the safety of people.

The criteria of heightened ecological danger and the ecologically hazardous zones and facilities should be defined in 1991. National economic facilities which could endanger the environment and the human being in the event of the accidental emission (or disposal) of the radioactive and chemical substances used, produced, or stored in these facilities or during the course of regular operations must be registered and categorized in terms of the degree of danger they present.

On the basis of this inventory, enterprises and organizations should work with local soviets of people's deputies in planning and carrying out the following:

A group of measures to minimize the risk of ecologically dangerous situations, especially accidents in chemical production units, in nuclear power engineering, in continental and off-shore oil and gas drilling, in facilities for the storage and transportation of combustible, radioactive, and toxic substances, and in elevated dams and avalanche and mud-slide barriers;

Measures to balance the production, consumption, and disposal of toxic, inflammable, explosive, and radioactive products and substances, with a view to the elimination or minimization of their transport;

Plans for the resettlement of the inhabitants of the quarantined zones of enterprises in the chemical, petrochemical, microbiological, gas production and refining, metallurgical, coal-tar chemical, and mineral fertilizer industries and other ecologically hazardous enterprises and production units;

The compilation of ecological-hygiene maps of the country's territory to reveal the regions with the most adverse effect on the state of public health;

The continued development of the system to keep track of public health indicators and reveal environmental factors with a negative impact from the standpoint of the comprehensive and combined effects of various factors on public health;

The assessment of environmental pollution levels near enterprises disposing of industrial waste containing carcinogenic, toxic, and other dangerous substances and the definition of safe living conditions for the population of these regions on the basis of these assessments in 1991-1993.

Early warning and emergency shut-off devices should be developed and installed in national economic facilities to turn off equipment and stop technological processes, and automated systems should be designed to assess the reliability and fire- and shock-resistance of equipment.

Regional plans should be drawn up to minimize the consequences of probable ecologically dangerous situations.

There should be a national system of early warning and the alleviation of the consequences of major accidents and cataclysms and of natural and ecological disasters, envisaging the timely acquisition of necessary and reliable information from the unified information system of the ecological monitoring, warning, and emergency management service.

The operational principles of systems guaranteeing the following should be defined:

The collection, storage, processing, and analysis of ecological information for the planning and implementation of conservation measures on the union and republic levels;

The regular monitoring (land and aerospace) of the state of the environment, sources of pollution, and the use of natural resources;

Contact with international ecological information systems for the purpose of the effective use of achievements in geodata processing.

Domestic and foreign experience in early warnings of accidents in AES's, GES's, and other ecologically hazardous production units should be used to the maximum in the development of these systems.

We should establish a national ecological first aid center and take part in organizing this kind of international system.

The construction standards and regulations governing the territorial distribution of potentially dangerous facilities should be supplemented in 1991 and should stipulate the compulsory inclusion of emergency plans in project documentation.

3.2. Reduction of air pollution in cities

In order to guarantee the normalization of the ecological situation:

Measures will be instituted between 1991 and 1995 in the cities of the Donetsk-Pridneprovskiy zone, the Urals, Kuznetsk, East Kazakhstan, the Transcaucasus, and other regions with the highest level of systematic atmospheric pollution according to Addendum 1 to improve the structure of industry, remodel obsolete production units, assign priority to the introduction of progressive technology, and install effective gas- purifying and dust-collecting equipment for the purpose of reducing the most dangerous emissions to the maximum permissible level and thereby considerably improving the sanitary and hygienic living conditions of more than 16 million people;

Gross emissions of pollutants into the atmosphere from permanent sources are to be reduced by an average of 17-20 percent, bringing the volume down to the indicators in Addendum 2, and emissions from motor transport are to be reduced by 7-10 percent by 1995 in comparison with 1988 figures;

Emissions of nitrogen oxides will be stabilized by 1994 within the country's European territory (using the 1987 level as a basis) in accordance with international agreements and will subsequently be reduced, and emissions of sulfur compounds will be reduced by 30 percent (in comparison with the 1980 figure) by 1993, and by 50 percent in the zones bordering on Finland by 1995;

Cities with a high level of environmental pollution will be fully supplied with low-ash and low-sulfur fuel;

Comprehensive measures will be planned and carried out to reduce the toxicity of vehicle engine emissions by setting official state limits on the content of pollutants in emissions in accordance with international requirements and with a view to the developmental prospects of motor transport in our country and by increasing the series production of exhaust neutralizers and equipping motor vehicles with them; the optimal structure of traffic in the cities of Moscow, Leningrad, the capitals of union republics, large industrial cities, and health resorts will be determined; electrified means of transport will be used on a broader scale; vehicle bypasses and parking lots will be built and pedestrian- only traffic zones will be established;

Uninterrupted supplies of non-ethylated gas to completely cover the needs of the cities of Moscow and Leningrad, the capitals of union republics, and health resorts will be secured by 1995; the proportional output of non-ethylated gasoline should rise to 75-80 percent by 1995;

Liquid motor fuel should be replaced by compressed and liquefied gas at a rate of at least 6.5 million tons a year by 1995.

3.3. Improvement of the state of bodies of water and provision of the population with drinking water

Improving the state of sources of water will necessitate:

The installation of facilities for the purification of sewage at a rate of around 35 million cubic meters a day and the more efficient operation of existing sewage treatment plants;

The cessation of the extraction of sand, gravel, and other construction materials from riverbeds representing valuable sources of fish or located in coastal erosion zones by 1991;

The development of a system of ecological criteria governing the operation of water management facilities and the institution of these criteria in 1992, including maximum permissible limits on water intake and on the dumping of pollutants;

The compilation and approval in 1991-1994 of plans for the comprehensive use and protection of the water resources of the Volga, Dnepr, Kura, and other large rivers with consideration for future ecological requirements.

The quality of drinking water is to be brought up to sanitary-hygienic standards by 1995 and the following steps are to be taken for this purpose:

The priority use of ground water for drinking and household use is to be secured;

The use of drinking water for technical purposes is to be reduced by a factor of 1.5 and the amount of group and local water supply lines installed should be increased by 10-15 percent each year;

New compound methods should be developed for the sterilization of water to meet quality standards, including distillation, deferrization, defluorization, and others;

Portable equipment for group and personal use will be produced for the purification and decontamination of drinking water in rural regions and outdoors;

Facilities will be established to supply the population with bottled drinking water, beginning with the Central Asian republics;

Water supply lines will be installed, remodeled, or enlarged, beginning with Baku, Berdyansk, Groznyy, Dzhambul, Yerevan, Kaspiysk, Kemerovo, Kerch, Kzyl-Orda, Kurgan, Makhachkala, Navoi, Nukus, Odessa, Omsk, Perm, Rostov-on-Don, Sverdlovsk, Tyumen, Urgench, Ufa, Chimkent, and Shakhtinsk, and sewer systems and sewage treatment facilities will be updated and enlarged in Bratsk, Vilnius, Zaporozhye, Kaliningrad, Kemerovo, Kirovakan, Krasnoyarsk, Leningrad, Mariupol, Novokuznetsk, Odessa, Perm, Riga, Ust-Kamenogorsk, Fergana, and Chimkent;

Automated water quality control and management centers will be installed in the central water supply networks of cities with a population of over a million.

3.4. Guarantee of radiation safety

Enhancing the radiation safety of the population and the environment will necessitate the following:

The establishment of a system for the comprehensive monitoring of thermal, chemical, and radioactive pollution in the areas surrounding AES's;

The validation of ecological requirements for the distribution and development of nuclear power engineering facilities;

The ecological appraisal of the building plans for nuclear, electrical, and thermal power plants and other projects with nuclear power equipment;

The planning and implementation of an additional group of measures to heighten the safety of nuclear power plants and nuclear reactors;

The development of ecologically safe technology for the post-operation shut-down of nuclear power engineering facilities;

The compilation of plans for each nuclear power plant for the elimination of the after-effects of possible accidents;

The drafting of legislative proposals in 1991 to establish a single procedure for the inventory, storage, transport, processing, and disposal of sources of ionizing radiation and radioactive waste and materials and the monitoring of disposal sites, specifying liability for the violation of laws in this sphere;

The establishment of a system to monitor the activities of all enterprises, organizations, and establishments operating nuclear equipment or using sources of ionizing radiation;

The development of a system to warn and inform the population in advance of radiation danger and the levels of radioactive pollution of the environment and agricultural produce;

The prohibition of the start-up of projects including nuclear equipment and sources of ionizing radiation without the planning and institution of a system to monitor radiation, meteorological, ecological, and sanitary-hygienic conditions;

The organization of detailed surveys of the territory of all cities with a population of over 100,000 before 1995 and cities with a population of over 50,000 before 2000 for the disclosure of previously unrecorded sources of ionizing radiation and their subsequent elimination.

3.5. Prevention of pollution of the environment with dangerous chemical substances

Steps will be taken for the gradual reduction and subsequent complete elimination of environmental emissions of health-endangering substances (polychlorinated biphenyls, dioxins, cyanides, phenols, and others).

Production units, technologies, and processes emitting carcinogenic and toxic substances into the environment will be inventories in 1991, and in 1992 a group of technical, organizational, and legal measures will be planned to keep these substances from entering the environment.

The permissibility of the continued use of asbestos and materials containing asbestos in the production of consumer goods, in housing construction, and in the construction of medical, children's, and pre- school establishments will be determined.

Imported goods and goods produced in the USSR will begin to be inspected in 1991 to check their content of dangerous chemicals.

3.6. Protection of the population from noise and electromagnetic radiation

The negative effects of noise on the human being are to be reduced. The following steps will be taken for this purpose:

Measures will be planned and carried out to reduce the external noise of all types of transportation and other technical equipment to below the existing required limits;

Devices to check the noise characteristics of operating vehicles in railway, air, water, and motor transport will be produced on a broader scale;

Urban highways will be categorized in terms of the noise factor in 1991 and 1992 and comprehensive plans for the protection of citydwellers from noise will be drawn up on the orders of executive bodies of soviets of people's deputies, as well as programs for the institution of noise-abatement measures with the appropriate technical and economic substantiation;

A group of measures will be taken to prevent noise pollution in newly developed territories.

Steps will be taken to reduce the harmful effects of electromagnetic influences on the human being and the environment, particularly the following:

The sanitary-hygienic categorization of these sources will be conducted from 1991 to 1993, and the present and projected electromagnetic conditions in all regions and cities of the country will be plotted from 1992 to 1994;

A group of organizational and technical-engineering measures will be elaborated and instituted in cities and other populated points to reduce electromagnetic radiation to the maximum standard level;

Urban development plans in 1991 and 1992 will concentrate on regulating and normalizing the electromagnetic field in cities and protecting the population from the effects of excessive levels of electromagnetic radiation, and the general plans of cities will be adjusted accordingly.

3.7. Health resorts and other recreational areas

Economic activity will be limited in the regions surrounding health resorts and unique recreational areas, with the removal of enterprises not connected with the functioning and development of health resorts and therapeutic clinics or with public services to secure the establishment of more favorable sanitary conditions for medical treatment and recreation.

The following steps will be taken to preserve the therapeutic and restorative functions of natural facilities:

Scientifically sound criteria will be defined in 1991 and 1992 for the maximum anthropogenic strain on the environment of health resorts and recreation areas;

Laws and standards governing the use and preservation of recreation areas and health resorts will be brought in line with current ecological requirements;

Comprehensive territorial plans for the protection of the environment in health resorts of unionwide significance will be drafted by 1995;

A system will be established to monitor the state of natural therapeutic resources, the landscape, water, air, soil, and vegetation;

Land evaluation studies of regions of recreational value in the USSR will be conducted.

3.8. Demographic and ethnic aspects of resource use

A state demographic strategy, coordinated with ecological factors, and a mechanism for its implementation will be defined to guarantee the introduction of a regionally differentiated approach to demographic problems and the prevention of the overpopulation of certain regions.

Special regulations governing resource use in the regions where small nationalities and ethnic groups live and work will be drafted in 1991 for the purpose of maintaining the conditions of their traditional uses of natural resources and cultural-economic principles.

The gradual introduction of the special regulations governing resource use in regions inhabited by small nationalities and ethnic groups will begin in 1991.

Section 4. Objectives in the Resolution of Union and Inter-Republic Problems in Zones with Unsatisfactory Ecological Conditions

A group of measures will be planned and carried out to solve the major interregional ecological problems requiring the combined efforts of union republics for their resolution.

4.1. Chernobyl accident zone

Steps will be taken to restore the environment and safe living and working conditions for the population in the Chernobyl accident zone and to resume the economic use of the polluted territory as radiation levels are normalized.

This goal will be attained with the aid of a special long-range state program for the elimination of the after-effects of the accident at the Chernobyl AES, envisaging the reduction of the level of radioactivity in the contaminated territories, the prevention of the spread of radioactive nuclides to other territories, and the establishment of a unified radioecological information system, and particularly the following:

The planning and introduction of effective methods and means of decontaminating the soil and sediment and compacting the soil to preclude dust formation;

The institution of measures to restore the natural hydrological conditions of bodies of water in the Pripyat River basin for the purpose of keeping radioactive substances out of waterways;

The institution of measures to prevent and quickly extinguish brush fires capable of recontaminating the environment with radioactive pollutants;

The more precise zoning of the territory in terms of the living and working conditions of the population in connection with the radioactive conditions and the institution of various regulations governing the use of the territory;

The relandscaping and reforestation of territories where the vegetation was damaged by radioactive pollution;

The guarantee of the effective monitoring of the environment, food products, and drinking and irrigation water for signs of pollution;

The regular monitoring of the long-lived isotopes in natural habitats.

4.2. Donetsk-Pridneprovskiy region

The percentage of polluting production units and those with high resource and energy requirements is to be reduced in the region, and the percentage of resource-saving and waste-free technologies is to be increased at enterprises in the region for the purpose of improving ecological and sanitary conditions;

Gas and dust purification equipment with a total capacity of around 71 million cubic meters an hour will be installed before 2005;

Cardinal measures will be taken to secure a 40-percent reduction in automobile emissions by 2005, including a 20-percent reduction by 1995;

Proportional expenditures of fresh water per unit of product will be reduced by 30-40 percent by 2005;

Water quality will meet sanitary-hygienic standards everywhere, and fishing standards in spawning grounds, by 2005;

Additional equipment for the treatment of around 4.5 million cubic meters of sewage a day will be installed in the next 15 years;

The average indicator of water recycling in industrial water supplies and thermal power engineering will rise to 0.9 or higher, and additional recycling systems with a total capacity of over 69 million cubic meters a day will be installed;

The amount of polluted sewage dumped into bodies of water will be reduced by 70-75 percent by 1996.

The following steps will be taken for the protection and intelligent use of crude resources:

Low-waste and resource-saving technologies will be incorporated on a broad scale, more useful components will be derived, and losses of these components during extraction, concentration, and processing will be reduced;

Fully 40 percent of the annual quantity of waste products of mineral extraction, processing, and concentration will be utilized;

The amount of recultivated damaged land will be brought up to the required level;

Up to 90 percent of old shafts will be filled, and filling machinery and equipment will be installed in mines.

By 2005 all of the high-mineral waste water of mines will be used in its entirety and will no longer pollute bodies of water.

At least 10 disposal sites will be built for the disposal, decontamination, and utilization of industrial waste.

Between 1991 and 2005 all open-hearth furnaces will cease operations, the percentage of oxygen-conversion smelting operations will be raised to 75 percent, and the percentage of electrosmelting operations will be raised to 22 percent because these are better processes in the ecological sense.

Converter processes with the compound blast cleaning of metals will be introduced, a higher percentage of scrap metal will be used in smelting, and the volume of continuous steel casting will rise to 70 percent.

4.3. Cis-Aral zone

Ecological and sanitary conditions and the living conditions of people in the Aral Sea basin will be improved radically, the population will be supplied with high-quality drinking water, and the water, land, and biological resources of the basin will be used more efficiently and protected more rigorously.

Priority will be assigned to the following measures in 1991-1995:

Forest reclamation work will be conducted to secure the soil of the exposed seabed and stricter measures will be taken to protect recently planted trees and expand reforestation projects in the basins of the Amu-Darya and Syrdarya rivers;

A group of measures will be planned and carried out to redirect the regional economy to production areas with lower water requirements and to find ways of conserving water, particularly through the use of progressive irrigation methods (underground, drip, and others);

The structure of agricultural production in the basin of the Aral Sea will be improved with a view to the ecological capabilities of the region;

Special water use regulations will be instituted in the basins of the Amu-Darya and Syrdarya rivers to encourage the conservation of water and discourage the pollution of bodies of water.

Plans for the restoration of the Aral Sea and the mechanism of their implementation will be elaborated.

4.4. Urals

Sverdlovsk Oblast

Financial and material resources will be allocated on a priority basis for the improvement of the ecological situation in Sverdlovsk, Kamensk- Uralsk, Krasnouralsk, and Pervouralsk and also in the basins of the Iset, Tavda, Tura, and Tagil rivers, which are experiencing the greatest anthropogenic pressure.

The following steps will be taken to improve ecological conditions:

More efficient technological processes will be introduced, and sewage treatment facilities will be built in the large industrial centers of the oblast;

The land damaged by enterprises of the mining and metallurgical industry will be recultivated and the total area of damaged territories will be reduced by 14,200 hectares by 2005;

Stricter forest conservation regulations will be instituted, and the division into groups and categories of protection will be revised to reinforce the generating and restoring ecological functions of forests;

Recreational areas and national parks will be established in densely populated regions;

The largest associations, enterprises, and organizations (especially in the metallurgical and fuel and energy complexes) will gradually reduce the amount of pollutants and waste entering the environment to ecologically safe quantities, and atmospheric emissions of harmful substances will conform to standard limits at virtually all enterprises by 2000; the dumping of polluted sewage into the water table will be stopped before the end of 1995; proportional expenditures of water for industrial needs will be reduced by 15-20 percent.

Chelyabinsk Oblast

The following steps will be taken to solve ecological problems in the oblast:

Inefficient and obsolete equipment and facilities (blast and open-hearth furnaces, coke ovens, and agglomeration plants) will cease to be used, and effective waste treatment equipment will be installed at industrial enterprises;

Low-waste and waste-free technological processes and production units will be incorporated on a broad scale;

Enterprises of the metallurgical and fuel and energy complexes and other enterprises will gradually reduce the amount of pollutants and waste entering the environment to conform to maximum emission and dumping limits;

The dumping of untreated sewage in surface bodies of water will cease by 1996;

Proportional expenditures of water for technical production needs in industry and agriculture will be reduced by at least 15-20 percent;

The metallurgical production units of the Karabash Copper-Smelting Combine will be respecialized before 1995.

By 2005 recycled water will represent 95 percent of the total in the production water supply. Recycling systems will be installed at enterprises.

Damaged land will be recultivated on an area of at least 1,100 hectares each year, and protective forest strips will be planted on an area of 3,200 hectares by 1995.

Bashkir ASSR

Ecological conditions will be normalized in Ufa, Sterlitamak, Salavat, and other large industrial centers on the Belaya and Ural rivers.

The following measures will be taken in 1991-1995:

Inefficient and obsolete equipment and facilities will be withdrawn from operation, and effective means of removing harmful substances from emissions (or sewage) will be installed at industrial enterprises;

Resource-saving and low-waste technological processes and fundamentally new systems for the decontamination of toxic industrial waste will be incorporated on a broad scale.

Annual quantities of untreated sewage will be reduced by 260 million cubic meters by 1995 as a result of the withdrawal of inefficient and obsolete equipment from production and the institution of water conservation measures to improve technological processes, intensify sewage treatment, and transfer enterprises to the maximum use of recycled water (an increase of 1.8 percent by 1995, 4 percent by 2000, and 6.4 percent by 2005).

The amount of potable fresh water used for technical purposes will be reduced by 10 million cubic meters each year.

Sewage treatment facilities with a capacity of 1.5 million cubic meters a day will begin operating at enterprises and in cities in the republic in 1990-1995.

The Shaytan-Tau state preserve will be established, and the total area of protected natural territory will increase to 723,000 hectares, or 5.1 percent of all republic territory.

The total area of the green zones of cities will be increased by 2,000 hectares each year and will reach 343,000 hectares by 2005.

The percentage of biological methods of plant protection will rise to 100 percent in protected areas and to 47-48 percent on agricultural land.

The ridging, dibbling, and rifting of plowland will be increased by 10- 15 times by 2005 and sowing with anti-erosion seeders will triple.

New disposal sites will be created and existing ones will be renovated in 1995-2005 for the decontamination and disposal of all of the toxic industrial waste produced in the region.

4.5. Caspian Sea basin

Ecological and sanitary conditions will be improved and stabilized in the Caspian Sea basin. A group of large-scale measures will be taken in 1991-1995 to stop environmental damage, particularly the following:

Annual emissions of pollutants into the atmosphere will be reduced by at least 500,000 tons and will conform to standards;

The discharge of polluted production and household sewage and the polluted effluent of reclamation systems into bodies of water will cease;

Measures will be taken to combat the eutrophication of waterways, with consideration for advanced foreign and domestic experience in this field;

Damaged lands covering an area of 150,000 hectares will be recultivated;

A group of economic-organizational, agrotechnical, forest-reclamation, and hydrotechnical measures will be taken to improve the state of the land and stop erosion processes on an area of 80 million hectares and prevent the devastation of the Black Lands in the Kalmyk ASSR and Astrakhan Oblast and the Kizlyar Pastures in the Dagestan ASSR, the Chechen-Ingush ASSR, and the North Osetian ASSR;

By 1992 all water intake works and discharge systems will be equipped with modern means of measuring water use;

Proportional expenditures of water in production will be reduced by at least 15-20 percent;

Measures will be taken to guarantee ecological safety and exclude the possibility of the accidental emission of pollutants into the atmosphere during the operation of equipment at the Astrakhan condensed gas deposit and other enterprises;

Reclamation systems covering an area of 1.3 million hectares will be completely remodeled;

By 1991 at the latest, boats and equipment connected with their operation will be equipped with devices and systems for the collection and decontamination of run-off and bilgeway water and the guaranteed purification and utilization of this water;

The necessary fish outlets will be established in the Volga-Kamsk series of reservoirs;

Research will be conducted in 1990-1993 to investigate the problems in the restoration and stabilization of ecological systems in the Caspian Sea basin, and work will be performed to restore and improve the state of flora and fauna;

The necessary measures will be taken to preserve and restore the numbers of sturgeon and other valuable species of fish, and the measures to increase the depth of the Akhtuba River and improve the state of spawning grounds in the Volga-Akhtuba flood plain will be completed in 1991-1995;

Protected natural preserves in the northern portion of the Caspian Sea and on the Volga, Ural, Sulak, Terek, and Kura rivers will be enlarged for the preservation and reproduction of sturgeon and other valuable species of fish.

4.6. Black and Azov sea basins

The following measures will be assigned priority in 1991-1995 for the purpose of improving the ecological situation in the Black and Azov sea basins.

Black Sea:

The discharge of biogenic substances will be reduced by 50 percent by 1995, and the discharge of untreated sewage in the amount of 2.4 cubic kilometers into the waterways of the Black Sea basin will cease completely by 2005;

Supplementary sewer systems will be installed and existing systems will be renovated in large populated centers before 1993;

The extraction of sand (or gravel) in coastal waters will be stopped in 1991, and damaged banks will be reinforced by 1993, beginning with resort beaches and the estuaries in the northwestern part of the Black Sea;

The use of drift nets in fishing will be prohibited everywhere in 1991 because they have an adverse effect on marine biocenosis;

The network of protected bodies of water and adjacent territories of the Black Sea basin will be enlarged by 1993, beginning with the region around Cape Tarkhankut and Karkinit Gulf;

The ecological impact of the accidental hydrobiotics in the Black Sea will be assessed before 1993, and recommended ways of preventing their negative effects on the sea's distinctive fauna will be drafted.

The dynamics of the state of the Black Sea under the influence of anthropogenic pollution and fluctuations in the hydrogen sulfide level will be studied, and the results will be used to plan a strategy of action to improve sea and coastal ecological systems and the human environment. All of the necessary efforts will be made to encourage interested states along the Danube and around the Black Sea and international organizations to participate in this work.

Sea of Azov:

A group of necessary measures will be taken in 1991-1995 to ensure water conservation and reduce unrecycled water use for the purpose of guaranteeing an average intake of at least 34 cubic kilometers of fresh water a year;

The equipping of all water intake and drainage systems with fish- protection devices will be completed by 1993;

Water recycling and other conservation measures will be introduced on a broad scale in rice irrigation systems to stop the discharge of polluted effluent from rice fields into bodies of water;

Pesticides will cease to be used in rice farming, and scientifically sound regional soil-protection and water-saving agricultural systems will be developed and incorporated to limit and subsequently exclude the use of pesticides and establish biological methods of protecting plants from pests and diseases; selection work on disease- and pest-resistant strains of rice will be conducted on a broader scale;

The construction of new irrigation systems will cease and existing systems will be renovated to heighten their efficiency;

A plan for the comprehensive use and protection of the water and land resources of the Azov Sea basin will be drawn up no later than 1992, with priority assigned to the improvement of ecological and sanitary conditions;

In 1991 and 1992 ports will be equipped with facilities for the collection and purification of sewage from boats, and a specialized service will be established to clean up spills of petroleum products and other pollutants;

Ecologically acceptable dredging technology will be developed and incorporated before 1995;

Research and development projects will be conducted to prevent the spread of hydrobiotics alien to the ecosystem of the Sea of Azov;

The creation of protected areas in Taganrog Bay and the estuaries and flood plain of the Don and Kuban rivers will be considered.

4.7. Arctic Zone

A long-range program of ecologically balanced resource use in the Arctic zone will be drafted, assigning priority to traditional forms of resource use and the sociocultural development of the native population of the region.

In view of the Arctic region's significance in producing the climate of the planet and stabilizing the level of the world ocean and in view of its importance as a major territorial-resource reserve of the USSR, the following steps will be taken:

Regional ecological standards will be drafted to regulate economic activity within the coastal zone, the shelf, and the open seas of the Soviet sector of the Arctic;

A network of protected territories and bodies of water of varying status will be established, including international wildlife sanctuaries;

Untreated sewage will cease to be dumped in bodies of water in the northern sea basins by 1995;

Effective methods of reclaiming the soil and plants of the tundra will be developed;

Reindeer grazing areas and tundra forests will be given reliable fire protection.

The following measures will be taken to improve ecological conditions in the city of Norilsk:

Air-protection measures for the gradual reduction of emissions of sulfur compounds and other pollutants to the stipulated levels will be instituted;

Water intake for production and household needs will be reduced by 15-20 percent by 1995;

Hazardous waste disposal in bodies of water will be reduced to the permissible maximum level by 1995.

The incorporation of new technologies and sewage treatment systems at the Norilsk Mining and Metallurgical Combine will reduce emissions of sulfur dioxide:

By 400,000 tons a year by 1995 (or by 19.2 percent of the 1990 figure);

By 850,000 tons a year by 2000 (40.9 percent);

By 1.52 million tons a year by 2005 (73.1 percent).

The sulfur utilization volume at the Norilsk combine will exceed 1 million tons of sulfur a year by 2005.

The main ways of improving ecological conditions in Murmansk Oblast are the reduction of atmospheric emissions to the standard level by 1996 and the cessation of the dumping of polluted sewage by all enterprises in the oblast.

The priority conservation measures are the following:

The construction and start-up of shops and other facilities to secure the utilization of sulfur and other harmful substances in the flue gases of the Pechenganikel and Severonikel combines and the Kandalaksha Aluminum Plant before 1995;

The development and introduction of technology for the intensive processing of industrial and mining waste at the Severonikel and Pechenganikel combines and the Kovdor Ore-Dressing Combine.

The maximum preservation of the ecological system of the Yamal peninsula will necessitate:

Prohibiting the start-up of new gas and oil production capacities without the completion of a group of measures to exclude the possibility of negative environmental effects;

Limiting the economic development of the region and creating the necessary conditions to preserve wildlife habitats, including fish habitats;

Planning and introducing ecologically safe methods of exploiting oil and gas deposits.

4.8. Baltic Sea basin

Priority will be assigned to the following measures for the improvement of ecological and sanitary conditions in the Baltic Sea basin:

The quantity of organic substances and compounds of nitrogen, phosphorus, and heavy metal salts dumped in the waters of the basin will be reduced by 50 percent by 1995 by prohibiting the disposal of untreated and inadequately treated sewage;

The construction of equipment for the complete biological decontamination of sewage and sewer systems will be completed by 1993 in Leningrad, Riga, Tallin, Vilnius, Kaliningrad, Kaunas, and Tartu and by 1995 in other cities, and local treatment equipment will be installed at enterprises. The network of storm drains carrying effluent to treatment facilities will be expanded. Systems for the intensive treatment of sewage and the removal of most of the nitrogen and sulfurous compounds and for the reuse of this waste water will be incorporated before 2005;

Measures will be planned and carried out to reduce the quantity of pollutants carried out to sea with surface run-off from the territory of populated points by 40 percent before 1993 by improving street-cleaning technology, and by 80 percent before 1996 by instituting a divided sewer network and treating part of the run-off;

An environmental protection program will be carried out at enterprises of the timber and pulp and paper industries to reduce atmospheric emissions to the standard level by 1995 and completely stop the dumping of untreated sewage;

Modern resource-saving, waste-free, and low-waste technology and production units will be developed and incorporated before 2005, and local and regional water management systems will be established for the use of treated sewage for technical purposes;

Progressive agricultural methods precluding negative changes in reservoirs and the seepage of mineral fertilizers and toxic chemicals into bodies of water will be developed and gradually introduced before 1995;

Mooring and handling equipment in ports will be renovated prior to 1991 to guarantee their ecologically safe operation;

Methods of monitoring the state of the marine environment from the air and from ships will be developed so that sources of pollution can be discovered in time and the necessary measures can be taken to eliminate the pollution;

Our country will take part in the creation of a unified international system to monitor the state of the Baltic Sea.

4.9. Kuzbass

Measures will be taken to reclaim the land damaged by mining (1,000 hectares a year), new mining methods will include internal dumping and the filling of old shafts, untreated waste will no longer be dumped in river basins, log drift will be prohibited, and obsolete production units in the metallurgical and chemical industries will be remodeled or closed.

Exploratory work will be conducted to find underground springs for drinking water and household use.

An automated system will be established in Kemerovo to detect hazardous substances and warn the population in the event of accidents at the enterprises producing them.

The establishment of quarantine zones around industrial enterprises and the resettlement of their inhabitants will be completed by 1995.

Expert ecological appraisals will be conducted in Kemerovo Oblast in 1990, and a comprehensive territorial environmental protection plan for the oblast will be drafted in 1991.

4.10. Lake Baykal

The following steps will be taken to preserve the unique natural complex of the Lake Baykal basin:

Programs will be carried out for the construction, remodeling, and enlargement of facilities for the purification of sewage and gas emissions in 1991-1995, and other measures will be taken to prevent the pollution of the environment and improve the use of natural resources in the Lake Baykal basin;

Navigation and cargo shipments on Lake Baykal will be regulated, the floating of timber will cease and logs will be transported on ships, and all vessel sewage and waste containing oil will be pumped from boats into floating or coastal treatment plants;

Effective equipment to remove sulfur compounds from flue gases will be developed and will be installed in the Gusinoozerskaya GRES, Ulan-Ude TETs-1, and other power engineering enterprises located in regions adjacent to Lake Baykal in 1991-1995;

Measures will be taken in 1991 to ensure the strict observance of the maximum limits on atmospheric emissions by the Baykal Pulp and Paper Combine and the Selenginsk Cardboard Combine;

The Baykal Pulp and Paper Combine will be respecialized in 1993 for ecologically safe production not requiring the preparation of cellulose;

The work to establish a recycled water system at the Selenginsk Cardboard Combine and stop the disposal of the combine's industrial waste in Selenga River will be completed in 1991;

Measures will be taken before 2000 for the complete and effective use of the manure of agricultural livestock and the sewage of agricultural facilities, including the ecologically sound development of irrigation fields, precluding their seepage into ground and surface water, and all farms in the region will be equipped with mineral fertilizer storage facilities and special machines and equipment for the application of solid and liquid fertilizer;

By 1995 ports will be equipped with mechanisms for the prevention and elimination of pollution in the lake;

All of the work conducted in the cities of Ulan-Ude and Severobaykalsk to stop negative changes in the environment will be completed by 2000;

By 1995 the hazardous emissions of enterprises located near Lake Baykal will be reduced by 150,000 tons, including 22,000 tons of nitrogen oxides and 37,000 tons of sulfur dioxide. The bulk of the work will be conducted at power engineering enterprises, where emissions will be reduced by a factor of 1.3, enterprises of the pulp and paper industry (a factor of 4.1), and enterprises of the construction materials industry (a factor of 4.5);

Measures will be taken to enhance the water- and soil-protecting properties of forests in the lake basin and to organize the expanded reproduction, intelligent use, and reliable protection of forests;

The environmental monitoring system in the region will be perfected.

By 1995 an international center will be established to investigate the environmental problems of Lake Baykal.

Section 5. Restructuring Resource Use Management and Securing Completion of Program

The completion of the measures specified in the program will entail the use of a system of legal, economic, and other levers to secure the effective management of resource use. Some elements of this system will be based on recently enacted laws of the USSR and union republics with consideration for the division of their rights and responsibilities and the transfer to a market economy. The establishment of a unified system of state environmental control agencies must be completed.

5.1. Conservation laws

Laws of the USSR "On the Protection of Nature," "On Protected Natural Territories," "On the Protection and Intelligent Use of Flora," "On the Use of Atomic Energy and Nuclear Safety," and other legislative documents are to be drafted in 1990.

Efforts to improve conservation laws will continue in 1991-1995. The following steps will be taken in connection with this:

The drafting of new laws or the clarification of existing ones regulating matters pertaining to water, forests, and mountains, as well as matters pertaining to the protection of the atmosphere and the protection and use of fauna;

The drafting of the normative acts necessitated by these and other laws;

The stipulation of the liability of officials for the deliberate concealment and distortion of information about accidents with ecological consequences and about the state of the environment and its effects on the human being.

Administrative or criminal penalties must be imposed for violations of conservation laws, including compensation for the damages (or losses) incurred by nature as a result of these violations.

5.2. Normative Reinforcement

One of the main immediate objectives in the management of resource use is the creation of a single set of scientifically sound standard technical documents to secure the regulation of conservation efforts and the use of natural resources.

Union and republic agencies performing management and monitoring functions in environmental control and the use of natural resources must work with central economic agencies and scientific research organizations in 1991-1993 to lay the basis for the fundamental standard technical documents in this area, including the drafting of new standards and the revision of existing ones with a view to the experience of the state standardization system and international standardization organizations.

The drafting and correction of standard technical documents will be preceded by special research to substantiate the regulations. The procedure of measuring the ecological impact of the anthropogenic influence on natural complexes must be defined in 1991.

Regional limits on emissions of pollutants, noise and vibration levels, electromagnetic radiation, and other harmful influences on the human being and the environment should be determined with a view to advanced foreign experience and ecological and sanitary requirements; environmental quality standards will be established.

Indicators of the ecological capacity of territories will be defined with a view to maximum technogenic pressure, the removal of natural resources, and other factors capable of causing irreversible environmental changes.

5.3. Economic mechanism and financing of environmental protection

The economic mechanism for carrying out the program will be based on the theory of steady economic development with consideration for all ecological factors and will represent part of the integral system of national economic management and focus on the creation of ecologically safe living conditions for people.

The development of the economic mechanism of environmental control during the transfer to a market economy must adhere to the following guidelines:

The establishment of strict ecological limits for the different territories and ecosystems in which the development and distribution of productive forces will take place, as well as the economic liability of resource users for violations of ecological limits;

The creation of a system of payments for resource use and the consideration of ecological factors in taxation;

The determination of the exact sources of financing for resource protection, reproduction, and conservation measures.

The following will be set as ecological restrictions:

Limits on permissible emissions (through disposal or dispersion) of polluting substances into the environment by enterprises and by the territorial economy as a whole;

Limits on the permissible use (or removal) of natural resources for different natural bodies, ecosystems, and territories.

Both types of ecological restrictions will be set in the form of graduated limits (gradually growing stricter) with the eventual institution of standard limits.

Emissions of pollutants causing global changes in the biosphere and causing international pollution when they cross borders will be limited by agreements (between the USSR and the republics, between republics and oblasts, and between the oblasts and cities and enterprises) covering different republics, oblasts, cities, and enterprises.

The group of ecological restrictions will promote the restructuring of the national economy through the conservation of resources, the transfer of industry to low-waste technological processes, and the enhancement of the effectiveness of national production.

The payments for resource use and taxes should encourage conservation efforts on the part of enterprises and regions and lead to the formation of centralized (local, republic, and union) sources of financing for resource protection and reproduction.

The system will include the following:

a) payments for the right to use natural resources;

b) payments for the reproduction and protection of natural resources by the state or by economically accountable specialized enterprises and organizations;

c) compensation for the withdrawal of natural resources from use or the deterioration of their quality through the activities of enterprises;

d) payments for emissions (through disposal or dispersion) of pollutants into the atmosphere;

e) a supplementary tax on the profits of enterprises manufacturing ecologically hazardous products or using ecologically hazardous technology;

f) fines and other economic penalties for violations of the regulations and standards of intelligent resource use;

g) enterprise profit tax exemptions.

The accelerated amortization of conservation equipment and facilities could be included in this system later.

Payments for the right to use natural resources will be set in line with the requirements of the Law of the USSR "On the Common Principles of Local Self-Government and Local Economic Management in the USSR" and other laws of the USSR and the union and autonomous republics.

Payments for the reproduction and protection of natural resources will be set with a view to the necessary expenditures on union, republic, and local programs for the protection and reproduction of the resources in question and the creation and operation of systems to control and monitor the state of natural resources. The rate of payment will be set in accordance with the laws of union and autonomous republics or with the consent of USSR government agencies.

Payments for emissions (through disposal or dispersion) of pollutants into the environment within official limits will be set on the basis of expenditures approved in republic and local environmental protection programs for the alleviation of environmental damages (excluding enterprise expenditures).

Payments for emissions (through disposal or dispersion) of pollutants exceeding permissible limits will be multiples of the cost of pollution prevention.

Payments for natural resources and fines for the pollution of the environment, the inefficient use of natural resources, and other violations of conservation laws will be deposited in local budgets and non-budgetary funds in accordance with the USSR Law "On the Common Principles of Local Self-Government and Local Economic Management in the USSR."

Economic penalties for violations of conservation laws will be imposed with consideration for enterprise income.

The system of tax exemptions connected with the ecological impact of economic activity will include the following:

The reduction of taxable profits when conservation measures are being carried out;

Tax incentives for enterprises producing conservation equipment, materials, and reagents, as well as environmental monitoring instruments and equipment.

Budget revenue losses due to the institution of tax privileges should be covered by revenues generated by supplementary taxes on the profits of enterprises producing ecologically dangerous items or using ecologically dangerous technology.

The organization of the proper sources of financing for the conservation efforts of enterprises will necessitate the creation of special environmental protection funds (or ecological funds) at resource-using enterprises and in local, republic, and union government agencies, with the subsequent transformation of territorial funds into ecological banks. Besides this, an ecological safety fund should also be created.

The sources of enterprise ecological funds could include amortization deductions for conservation facilities and equipment;

Credits and subsidies from territorial ecological funds (or banks) to reduce the harmful effects of enterprise emissions on the environment;

The income (deposit interest) earned on the money the ecological fund keeps in the bank;

Part of the enterprise profits used to finance conservation activity;

Other sources.

The money in the enterprise ecological fund should be spent under the supervision of environmental protection agencies. With their consent, part could be used for basic production improvements to alleviate the harmful effects of enterprise emissions on the environment and to conserve natural resources.

The sources of the money in territorial ecological funds could be enterprise payments for emissions (through disposal or dispersion) of pollutants into the environment, income from the extension of conservation loans, budget subsidies, special local taxes, voluntary contributions, and interest payments on conservation credits.

The distribution of the money in the territorial funds among local, republic, and union funds should be conducted on the basis of agreements.

The money in territorial ecological funds should be used to finance (or credit) the construction and remodeling of regional conservation facilities, measures to improve ecological conditions and reproduce natural resources, and enterprise expenditures on the reduction of their adverse effects on the environment in accordance with assignments in environmental protection programs.

The ecological safety fund should consist of special taxes on ecologically hazardous technologies and potentially hazardous facilities, insurance on natural resources and facilities in the event of losses resulting from accidents and natural disasters, and the centralized portion of amortization deductions for environmental protection facilities.

This fund will be used to finance the forecasting, prevention, and elimination of natural disasters, accidents, and ecological calamities and economic aid to republics and regions for environmental protection projects.

In view of the broader autonomy of union and autonomous republics and regions and the transfer to a regulated market economy, they will be responsible for most of the financing and work in the protection and intelligent use of natural resources and will be fully accountable, and union bodies will ensure the completion of the appropriate research projects of unionwide significance and the completion of national programs and of programs connected with the international commitments of the USSR.

Enterprises, associations, and organizations will be responsible for the ecological safety of production units and for all expenditures for this purpose.

State centralized capital investments can be allocated to finance major environmental undertakings of a union or inter-republic nature (the Chernobyl accident zone, the Aral Sea basin, and others). These funds will be allocated on a competitive basis to territorial administrative bodies or production units for specific projects in these regions. Furthermore, the plan assignments of enterprises, associations, or territorial bodies acting as general contractors in projects financed with centralized capital investments will represent state requisitions for environmental protection.

The same financing procedure could be used in union republics.

State environmental protection plans will be based on the corresponding sections of plans for the economic and social development of union republics and should include assignments pertaining to the most urgent ecological problems of inter-republic and unionwide significance and the fulfillment of the USSR's international obligations.

The control figures for union republics will be the environmental indicators of the territory as a whole, and the union republics will bring these indicators to the attention of local agencies, enterprises, and organizations of union and republic jurisdiction. Assignments will be based on union, republic, and regional environmental protection programs.

5.4. State ecological appraisals

The practice of conducting state ecological appraisals, which will be compulsory and will precede the making of economic decisions, will be developed on a broader scale for the purpose of determining the ecological soundness of ideas and plans for the development and distribution of productive forces in the country and projected economic or other undertakings, the legality and feasibility of client assessments of the impact of these undertakings on the environment, natural resources, and public health, the validity of the client's choice, and the ecological safety of new equipment, technology, materials, and substances, including imported ones.

An important element of the compilation of documents on the planning and development of the national economic complex will be the environmental impact analysis (EIA), which will include the examination of the purpose and need for the projected activity, the methods of accomplishing it, the realistic alternatives (including the cancellation of the project), the nature and degree of environmental influence, including the influence in the event of accidents, the possibility of reducing negative influences and ecological risks, and other aspects. The impact analysis will be discussed with public spokesmen and the population of the region of the projected economic activity.

The financing of all projects and programs will begin only in the presence of a positive ecological impact study.

State ecological appraisals of previously approved state programs of land reclamation, the use of chemicals in the national economy, and the development of nuclear power engineering and the chemical, microbiological, and other industries will continue in 1991.

5.5. State control

State control of environmental protection and the use of natural resources will be exercised by soviets of people's deputies and specially authorized bodies.

The basic purpose of state control over environmental protection and the use of natural resources will be the guaranteed observance of environmental laws, ecological standards, and the rules and regulations governing the use of natural resources and the protection of the environment by all ministries, state committees and departments, enterprises, establishments, and organizations, regardless of their departmental jurisdiction, citizens, and foreign legal and physical persons.

The main requirements in the exercise of state control should be the prevention and disclosure of violations of environmental laws and other rules and standards governing the intelligent use of natural resources, the improvement of forms and methods of state control, and the prevention of regional, inter-republic, inter-ethnic, and international ecological conflicts.

A special role in the system of state control will be assigned to the verification of the accuracy of enterprise and organization estimates of resource use and records of the quantity and composition of different types of production waste dumped (or discharged) into the environment and to the drafting of proposals on stricter control over the use of natural resources and environmental protection.

The effective functioning of state control offices in union and autonomous republics, krays, oblasts, cities, and rayons will necessitate the centralized allocation of material and technical resources (vehicles, instruments, etc.). The acquisition of this technical equipment will cost around 700 million rubles between 1991 and 1995.

Laboratories and measuring devices will be designed and developed to monitor and measure pollution and the state of the environment in accordance with the requirements of control centers. The necessary funds will be allocated from centralized sources to equip these centers with vehicles, instruments, and laboratory equipment.

5.6. Ecological indoctrination, education, and training of personnel. The role of public organizations

The steady development of the country and the completion of socioeconomic programs will be impossible without heightened public ecological awareness. Ecological indoctrination, representing the process by which the individual acquires ecological sophistication—i.e., environmental convictions and awareness of the need to treat nature and its resources carefully—will be a necessary factor in carrying out this program.

Measures to reorganize ecological indoctrination and education in the country are envisaged in the program of environmental education in 1991- 1995 and over the long range up to 2005. The main strategic elements of the program consist of measures to establish an integral system of mass ecological enlightenment and of general and continuous environmental education in the country and develop the habit, especially in youth, of using resources intelligently through meaningful conservation efforts.

This process should be secured in three basic ways.

The first entails the creation of a system of mass ecological information and public enlightenment.

This will require:

The preparation of annual reports on the state of the environment in the USSR, union republics, krays, and oblasts for distribution to the general public beginning in 1991;

The more extensive dissemination of ecological information by means of radio, television, and other news media;

The publication of union and republic ecological newspapers;

The installation of bulletin boards in cities and large populated points in the country with current information on the state of the environment;

An increase in the number of ecological publications and audio-visual materials and in their circulation by 1995;

The organization of environmental pavilions at national economic fairs, and of special exhibits in sectorial pavilions.

The second entails the creation of a system of general and continuous environmental education, the development of the habit of intelligent resource use, and the training and advanced training of personnel and ecological experts.

This will require:

The introduction of programs of ecological indoctrination and education in kindergartens, schools, vocational and technical institutes, secondary specialized and higher academic institutions, and the system of courses for the training and advanced training of educators and specialists in 1991;

The establishment of departments of the fundamentals of ecology in people's universities;

The organization of studies of pre-school ecological indoctrination;

The establishment of an all-union scientific methods center for ecological education, higher ecological courses, and an all-union computerized information service in environmental protection education;

The creation of a network of regional information centers in higher academic institutions on environmental education and personnel training;

The establishment of schools of environmental protection and resource conservation in VUZ's and advanced training institutes;

The publication of textbooks, teaching aids, and other academic materials on environmental protection, covering all aspects of the training of students and specialists in this field;

The creation of centers for the humanitarian ecological indoctrination of the population;

The mass production of children's educational toys and games dealing with environmental protection and resource conservation.

The third entails the development of the public ecological movement.

This will require:

Public ecological organizations must be granted the right to appoint representatives to participate in state ecological appraisals;

Public ecological organizations must be given access to information on the state of the environment, the sources of pollution, and environmental protection measures;

A system for the study of public opinion on environmental protection and conservation should be established with the extensive use of the capabilities of public ecological organizations.

Section 6. Scientific and Technical Solutions to Environmental and Conservation Problems

6.1. Scientific research

The scientific reinforcement of the State Program for the Protection of the Environment and the Intelligent Use of Natural Resources should be based on the results of basic research, draft state scientific and technical programs (SSTP), the projects of intersectorial scientific and technical complexes and VUZ scientists, major inventions of statewide significance, and the results of applied studies conducted within the framework of union, republic, and regional ecological programs.

The following elements must be secured in the sphere of basic ecological research:

The elaboration of a general philosophical theory of the interaction of society and nature and a theory of human ecology reflecting the fundamental multifaceted relationship between mankind and the environment;

The elaboration of a theory of the functioning of the biosphere on the global, regional, and local levels and a theory of the resistance of anthropogenic pressure by the biosphere and its separate components;

The development of the theoretical and procedural bases of ecological thinking, awareness, ethics, and culture and the dissemination of ecological knowledge;

The elaboration of a socioeconomic ecological theory of balanced and non-depleting resource use and the scientific bases of the preservation of biological diversity;

The establishment of the theoretical bases of ecologically clean technologies in power engineering, industry, agriculture, and transportation;

The elaboration of the procedural bases of information about the state of the environment and the use of natural resources;

The study of global changes in climate, the destruction of the earth's ozone layer, and their ecological and socioeconomic implications;

The development of procedures for the economic assessment of the socioeconomic consequences of possible measures to protect the environment and maintain the climate for the purpose of determining economically optimal and ecologically safe avenues of national economic development;

The development of methods of forecasting the emissions producing the greenhouse effect.

The resolution of these problems will be carried out within the framework of the approved program of biosphere and ecology studies of the USSR Academy of Sciences for the period up 2015, with annual financing in the amount of 60-80 million rubles.

The SSTP are expected to bring about scientific-technical and technological breakthroughs in the resolution of major national economic problems with a view to rising ecological requirements.

The SSTP will be drawn up on a competitive basis and will represent a means of centralized management of the development of priority areas of scientific and technical progress and an object of state support. The most important phases in carrying out the SSTP will be included in state requisitions and should be assigned priority in material and technical resource allocations.

The following SSTP will be carried out in the interest of sectors with particularly severe ecological problems:

"High-Speed, Ecologically Clean Transportation,"

"Ecologically Clean Power Engineering,"

"Resource-Saving and Ecologically Clean Processes in Metallurgy and the Chemical Industry."

The financing for these programs in 1990 has been set at 120 million rubles.

The resolution of acute regional problems, especially in ecological disaster zones, such as the Chernobyl AES, the cis-Aral zone, and others, will require the organization and completion of a broad range of scientific studies with additional financing from the state budget.

Applied research and development projects conducted within the framework of union, republic, and sectorial programs to solve environmental problems and problems in the intelligent use of resources and the remodeling and retooling of production should be based on cost accounting principles in general and on contracts with specific clients and should be financed by public funds and local budgets.

A comprehensive unionwide scientific and technical program of work on ecological problems will be drawn up (the "Ecology" program) to accomplish the following:

The development of methods for the comprehensive assessment of the state of natural-technical systems and their components; the improvement of ecological cartography and the compilation of constantly updated ecological maps of the USSR and separate regions;

The development of scientific research in the field of toxicology;

The development of methods of assessing the current state of the environment and public health, the ecological capacity of regions, and ecological risks during the elaboration of theories and basic guidelines of the distribution of productive forces;

The development of automated systems for the comprehensive assessment and forecasting of environmental impact during the consideration of alternative plans for the socioeconomic development of the country and separate regions and scenarios and mechanisms of environmental quality control and for the optimization of decisionmaking procedures;

The development of a system of "restraints" (limits and standards) on the status of components of natural-technical systems and comprehensive ecological "restraints" with a view to the combined impact of all influences;

The development of the principles and methods of evaluating components of natural-technical systems and the methods and means of local, regional, and general monitoring;

The organization of comprehensive research and development projects dealing with effective ways of balancing social and ecological tension, primarily in ecological disaster zones;

The development of a group of scientifically sound and interrelated legal standards and technical documents to regulate economic activity in the country and its separate regions.

In addition to these comprehensive studies, there must be investigations of several problems specific to certain components of the environment:

The development of new methods and means of studying the migration and metamorphosis of chemical compounds, including transnational and transregional migration;

The clarification of forecasts of the factors influencing climatic changes and the strategy of national economic restructuring with a view to these changes;

The development of rush procedures for the determination of the most harmful contaminants in the air, water, and soil;

The development of non-traditional methods and highly effective systems and equipment for the decontamination of the flue gases of industrial enterprises, especially the removal of sulfur and nitrogen compounds, hydrocarbons, and toxic substances with the top two hazard ratings and the utilization of waste products;

The development of technological processes, equipment, instruments, and reagents for the maximum derivation of minerals and the intensive processing of crude resources with the subsequent use of the waste products and the prevention of the negative environmental effects of mining;

The elaboration of designs precluding engine exhaust emissions of pollutants;

The categorization of water ecosystems as objects of protection and resource use;

The development of the ecological-economic and legal bases of the protection and restoration of damaged bodies of water;

The development of new methods of restoring soil fertility and protecting soil from erosion, recultivating damaged lands, preventing desertification, floods, landslides, mud slides, and cave-ins, and restoring the productivity of salinized and polluted soils with biological methods of reclamation;

The categorization of soils and territories as objects of protection with the use of standardized indices of the dynamics of their state for the purpose of planning soil-protection and land-protection measures;

The improvement of methods for the decontamination of solid household waste (biochemical methods and incineration procedures) to keep heavy metals and xenobiotic elements out of the environment;

The development of ecologically safe methods of offshore mineral extraction and geological prospecting;

The development of methods of determining the ecological properties of natural fuel resources (coal, oil, and gas) and crude minerals used in the production of fertilizer and construction materials;

The development of new methods of preserving the gene pool and the entire range of species of plants and animals

and methods of substantiating systems for the efficient exploitation, reproduction, and protection of the main types of bioresources;

The development of integrated systems of forestry management to prevent the depletion of timber resources, provide for the reproduction of forests, and enhance their viability, productivity, and natural protective properties;

The development and introduction of effective and ecologically safe technical equipment, technologies, and methods of fighting forest fires and protecting forests as well as agricultural plants and livestock from pests and diseases;

The establishment of a common system for the categorization of plant communities in the USSR and the organization of preparations for the publication of a detailed summary of their characteristics;

The study of the geography, biology, ecology, and genetics of populations of common and dominant, as well as intensively exploited and rare (relicts) species of plants for the purpose of planning their reproduction and preserving the gene pool in their natural habitats.

Scientific research will be organized to study problems in the restriction and prevention of the unfavorable effects of environmental factors on public health, particularly in the following fields:

Broader scientific research into the mathematical modeling and forecasting of the state of public health depending on levels of environmental pollution and research aimed at developing comprehensive indicators for the evaluation of pollution levels with a view to the combined or comprehensive impact of various factors on human health;

Hygienic standards limiting the content of dioxins, diphenylene oxides, and polychlorinated biphenyls in the environment and in foods, and studies of actual pollution levels and their possible effect on public health;

Studies and assessments of the contribution of various chemical, physical, and biological factors to the environment and to organization and their influence in the origination and development of functional and pathological changes in the state of public health;

A comprehensive study of the effects of asbestos and materials containing asbestos on the state of public health and the development of preventive measures;

Forecasts of the risk of common diseases from environmental pollution to set priorities in preventive care;

A national computerized register of the chemical substances which are used in the national economy and which have undergone toxicological and hygienic tests and registration;

Broader research into the assessment and regulation of microbes and other pollutants in the waste of enterprises of the microbiological industry.

The problem of reorienting the national economy toward resource-saving and ecologically clean production will be completely solved in 1991-2005 by means of retooling in all spheres of industry and agriculture and the incorporation of low-waste and waste-free technological processes and production units.

This will require:

The development of scientifically sound theories, forecasts, and programs of industrial development in different regions within the specified limits guaranteeing ecological balance and the preservation and development of the biosphere;

The development and introduction of optimal scenarios for the quality control of ecological-economic systems based on the use of ecologically clean technologies and operating conditions, beginning with ecologically critical regions;

The development and gradual introduction of alternative sources of energy for guaranteed ecological safety and resource conservation;

The construction of new enterprises using energy- and resource-saving technological processes and equipment, providing for the comprehensive use of processed resources and materials without discharging hazardous pollutants into the environment, the minimization of production waste, and the intelligent use of waste products;

The stepped-up retooling and comprehensive remodeling of existing enterprises, beginning with ecologically critical zones. This will also entail the heightened technological flexibility of production units for the purpose of the ecologically and economically effective processing of crude resources experiencing changes in composition and quality and limits on the growth of capacities of industrial power engineering facilities;

The inventory of particularly hazardous technological processes and production units affecting ecological safety for the purpose of determining the specific schedules and volumes of their remodeling or withdrawal from operations.

6.2. Gas-purifying, dust-catching, and water-purifying equipment, materials, reagents, and devices

The completion of the assignments in the program pertaining to the reduction of the quantity of pollutants discharged into the atmosphere, bodies of water, and other elements of the environment will necessitate the development and production of new types of gas-purifying equipment in accordance with Addendum 5, as well as dust-catching and water- purifying equipment, materials, and reagents in quantities meeting the needs of different sectors of the national economy.

In the sphere of gas purification, this will entail:

The production of gas-purifying and dust-catching equipment with a total value of around 5 billion rubles before 2005, including 1.9 billion rubles' worth between 1991 and 1995;

The development of new generations of highly effective electrical filters and bag filters for general industrial use;

The development and incorporation of several new types of equipment for the collection of low concentrations of highly toxic dust and the removal of submicroscopic particles from gases at high temperatures and under high pressure;

The introduction and incorporation of gas-purifying technology and equipment using wet, semidry, and dry methods of removing sulfur dioxide, the thermocatalytic method of deoxidizing nitrogen oxides with ammonia, absorption-regenerative processes for the recovery of hydrocarbons, the use of ionizing radiation for the removal of sulfur dioxide and nitrogen oxides, and the use of plasma technology and diffusion membranes and fibers to split and decontaminate gas currents;

The extensive incorporation of automated systems for the monitoring and control of gas purification processes based on microprocessor technology combined with the regulation of technological parameters.

Sewage treatment technology and water-purifying equipment will be perfected in the following ways:

The intensification of biological and biochemical methods of decontamination;

The transfer to physico-chemical methods using flocculents instead of mineral coagulants and the development of reagent-free methods of purification (centrifugal filters, fine sedimentation, and others);

The introduction of chemical purification methods using oxygen, ozone, and other strong oxidizing agents (oxytanks, aeration tanks, aeration pits, and others);

The mastery of the membrane method of desalinization;

The biotechnological processing of sediment for the recovery of methane and carbon dioxide, including the use of underground methane tanks.

In the regulated market economy the provision of the national economy with equipment, instruments, and other material and technical means of establishing ecologically clean technologies and production units and systems of environmental quality control will require the following:

Strict penalties for enterprises and organizations operating and manufacturing obsolete and ecologically hazardous equipment, a stronger emphasis on the ecological aspect of the state system of standards, and the creation of a steady demand for progressive types of resource-conserving equipment;

A group of economic incentives for the production of resource-saving equipment, materials, and reagents and of monitoring instruments and devices (credit and tax privileges and centralized subsidies);

The state financing of research and experimental design projects in the development of progressive types of equipment for the protection of the environment;

Encouragement for the development of joint ventures, associations, concerns, and other organizations and enterprises in the design, development, and production of gas-purifying, dust-catching, and water- purifying equipment and instruments and devices to monitor the environment and control technological processes.

6.3. Informational reinforcement and evaluations of natural resources

A state information system for the collection, storage, collation, and processing of data on the state of the environment, resource potential, and conservation measures should be established by 1995 to accomplish the following:

The creation of a data bank on the state of the environment;

The compilation of constantly updated ecological maps of the USSR and separate regions;

The evaluation of natural resources;

The forecasting of ecological situations in the country;

The ecological categorization of enterprises, industries, and territories;

The development and improvement of the system for the exchange of scientific and technical information on the environment with international, union, republic, and sectorial informational bodies;

The provision of government agencies, scientific and public organizations, and the population of the country with quick and reliable information on the state of the environment.

In 1991 a procedure will be developed and approved for the transmission of environmental information to the state information network by ministries and departments and the exchange of this information among interested state establishments; new methods and principles of obtaining and using aerospace data on the state of the environment will be developed and gradually introduced before 1995.

The creation of the state information system will make it possible to do the following:

Provide government agencies on various levels with quick analytical information on the state of the environment and forecasts of environmental changes serving as an adequate basis for ecologically sound decisionmaking;

Substantiate the calculation of payments and fines for the use of natural resources;

Conduct evaluations of natural resources and environmental pollution through the comprehensive use of the data of various environmental monitoring and control systems;

6.4. Conversion and ecology

The conversion of defense branches will provide an opportunity to use the intellectual and production potential of the scientific research and design achievements in the field of defense for the improvement of ecological conditions in the country in the following areas:

The development of conservation technology;

The development and introduction of progressive waste-decontamination systems;

The creation of an information base for environmental protection efforts by means of the establishment of a state information system with an aerospace service for ecological monitoring and the development of ecological cartography;

The development and production of ecological monitoring equipment.

The practical contribution of defense branches will consist in the transfer of various types of resources made available by defense cuts to environmental protection agencies, including technology, equipment, materials, personal means of chemical protection, and other equipment which could be used in the following areas:

Automobiles, all-terrain vehicles, and other vehicles to equip mobile laboratories on land;

Airplanes, helicopters, and remote-controlled aircraft to equip airborne laboratories, to take photographs from the air, and to perform other functions connected with resource monitoring and accident clean-up operations;

Navigational craft and equipment to remove petroleum products from bodies of water and create mobile sea-based chemical laboratories;

The technical equipment of chemical forces to equip monitoring centers and observation networks and laboratories;

Communication and telecommunication equipment and computers to be used in the ecological monitoring network;

The technology and equipment of engineering forces to alleviate the after-effects of ecological calamities, accidents, and natural disasters;

Spacecraft and ground-based flight support equipment to compile maps and determine the level of pollution in different regions and in water and ground cover;

Structures and facilities to house environmental monitoring centers on land.

The scientific and technical contribution of conversion will consist in the transfer of defense development projects to civilian branches, the completion of research and design projects, and the organization of the production of conservation equipment and ecological monitoring devices and instruments in the following main areas:

The development of ecologically clean technological processes and equipment for electrochemical and electroplating production units;

The design of new ecologically safe vehicles (automobiles running on hydrogen, a binary fuel system of household gas and benzene, a catalytic steam propulsion system, and vehicle exhaust neutralizing systems);

The introduction of stationary and mobile equipment for the high- temperature decontamination of highly toxic waste and materials;

The development and introduction of methods and means of forecasting and preventing industrial accidents and natural disasters;

The development of experimental models and the series production of new equipment for the purification and decontamination of the waste gases of industrial enterprises;

The development of technology and equipment for the purification of highly mineralized sewage;

The development of equipment for the removal of organochlorine compounds and suspended matter from sewage and the development of electrochemical sewage treatment methods;

The design of machines and equipment for the derivation of bio-organic fertilizer from the products of the microbe conversion of the waste of hog-fattening complexes;

The introduction of devices for the ultra-filtration of used motor oil, the electrocoagulation of effluent, and the disinfection and dehydration of sewage sediment;

The series production of water-purifying equipment, including bio- oxidizers, separators, centrifuges, and flotation units for the condensation of active sludge;

The development of equipment for the preparation and application of pulp on reclaimed land;

The development of stationary and mobile plasmochemical devices for the elimination of particularly hazardous waste (polychlorinated biphenyls, diphenylene oxide, dioxin, pesticides, and others);

The use of cryogenic technology for the processing and utilization of industrial rubber goods;

The development of methods for the ecologically acceptable disposal of radioactive waste;

The establishment of a system for the comprehensive and reliable inventory of the country's resource potential and for the efficient monitoring of the dynamics of this potential with the aid of aerospace and computerized equipment and remote systems for the automatic transmission and processing of ecological data.

Assignments will be set in the development of effective technology and the design of conservation equipment and monitoring devices with the aid of the ministries of the defense branches of industry within the framework of the "Conversion—Ecology" program.

6.5. Financial reinforcement of scientific and technical projects

The concentration of funds in priority fields of scientific and technical progress in the sphere of conservation and environmental protection will guarantee the quicker resolution of the country's ecological problems.

Annual financing for the priority development of research and experimental design projects in priority fields of scientific and technical progress will amount to 2.5-3 billion rubles a year, including around 700 million rubles from the union budget and the state (unionwide) environmental protection fund. Capital investments in the amount of 3.5 billion rubles should be allocated in 1991-1995 for the construction of experimental laboratories for ecological research, as well as around 25-30 million dollars a year for the computerization of experimental work.

Section 7. Statewide Environmental Pollution Control Service (OGSNK)

The OGSNK must be developed for the purpose of the fuller satisfaction of the national economic and public need for information about environmental pollution in the USSR.

Air pollution inspections will be organized in 1991-1995 in all cities with a population of over 50,000 or with over 100,000 tons of polluted waste a year, and in all cities by 2005, as well as in the vicinity of all other permanent industrial facilities with polluted waste exceeding 20,000 tons of harmful substances a year.

The network of water pollution and general environmental pollution inspection centers and stations will be enlarged in 1991-2005.

The system of efficient nationwide radiation monitoring will be complete before 1996 and will include more frequent inspections, including automated ones, in the vicinity of AES's, ATETs's, AST's, and enterprises producing and processing radioactive materials and in the border territories of the USSR.

The series of airborne photographic inspections of radioactive pollution throughout the European territory of the country will be completed before 1994.

Automated air pollution control systems will be established in Baku, Sumgait, Yerevan, Alma-Ata, Ust-Kamenogorsk, Frunze, Angarsk, Berezniki, Krasnoyarsk, Magnitogorsk, Nizhniy Tagil, Norilsk, Omsk, Salavat, Sterlitamak, Tolyatti, Cherepovets, Almalyk, Tashkent, Fergana, Zaporozhye, and Mariupol between 1991 and 1995. The systems in Moscow, Leningrad, and Kemerovo will be modernized and enlarged. Automated air pollution control systems will be established in 23-25 cities between 1996 and 2000 and in 24-26 cities between 2001-2005.

Observations of global changes in the state of the environment and climate, including ecological conditions in the world ocean, will be organized in 1991-2000.

From five to seven regional centers of highly accurate environmental quality analysis will be established in 1991-1995, and 20-25 will be established before 2005.

Before 1995 agencies will be established in all oblast and kray centers, and in cities where large quantities of highly toxic substances are produced and stored, for the efficient monitoring of the radioactive and chemical pollution of the environment and the forecasting of environmental conditions, including conditions resulting from accidental emissions of these substances.

Measures will be taken for the considerable expansion of the list of specific substances subject to monitoring and for efficient control with a view to the most objective assessments of pollution levels.

Technical means of pollution control will be produced on a broader scale in line with official specialization schedules. The necessary research and design projects will be conducted for the development of technical means of monitoring pollution levels (Addendum 6).

The development of inspections and projections of the international spread of pollutants and of airborne debris, including radioactive fallout, within national territory will be carried out in accordance with international requirements.

The development and extensive use of models and programs for the calculation of air and water pollution levels, including levels resulting from accidental pollution by radioactive and chemical substances, will be organized.

Section 8. Guidelines of Environmental Protection and Intelligent Resource Use

8.1. Atmosphere

The prevention of air pollution will necessitate:

The reduction of atmospheric emissions of the most harmful substances to permissible levels by the end of

1995 by enterprises responsible for the adverse ecological conditions in the most highly polluted cities and industrial centers;

The reduction of gross atmospheric emissions by stationary sources by a factor of 1.9, of solid substances by a factor of 2.4, of sulfur dioxide by a factor of 2.3, of nitrogen oxides by a factor of 1.5, of carbon monoxide by a factor of 1.8, and of hydrocarbons by a factor of 1.7 throughout the country by 2005 in comparison with 1988 figures; the reduction of emissions of more than 30 specific substances by 80 percent in 276 cities in our country by 2000. These levels of reduction will require the expenditure of 21-23 billion rubles in capital investments for air protection measures;

The cessation of the production and use of substances destroying the earth's ozone layer by 2000;

The reduction of atmospheric emissions of pollutants by enterprises having an adverse effect on unique natural and cultural objects and health resorts, including enterprises located in the following basins, by the following amounts by 1995 in comparison with 1988 figures:

Lake Baykal—by 150,000 tons a year, including 37,000 tons of sulfur dioxide and 22,000 tons of nitrogen oxides;

Lakes Ladoga, Onega, and Ilmen—by 90,000 tons a year, including 490 tons of hydrogen fluoride and 85,000 tons of solid waste;

The establishment of new equipment production facilities for the installation of gas-purifying equipment with a total capacity of over 1,500 million cubic meters an hour and for the more effective purification of gases and utilization of recovered hazardous substances;

The institution of measures to reduce gross automobile exhaust emissions to 20.6 million tons in 2005 (by more than 40 percent of the 1988 figure), with the complete exclusion of emissions of lead and the priority reduction of vehicle emissions in the capitals of union republics and in health resort areas. To this end, measures will be taken to reduce vehicle emissions of pollutants in accordance with Addendum 4.

The main measures to reduce vehicle emissions of pollutants will be the following:

The equipping of new carburetor vehicles with effective emission reduction systems and devices (catalytic neutralizers, automatic ignition and choke systems, and a device to trap gasoline fumes);

The augmentation of the number of cars and buses running on fuel gas (in 1990 there will be 1 million such vehicles);

The equipping of automobiles with exhaust neutralizing systems. The achievement of these emission reduction levels and the completion of immediate measures to reduce the toxicity of motor vehicles will require the allocation of 2 billion rubles in 1991-1995, 5 billion in 1996-2000, and 8 billion in 2001-2005;

The cessation of the production and use of non-ethylated gasoline by 2000, which will require around 3.5 billion rubles in capital investments for the creation of the appropriate production capacities;

The production of smoke-suppressing additives, filters, and oxidizing neutralizers for diesel vehicles;

The establishment of diagnostic centers to determine the technical state of engines and the pollutant content of vehicle exhaust.

8.2. Water

The radical improvement of the state of bodies of water will require the following: the cessation of the dumping of polluted sewage in bodies of water by 2000, the reduction of discharged pollutants to the permissible limit, the re-establishment of favorable hydrological conditions in bodies of water, and the restoration of their recreational value;

The organization of broad-scale work to improve the state of bodies of water, including the cleanup of lakes, ponds, and creeks filled with silt and algae and the removal of submerged timber.

The combination of national economic development according to plan with the stabilization of water intake levels throughout the country and the gradual reduction of water intake from bodies of water in the basins of the Volga, Ural, Irtysh, Amu-Darya, Syrdarya, Dnepr, Dnestr, and Kura rivers in accordance with Addendum 3;

The installation of sewage treatment plants with a total capacity of over 100 million cubic meters a day before 2005;

The reduction of proportional expenditures of fresh water per unit of product by 30-40 percent in industry and by 40 percent in thermal power engineering by 2005, an increase in the use of sea, well, stratal and other mineralized waters to 15-20 cubic kilometers a year, the reduction of proportional expenditures of water per hectare of irrigated land by at least 25 percent, and the reduction of unproductive losses of water during transport to a third of the present figure;

The achievement of the standard level of proportional water consumption by the urban and rural population by 2000;

The elevation of the average indicator of recycled water use in industrial water supply systems to 0.85 (and to 0.75 in thermal power engineering) by 2005. The capacity of water recycling systems will be increased by a factor of 1.6-1.7;

The reduction of eutrophication processes in the reservoirs of the Volga-Kamsk, Dneprovsk, and other hydroelectric series, primarily by intensifying circulation, reducing the size of shallow areas, and other measures;

The organization of work before 2005 to reinforce the banks of internal seas, reservoirs, and rivers (10,000 kilometers), beginning with health resorts and coastal cities;

The reduction of the dumping of heavy metal salts, toxic compounds, and biogenic substances into bodies of water in sea basins by quantities guaranteeing the stabilization of marine ecosystems by 1995;

The development of technology and efficient equipment for the cleanup of oil spills by 1993 and the removal of the heavy factions of oil pollutants from offshore sludge;

The continuation of engineering projects to secure the ecological safety of shipping. The methods and technical equipment of cargo handling operations precluding the pollution of the environment during shipments of chemicals in bulk or in liquid form will be developed before 1992. By 1995 bulk chemical shipments will be packaged or transported in special cars. The improvement of the design of liquid- and dry-cargo ships, including their anti-pollution equipment, will be stepped up.

By 1993 ecologically safe methods and technical means of prospecting and exploiting seabed resources will be developed with the use of their foreign counterparts;

Anti-pollution procedures and methods of off-shore and coastal exploratory and drilling operations in the extraction of non-combustible mineral resources will be developed.

These measures in the protection and intelligent use of bodies of water will require 60-65 billion rubles in capital investments between 1991 and 2005 and will fundamentally improve the ecological state of these bodies. The restoration of the commercial value of most of these bodies as sources of fish will necessitate additional measures costing around 100 billion rubles and extending beyond the period covered by this program.

8.3. Land and soil

The intelligent use and protection of the land and the preservation of soils will necessitate:

The elimination of the negative balance of organic substances in soils by 2000 and the achievement of a positive balance by 2005 through the increased use of organic fertilizers and scientifically substantiated quantities of mineral fertilizers;

The completion of anti-erosion measures on agricultural lands covering an area of at least 325 million hectares by 2005. To this end, soil- conserving methods of cultivation will be introduced in all areas suffering from erosion before 1995, protective woodlands will be planted on an area of at least 1.54 million hectares, including field-protecting forest strips on an area of 400,000-500,000 hectares, forest strips will be maintained on an area of 500,000 hectares, and unplowed protective strips will discourage erosion on the banks of rivers and other bodies of water and on the edges of ravines;

By 1995 gullies, ravines, sand pits, and other unproductive lands will be reinforced and afforested on an area of 500,000 hectares;

The development of contour farming will be organized on all slopes with erosion-prone soils, steep slopes will be terraced on 300,000 acres, and work will begin on the construction of anti-erosion hydraulic structures and landslide and mudslide barriers;

The use of toxic chemicals will be reduced, the use of mineral fertilizers will be optimized, the use of non-degradable pesticides will be prohibited everywhere, and work will begin in 1991-1995 on the removal of polluting pesticides from farmland;

Biological methods of protecting agricultural crops will be introduced on an area of 55 million hectares;

Low-pressure cultivating equipment will be designed and produced;

Plowing will be coordinated with regional requirements of ecological stabilization, and the work of stabilizing the ecological system of the Black Lands and the Kizlyar Pastures will be performed in 1991-2005;

Measures will be taken to prevent the degradation and enhance the productivity of pastures on 373 million hectares, including the radical improvement of eroded pastures on 32 million hectares and surface improvements on 90 million hectares, agrochemical melioration will be completed on 120 million hectares, and forest reclamation measures will be instituted to reinforce sandy areas;

Ecologically expedient systems of pasture rotation will be institution, and the composition and number of livestock will be brought in line with the feeding capacity of pastures;

Conservation measures will be combined with the comprehensive renovation of irrigation systems on an area of 7 million hectares;

A dependable water supply will be organized on arid and semi-arid pastures on 50 million hectares with the use of supply lines and non- traditional sources and the harnessing of groundwater supplies;

A program will be drawn up for the reduction of filtration and other losses of water from canals, beginning with the Aral Sea basin;

Damaged lands will be recultivated on an area of 2.15 million hectares, and at least 1.3 million hectares of the recultivated land will be returned for agricultural use,

removed topsoil will be used on a broader scale for the reclamation of gullies and the improvement of unproductive agricultural lands on an area of 250,000-260,000 hectares.

All of this work will require around 34-38 billion rubles in capital investments from all sources of financing, including the funds allocated for land reclamation.

8.4. Plant life

The preservation and reproduction of the natural plant cover, its resource- and environment-restorative properties, and the range of plant species and populations, as well as the augmentation of the biological productivity and the more effective use of natural plant communities, will necessitate:

Measures to prevent the depletion of the composition of the country's plant life, especially the disappearance of rare species of plants;

An inventory of rare and endangered plant species of special economic value and maps of their growing sites; the protection of rare relicts;

The periodic monitoring of the state of populations of particularly rare and endangered species of plants;

Measures to bring procurements of wild medicinal and essential-oil plants in line with existing reserves, especially in regions where the supply is being depleted.

The efforts to carry out these elements of the program will be reinforced by the following measures:

The keeping of state records and state evaluations of plant life;

The creation of gene banks and live collections of rare and valuable species of plants and the enlargement of existing ones;

The restoration of destroyed communities, including lichens, junipers, mulberry trees, walnut trees, and others;

The inclusion of most rare and endangered species, which can still be cultivated, in the collections of the country's botanical gardens;

The organization of the geographic and ecological categorization of populations of rare species;

The regular updating of the red books of the USSR and republics with a constantly supplemented database on plant communities and ecosystems needing special protection;

The enlargement of the network of botanical sanctuaries, reservations, and preserves;

Effective state control over the use of plant life for economic, scientific-educational, and other purposes;

The expansion of efforts to include wild and essential-oil plants among agricultural crops; the expansion of the network of special farms raising medicinal and essential-oil plants;

The organization of a controlled system of licensed procurements of vegetative raw materials, including sales for convertible currency, with the use of the receipts for measures to protect plant life;

The expansion of the comprehensive studies of the invulnerability of basic types of plants and certain species to different kinds of anthropogenic influences and pollution;

The cessation of the use of heavy transport vehicles, including caterpillar tractors, in permafrost regions during periods of thaw, and the series production of specialized vehicles for the Far North exerting less pressure on the ground;

The development of the optimal methods of restoring vegetation in various growing conditions following various kinds of degradation;

The selection of plant species resistant to anthropogenic pressure and the creation of artificial self-reproducing communities.

8.4.1. Forests

The following steps will be taken to prevent the degradation of forests, maintain their ecological and resource potential, and guarantee their intelligent use:

Fire-prevention measures in forests will be reinforced according to plan. As previously inaccessible territories are developed for economic purposes, the protected area of forests and grazing lands will be expanded to 1,339,000 hectares by 2005, including aerial protection on 1,246,000 hectares;

The negative effects of pests and diseases on forests will be reduced through the introduction of regional systems of integrated forest protection; by 2005 biological methods of combating forest pests and diseases will represent 80 percent of the total, with a simultaneous decline in the percentage of chemical methods;

Reforestation will be conducted on a broader scale with trees of commercial value, forests destroyed by fires, pests, diseases, and industrial waste will be restored according to plan, and the total volume of forest restoration work will reach 2.4 million hectares a year by 2005;

Steps will be taken to prevent the replacement of conifers and hardwoods with softwood trees of little commercial value and to ensure plantings of the optimal composition and structure. The work of forest maintenance and the restructuring of stands of low value will be expanded to 3.9 million hectares a year by 2005;

There will be a transition to the principles of continuous and non- depleting forest use and the satisfaction of national economic and public needs for wood and all other types of crude forest resources in accordance with plans and with minimal damage to the natural protective and other beneficial functions of forests;

The division of forests into protective groups and categories and felling estimates will be coordinated with rising ecological and socioeconomic requirements;

Steps will be taken to secure the fuller development of softwood trees and the use of stocks of mature and overmature timber in forests of the first group with ecologically sound felling methods based on the extensive use of ecologically harmless lumbering equipment;

Losses of wood during logging operations, shipping, and processing will be reduced to the level achieved in the leading foreign countries, and the effective use of waste timber will be secured;

Comprehensive assessments of nut and juniper forests will be conducted in 1991-1995, areas planted to cedar will be enlarged, the procedures of maintenance cutting will be revised in nut forests with a view to their ability to enhance yield and restore the main species of trees, and unregulated grazing by livestock in nut and juniper forests will cease;

Ecologically dangerous logging equipment will be replaced by a new generation of machines meeting international ecological requirements by 2000;

Forests will be used more extensively for cultural and therapeutic purposes, and forests performing primarily sanitary-hygienic and restorative functions will be developed for public use on a total area of 25 million hectares;

Forestry and hunting on the territory of state forests will be transferred to comprehensive jurisdiction according to plan;

The industrial reproduction of the food and medicinal resources of forests will be organized, and their procurements will double by 1995 and quadruple by 2005;

A system to monitor the state of the country's forests with the aid of aerospace and ground equipment will be developed by 1995 and introduced in 1995-1998;

Additional protective forest strips will be planted on agricultural lands covering a total area of 3.6 million hectares by 2005.

8.5. Animal life

The following steps will be taken to preserve a steady dynamic balance between natural ecosystems and the conditions of the existence and self- reproduction of wild animals in their full present range of species, subspecies, and populations and to use animals more effectively for economic, scientific, recreational, and other purposes:

Measures will be taken to prevent the depletion of the present composition of animal life in the USSR and the extinction of rare species, subspecies, and small populations of wild animals;

Objective records will be kept of animal life, reflecting the current state of the animal species, subspecies, and populations;

A system will be established to monitor the state of populations of rare and endangered animal species;

The system for keeping records of food animal species will be perfected;

A unionwide system will be established to monitor the state of wild animal populations;

An effective mechanism will be developed for the protection, reproduction, and comprehensive, efficient use of animal resources, including the elaboration and introduction of a group of economic incentives for animal protection, reproduction, and the introduction of non-depleting forms of use, and excluding the disruption of the biological balance in natural ecosystems;

Scientifically substantiated limits on the removal of wild animals from natural populations will be elaborated, instituted, and enforced, and hunting and trapping for any purpose (including population control) with the aid of methods injuring other animal species and their habitats or polluting the environment will be prohibited;

The land and water in the propagation areas of wild animals, particularly rare and endangered species, will be protected from anthropogenic influences and all types of pollution;

Methods of propagating rare and particularly valuable species of animals in captivity for their subsequent release in the wilds will continue to be perfected, and measures will be taken for the extensive use of these methods;

All of the basic species and lines of domestic animals will be preserved, and an economic mechanism will be set up to stimulate their propagation.

The completion of these portions of the program will be secured by the following measures:

The keeping of state records and state evaluations of animal life;

The keeping of the Red Book of the USSR and the red books of union republics;

The creation of gene banks;

The organization of new wildlife sanctuaries and other protected natural territories and bodies of water;

The institution of scientifically sound biotechnical measures to regulate the numbers of certain species of wildlife and to ensure state regulation of the limits on

commercial trapping (and hunting) and state control over the fulfillment of reproduction and protection assignments.

8.6. Protected natural territories

The creation of a unified, functional and integral system of protected natural territories and bodies of water is an essential condition in preserving the viability of the biosphere and regenerating biological resources. This will require:

The elaboration of ideas about a scientifically sound system of protected natural territories and bodies of water, requiring varying degrees of protection and serving various purposes, to secure the guaranteed long-term preservation of standard and unique natural complexes with all of the present diversity of their biotic and abiotic components;

The continuation of the efforts to establish a scientifically sound network of state sanctuaries and other protected natural territories (or bodies of water), with the aim of increasing the area of sanctuaries and national parks to 3 percent of all national territory by 2000;

The continuation of the work to improve legislation on protected natural territories (and bodies of water);

The professional training of personnel for the network of protected natural territories (or bodies of water), including the organization of the international exchange of trainees and the establishment of an office to plan new sanctuaries and other protected territories.

8.7. The earth's interior and mineral resources

The efficient and comprehensive exploitation of mineral deposits through the incorporation of scientific and technical achievements can increase the annual output of the commercial product of mining enterprises, reduce mining volumes, and alleviate negative effects on the environment. Furthermore, production costs could be 10-20 percent lower than current indicators and proportional capital investments could be 30-50 percent lower.

This will require:

The completion of measures for the efficient and comprehensive use of crude minerals in the national economy in accordance with Addendum 7 before 2005;

The extraction of the useful components of crude mineral resources during mining, concentration, and processing and the use of surface and surrounding rock and ore-dressing waste at a level no lower than the one specified in Addendum 8 in 1991-2005;

The increased use of surface and surrounding rock and the waste products of the extraction and concentration of minerals in the production of construction materials;

The stepped-up construction of filling complexes and the considerable expansion of mineral extraction operations including the filling of shafts;

The institution of measures to preserve mine workings at enterprises engaged in the underground mining of minerals in the event that arrangements are made for the effective use of these workings in the national economy;

The provision of economic incentives for the complete and comprehensive use of minerals and raw materials during all stages of extraction and processing.

8.8. Conservation

The economical use of natural resources and raw materials is an essential condition of efficient resource use and the prevention of environmental pollution and degradation. This should be accomplished by means of the radical reduction of losses of natural materials during all stages (extraction, shipping, processing, storage, and the use of derived products) and by means of the use of production and consumption waste.

The structural improvement of the production and consumption of fuel and energy, the extensive introduction of energy-saving equipment and technology and fundamentally new sources of energy, and the recycling of energy resources should produce a savings of 135-140 million standard fuel units in the national economy in 1991-1995 and 400-420 million units by 2005, including:

In electrical power engineering—6.6 million units in 1995 and 7-8 million units in 2005 in comparison with the 1990 figure as a result of the retooling of heat and electric power plants;

In the petroleum industry—4.5 million units in 1995 and 15.3 million units in 2005 as a result of the use of progressive economical methods of conserving fuel and energy resources;

In the coal industry—2.2 million units in 1995 and 5.1 million units in 2005, as well as 950,000 units as a result of the reduction of coal losses in railway transport;

In the gas industry—6.4 million units in 1995 and 17.1 million units in 2005;

In metallurgy—a savings of 4-5 billion rubles' worth of ferrous metals in the 13th Five-Year Plan as a result of the introduction of progressive processes in the production of ferrous metals and the improvement of their quality;

In the petrochemical industry—an increase in oil processing intensity to 71 percent in 1995 and 80-82 percent in 2005, in comparison with 63.5 percent in 1990 as a result of radical remodeling and retooling.

Besides this, the program envisages the priority development of capacities for the retrieval and utilization of various types of recyclable resources and the introduction of progressive technology for their processing. The use level of certain types of waste products should be raised to 95-100 percent of the total volume (Addendum 9) on this basis and the waste products accumulating in

scrap heaps should be used on a broader scale to make primary material resources, worth around 30 billion rubles in the national economy as a whole, available by 2005.

The following steps will be taken for the intelligent use of the most common types of waste products:

The broader use of the waste products of mining enterprises for the production of construction materials, for land reclamation, and for use as land fill;

The 100-percent use of the slag produced in ferrous metallurgy by 1995 and the exploitation and gradual elimination of slagheaps;

The achievement of at least 82-percent slag use in nonferrous metallurgy by 2005;

The use of at least 40 million tons of waste halite, at least 18 million tons of phosphogypsum waste, and at least 7 million tons of pyrite cinders by 2005 (including the development of comprehensive technology for the removal of gold, silver, and other valuable components from them);

The introduction of methods of compound treatment for solid household waste with the preliminary extraction of valuable components for the purpose of making compost from the organic portion and using heat to decompose the rest;

The organization of the separate collection of different types of waste: paper, glass, metal, polymer, used tires, footwear, and others. By 2005 the amount of broken glass, used tires, and recycled polymer should reach 90 percent of annual resources, and the amount of waste paper used should reach 5.5 million tons, or 98.9 percent of annual resources, providing for a savings of at least 200 million cubic meters of wood worth 4 billion rubles in 1991-2005;

By 2005 the volume of recycled textile materials should increase by at least 1.5 million tons a year, providing for a savings of over 1 million tons of natural and man-made fibers worth over 2 billion rubles a year. The amount of recycled glass used in the country should be increased to 1.5 million tons in 2005 (twice as much as is used now);

The system for the collection of recyclable items from the population should be improved, and the assortment of waste products to be collected should be expanded;

Technology for the derivation of biological gases from garbage dumps and for their comprehensive use on the industrial scale should be perfected, beginning with the creation of the appropriate disposal sites in cities with a population of over 100,000;

The derivation of biological gases from sewage sediment should be practiced more widely;

The capacities of garbage recycling plants should be augmented so that they can handle 23-25 percent of all solid household waste by 2005;

Technology for the decontamination and processing of toxic industrial waste should be developed and introduced;

Special disposal sites should be created for the decontamination and ecologically safe burial (or storage) of all toxic industrial waste;

Enterprises (or plants) should be set up for the decontamination of banned and unusable pesticides.

Section 9. Collective Program Indicators

	Units of measurement	Years				
		1985 (report)	1990 (plan)	1995	2000	2005
Water use limit	Cubic kilometers	327.3	330	327	323	320
Polluted sewage dumped in bodies of water		15.9	26.6*	13.8	—	—
Amount of recycled and reused water	Cubic kilometers	244	300	350	400-410	470-500
Permissible levels (limits) of atmospheric emissions (in last year of five-year plan):						
Stationary sources	Million tons	68.3	57.3	50	42.1	32.6
Motor vehicles	Million tons	36.7	36.7	34.6	28.6	20.6
Construction of anti-erosion, hydraulic engineering, anti-landslide, and anti-mudslide structures (over 5-year period)	Million rubles	—	—	2430	2770	3180
Creation of protective forest strips	Thousand hectares	154.3	168.7	214	235	250

	Units of measurement	Years				
		1985 (report)	1990 (plan)	1995	2000	2005
Forest reclamation work	Million hectares	2.2	2.2	2.2	2.3	2.4
Protection of agricultural crops from pests and diseases by biological means		33.7	39.3	46	48	55
Land reclamation (over 5-year period)	Thousand hectares	697.2	735	719	715	716
Protection of forests and grazing areas from fire and degradation	Million hectares	1017.5	1044.2	1130	1223	1339
Protection of forests from pests and diseases by biological means	Thousand hectares	1000	925	1109	1217	1300
Protection and reproduction of wildlife	Million rubles	100.2	210.7	356.8	420.7	480.1
Reproduction of fish reserves	Billion fry	8.8	7.7	8.8	9.4	9.6
Organization of sanctuaries (over 5-year period)	Units	20	27	35	27	21
Organization of sanctuaries (over 5-year period)	Thousand hectares	6235	4883	9140	4700	11000
Use of cover and surrounding rock and concentration waste	Million cubic meters	1126.3	1425.8	1586	1706	1870

*The increase in polluted sewage dumping in 1990 is connected with stricter sewage quality requirements.

**6 million hectares in the Arctic Ocean.

Capital Investments Required for Environmental Protection and Resource Conservation Measures (billions of rubles)

Categories	1991-1995	1996-2000	2001-2005	1991-2005
Total	44.2-48.7	45.9-50.5	42.5-46.5	132.6-145.7
Protection and intelligent use of water resources	19.5- 21.5	19.8-21.8	20.1-22.1	59.4-65.4
Protection of atmosphere (stationary sources)	7.9-8.7	7.6- 8.4	5.3-5.8	20.8-22.9
Protection and restoration of land resources	10.8-12.0	12.1- 13.4	11.4-12.6	34.3-38.0
Protection and restoration of animal life and ground cover	2.1	2.8	3.6	8.5
Protection and restoration of forest resources	1.0	1.5	2.0	4.5
Organization of sanctuaries and national parks	0.8-0.9	0.9- 1.0	0.9-1.0	2.6-2.9
Protection and intelligent use of mineral resources	4.2- 4.6	4.0-4.4	2.8-3.0	11.0-12.0

The economic effectiveness of special capital investments in air and water protection will exceed the standard recoupment indicator of investments in the national economy as a whole. The estimated rates of effectiveness are 0.2 for air protection and 0.13 for water protection. Furthermore, these estimates of the effectiveness of the special investments are understated because it is impossible to calculate some of the social and other results of the investments in monetary terms. The calculated result was based on the economic losses eliminated by the absolute reduction of emissions (or dumping), because this is the express purpose of the attainment of the social objective of improving ecological conditions in the country.

The completion of all the measures stipulated in the program is expected to have the following results:

The reduction of gross atmospheric emissions from stationary sources by a factor of 1.9 and vehicle emissions by a factor of 1.7, which will meet air quality standards, including the considerable improvement of ecological conditions in 30 cities and large industrial centers with the most highly polluted atmosphere by 1995;

The stabilization of nationwide water intake from natural sources, the cessation of the dumping of polluted

sewage by 2000, and the guarantee of favorable hydrological conditions in bodies of water;

The cessation of soil degradation, the enhancement of soil fertility, and the considerable reduction of flooding;

The protection of forests and grazing areas from fire, the balancing of forest resource use with reproduction, and the improvement of the qualitative composition of forests;

The maintenance of a stable balance between natural systems and conditions of animal self-reproduction;

The essential completion of the network of protected territories;

The virtually complete and comprehensive use of mineral resources.

Section 10. International Cooperation

The global nature of environmental deterioration necessitated concerted effort by all countries to avert ecological calamities and preserve the earth's biosphere as the main factor in the continued steady development of the human race. The Soviet Union has been active in advocating the intensification of international cooperation on the bilateral, regional, and global levels and the attainment of genuine practical results.

The USSR's participation in multilateral cooperation is based on the principles and approaches dictated by national objectives and set forth in such well-known documents as the report of the International Commission on Environment and Development "Our Common Future," the "Regional Strategy of Environmental Protection and Resource Conservation in the Countries Belonging to the UN European Economic Commission up to the Year 2000 and Beyond," the "Strategy of CEMA Countries in the Sphere of Environmental Protection up to 2010," the final document of the Vienna meeting of the CSCE states, and several other international legal documents signed or approved by the USSR.

Interaction will be organized with UNEP [United Nations Environment Programme], UNIDO [United Nations Industrial Development Organization], UNDRO [Office of the United Nations Disaster Relief Co-Ordinator] and other international organizations and specialized UN establishments, and cooperation will be developed and improved on the basis of legal agreements.

Steps will be taken to ensure the fulfillment of the USSR's international commitments and to continue the work of implementing the theory of ecological security, of making the Soviet Union party to international conventions and agreements of environmental importance, and of assisting in the drafting and conclusion of international agreements on priority fields of cooperation, including the following:

The preservation of biological diversity;

The prevention of global climate changes;

The preservation of the earth's ozone layer;

The protection of unique natural zones, including the Antarctic and Arctic regions;

The prevention and limitation of the transnational effects of industrial accidents;

The prevention of the pollution of transnational waterways and international lakes;

The assessment of environmental impact in the transnational context;

The protection of the Black Sea from pollution.

The attainment of the goals of international agreements will necessitate the concentration of efforts in the creation of an international mechanism envisaging the following:

Technological cooperation, including the exchange of environmental technology and information;

The creation of specialized organs and funds;

The establishment of a system to verify the observance of commitments, including on-site inspections;

The organization of international ecological expert appraisals;

The establishment of an emergency ecological aid center in the United Nations and the creation of the appropriate system of international assistance in Europe.

In the sphere of bilateral cooperation it will be important to enhance the effectiveness of quick solutions to specific environmental problems and strive for united conservation efforts on the regional level.

Methods and forms of cooperation within the framework of existing and new intergovernmental agreements must be improved with a view to the specific ecological problems of partners, their level of economic development, and their geographic location. Special priority should be assigned to the resolution of ecological problems in border regions.

It will be necessary to develop and intensify joint projects and the exchange of experience in such fields as the following:

The minimization of the quantity of harmful substances discharged into the atmosphere, bodies of water, and the soil;

The achievement of a reasonable and intelligent level of resource use;

The assessment and monitoring of the state of the environment;

The protection of ecological systems, including the development of protected natural territories and the creation of joint sanctuaries in border regions;

The development of scientific research in various fields connected with the preservation of the biosphere;

The preservation and restoration of rare species of flora and fauna;

The development and introduction of low-waste and waste-free technology;

The protection of the Arctic environment;

Ecological education and indoctrination;

The development of direct contact between enterprises and organizations in the partner-countries in the fields of technology transfer and the production of instruments and equipment.

The Soviet Union will work with other countries in the resolution of global ecological problems. The arrival at more effective decisions, coordinated on the international level, will necessitate the following:

The compilation and institution of a long-range state program to secure the steady development of the country at a time of climatic changes, including the planning of specific steps to reduce the negative effects of possible changes in climate on the economy, the environment, and public health and welfare and to reduce the effects of economic activity on the climate of the planet;

The intensification of scientific research for the elaboration of reliable and sound scenarios and forecasts of future climate, the study of the socioeconomic implications of climatic changes for the economy and the environment, the determination of specific responses to these changes;

The intensification of the Soviet Union's participation in international efforts to elaborate criteria and concerted action to reduce the negative effects of human activity on the climate, including the elaboration and implementation of a framework convention on climatic changes and possible protocols to it;

The development and organization of international cooperation, backed up by scientific knowledge and findings, in the drafting and implementation of the framework convention on climatic changes and a program for the development of key sectors of the national economy (agriculture, industry, including power engineering and transportation, forestry and water management, and public health) at a time of changes in climate and a need for the dramatic reduction of emissions of substances with adverse effects on the atmosphere, and the choice of a national economic development strategy, beginning with the restructuring of power engineering in connection with the need to reduce fossil fuel use, primarily by means of the development and extensive use of energy- saving technology and alternative sources of energy.

Addendum 1

List of Cities with Most Critical Sanitary-Hygienic and Ecological Conditions in 1989 Due to Air Pollution and Scheduled for Priority Clean-Air Measures

Cities with systematically high levels of air pollution over many years (air pollution index—API—of over 15 units each year from 1985 to 1989)		
Alma-Ata	Almalyk	Bratsk
Groznyy	Dzhambul	Dneprodzerzhinsk
Donetsk	Dushanbe	Yerevan
Zaporozhye	Zestafoni	Zyryanovsk
Kemerovo	Kommunarsk	Komsomolsk-on-Amur
Krasnoyarsk	Kuybyshev	Magnitogorsk
Mariupol	Nizhniy Tagil	Novokuznetsk
Odessa	Osh	Perm
Rustavi	Ust-Kamenogorsk	Fergana
Frunze	Chardzhou	Chelyabinsk
Cities with high levels of air pollution (API of over 15 units in 1989)		
Abakan	Angarsk	Andizhan
Arkhangelsk	Berezniki	Volzhskiy
Voroshilovgrad	Gorlovka	Dnepropetrovsk
Irkutsk	Kamensk-Uralskiy	Kokand
Kramatorsk	Krasnodar	Kutaisi
Krivoy Rog	Kurgan	Lipetsk
Lisichansk	Makeyevka	Nikopol

List of Cities with Most Critical Sanitary-Hygienic and Ecological Conditions in 1989 Due to Air Pollution and Scheduled for Priority Clean-Air Measures (Continued)

Novosibirsk	Novocherkassk	Omsk
Prokopyevsk	Rostov-on-Don	Ryazan
Sverdlovsk	Severodonetsk	Seleginsk
Slavyansk	Tashkent	Tbilisi
Temirtau	Tolyatti	Tyumen
Ulan-Ude	Usolye-Sibirskoye	Khabarovsk
Chimkent	Chita	Shelekhov
Yuzhno-Sakhalinsk		
Cities displaying systematic signs of the dramatic deterioration of air quality in 1989 (API of under 15, but with a high frequency, more than 5 times a year, of cases in which the content of specific pollutants in the air exceeded 10 times the permissible limit)		
Volgograd	Dzerzhinsk	Krasnoperekopsk
Mogilev	Norilsk	Sterlitamak
Cities with an API of under 15, but with sizable emissions of unidentified pollutants		
Baku	Salavat	Sumgait
Novokuybyshevsk	Ufa	Yaroslavl

Addendum 2

Atmospheric Emissions of Pollutants from Stationary Sources

Locations	1991	1992	1993	1994	1995	2000	2005
USSR—total	57587.8	56253.3	54220.4	52066.6	50081.2	41150.2	32148.5
RSFSR	36500	36000	35000	34300	33300	25800	18700
Ukrainian SSR	10630	10386	9960	9280	8726	7392	6635
Belorussian SSR	1222	1181	1140	1100	1060	830	580
Uzbek SSR	1333	1300	1232.8	1128.8	988.9	851.9	613.6
Kazakh SSR	4305	4036	3689.7	3427.4	3122	3889.3	3544.9
Georgian SSR	453.2	401.4	349.2	296.8	244.6	185.2	146.3
Azerbaijan SSR	673.8	654.3	643.7	629.8	609.8	380.3	330.3
Lithuanian SSR	452.6	428.2	415.5	392.5	376.5	364.3	350.6
Moldavian SSR	419	415	410	400	393	361	328.1
Latvian SSR	168.5	165.1	161.7	158.3	154.9	141	114
Tajik SSR	118	109	99	90	84	78	73
Kirghiz SSR	177.7	173.3	168.8	167	165.2	134.6	113.7
Armenian SSR	158	130	120	101	93	84	73.9
Turkmen SSR	530	525	500	475	454	403.6	345.1
Estonian SSR	447	342	330	120	310	255	200

Addendum 3

Fresh Water Intake Limits from Bodies of Water in River Basins of Inter-Republic Significance, cubic kilometers

River basins	1988—report	1995	2000	2005
USSR—total	323	324	321	318
Volga	34.7	35	35	35
Ural	4.7	4.7	4.5	4.3
Irtysh	9.8	9.8	9.8	9.8
Amu-Darya	73.5	68.1	63.4	58.7

Fresh Water Intake Limits from Bodies of Water in River Basins of Inter-Republic Significance, cubic kilometers (Continued)

River basins	1988—report	1995	2000	2005
Syrdarya	52	40.5	37.7	34.9
Dnepr	22.4	22.8	22.3	21.8
Don	16.7	17.2	16.7	16.2
Dnestr	4.8	3	3.4	3.7
Kura	19.4	20.5	19.8	19.1

Addendum 4

Measures To Secure the Reduction of Atmospheric Emissions of Pollutants from Vehicles

Objectives	Units of measurement	1991-1995	1996- 2000	2001-2005
Production of VAZ, AZLK, ZAZ, RAF, UAZ, GAZ, and ZIL automobiles with effective emission control systems and devices (catalytic neutralizers, including ternary neutralizing and exhaust recycling systems and automatic starter engines)	Millions	1.5	5.0	15
Equipping of cars, trucks, and buses with fume traps	Millions	5.8	15	15
Manufacture of high-power fuel injection systems with feed adjustment devices	Millions	2.325	3.5	4.5
Production of cars and buses running on fuel gas	Millions	0.855	1.0	1.0
Reduction of vehicle fumes and toxicity by modifying carburetor vehicles to run on fuel gas and equipping them with exhaust neutralizing systems	% of total	50	75	100
Production of electronic and microprocessor systems (to control ignition, fuel injection, exhaust neutralization, and other processes)	Millions	0.75	3.0	5.0
Production of smoke filters and oxidizing neutralizers for diesel trucks, tractors, and fork-lift trucks	Millions	2.56	3.5	4.5
Production of non-ethyl, including high-octane, gasolines	%	80	100	100
Production of anti-smoke additives for diesel fuel	Thousands of tons	27	27	27
Expansion of network of compression filling stations	Units	521	258	300
Production of mobile liquefied fuel gas pumps for motor transport	Units	1500	1000	1000
Expansion of network of State Automobile Inspection diagnostic stations of USSR Ministry of Internal Affairs	Units	162	36	35
Establishment of diagnostic centers to determine technical state of vehicles in automotive enterprises	% of enterprises	70	100	100
Introduction of automated traffic control systems in cities	Number of cities	48	35	12
Installation of vehicle emission control systems in vicinity of railroad stations	Units	150	200	430
Equipping of diesel locomotives with exhaust neutralizing systems	Units	500	500	500

Addendum 5

Total Demand for Gas-Purifying Equipment for Gas Treatment Plants (cost of equipment in millions of rubles)

Number	Substance to be recovered	Main equipment and facilities	1991-95	1991	1992	1993	1994	1995	1996-2000	2001-2005	1991-2005
1	Sulfur dioxide	Absorbers, tanks, heat exchangers, filter presses, pumps, forced-draft units, desiccators, roasting furnaces	833	32.8	72	236.4	247.1	244.7	718.6	704.8	2256.4
2	Nitrogen oxides	Catalytic reactors, high-pressure tanks, heat exchangers, others	349	2	34	103	104.5	105.5	294.1	314.6	957.7
3	Carbon monoxide	Catalytic reactors, waste-heat boilers, incinerators, heat exchangers, force-draft units, others	40.4	4.4	6.7	9	10.8	9.5	26.9	19.5	86.9
4	Hydrocarbons	Adsorbers, reactors, heat exchangers, forced- draft units, fractionators, condenser-separators, others	114.2	14.6	19.5	23.1	24.9	32.1	103.6	97.9	315.7
5	Specific pollutants: carbon disulfide, hydrogen sulfide, ammonia, fluoride, chlorine, mercury, etc.	Adsorbers, distillers, reactors, fluid electrofilters, fiber filters, heat exchangers, tanks, forced-draft units, pumps, others	125	18.9	24	25.4	27	29.7	99	67.8	291.8
	Total		1461.6	72.7	156.2	396.9	414.3	421.5	1242.2	1204.6	3908.5

Addendum 6

Production Volumes of Work on Development of Technical Pollution Monitoring and Emission Control Devices in 1991-2005 at Request of USSR State Committees for Hydrometeorology and Environmental Protection

Objectives	5-year R & D costs (millions of rubles, estimated)		
	XIII	XIV	XV
1. Development and series production of set of technical means of measuring pollution levels, including overall level	170	170	200
2. Development and series production of atmospheric emission control devices	30	30	40
3. Development and series production of set of sewage control devices	25	25	30
4. Metrological project reinforcement	10	10	10
5. Design and manufacture of airborne ecological observation equipment (for IL-114 plane)	50	50	50
6. Development and series production of ecological observation plane based on IL-114 design			
7. Investigation and design of radiometric set of equipment to determine levels of water and air pollution	10	5	5
8. Development and start-up of space-based air and water quality monitoring system with consideration for changes in state of environment, including disasters	90	80	70

Production Volumes of Work on Development of Technical Pollution Monitoring and Emission Control Devices in 1991-2005 at Request of USSR State Committees for Hydrometeorology and Environmental Protection (Continued)

Objectives	5-year R & D costs (millions of rubles, estimated)		
	XIII	XIV	XV
9. Development and operation of state automated system of monitoring radiation and chemical levels throughout the country and on its continental shelf, with special emphasis on all AES's and adjacent zones	90	120	120
10. Development and manufacture of multi-purpose complex with small remote-controlled units for probes of earth's surface and atmosphere to monitor surface radiation levels and concentrations of gases and other impurities in atmosphere while pinpointing sources, detect forest fires, and monitor state of heat, gas, and oil pipelines	30	30	30
11. Design and construction of group of maritime environmental control devices	250	100	100
12. Design and construction of coastal facilities to house group of maritime control devices	50	50	50

Addendum 7

Measures To Be Taken Before 2005 for Efficient and Comprehensive Use of Crude Mineral Resources in National Economy

Section 1. Basic Guidelines of Scientific and Technical Progress in Intelligent, Comprehensive Development and Use of Mineral Resources

Number	Objectives	Anticipated social and economic results
1	Comprehensive development of deposits of hard commercial minerals	Highly efficient, resource-conserving, low-waste, and ecologically harmless technology for extraction of hard commercial minerals and redevelopment of deposits with emphasis on methods and means of extraction using physical, chemical, physico-chemical, and bacteriological agents
2	Comprehensive dressing of minerals	Reduction of processing costs by an average of 20 percent, 2.5-fold increase in labor productivity, reduction of electric power requirements by 5 percent per ton of processed raw material, reduction of expenditures on construction of new enterprises by 20 percent, total savings of around 7 billion rubles in 2005
3	Comprehensive use of metallic and non-metallic raw materials in metallurgy	Savings of around 14 billion rubles in 2005 as a result of comprehensive processing and use of crude minerals on the basis of scientific and technical achievements
4	Protection of mineral resources and environment	Procedural and normative documents coordinating effective use of mineral resources with environmental protection requirements
5	Planning, management, and economic encouragement of comprehensive use of crude mineral resources	Set of procedural documents and proposals aimed at establishing effective system of planning comprehensive use of mineral resources under new conditions of economic management and perestroyka of administrative structures and economic incentives for comprehensive use of crude mineral resources

Section 2. Guarantee of Efficient and Comprehensive Use of Main Types of Mineral Resources

6	Comprehensive study of reserve facilities with intersectorial functions	1988	—	—
7	Comprehensive use of mineral by-products in oil and gas deposits	1995	358	528
8	Comprehensive use of coal for derivation of microelements	2000	18	5
9	Comprehensive use of waste products of coal mining and processing	2005	379	247
10	Comprehensive use of crude minerals in Angren Coal Deposit	1995	27	11
11	Comprehensive use of apatite-nepheline ores in Khibinsk group of deposits	2003	2796	377
12	Comprehensive use of polymetallic ores in Solnechnyy Ore Dressing Combine	2000	115	33

Section 2. Guarantee of Efficient and Comprehensive Use of Main Types of Mineral Resources (Continued)

13	Comprehensive use of crude minerals in Stremigorodskoye deposit	2002	533	127
14	Comprehensive use of ore in Beloziminsk Mining and Metallurgical Combine	2003	1170	207
15	Comprehensive use of ore in Zhayrem Ore Dressing Combine	2000	75	30
16	Comprehensive use of crude minerals in Verkhnedneprovsk Mining and Metallurgical Combine	2004	42	12
17	Comprehensive use of titanomagnetite ore in Gusevogorskoye deposit	1995	96	118
18	Comprehensive use of brown iron ore in Lisakovsk deposit	1995	76	249
19	Comprehensive use of ore in Sokolovo-Sarbay Ore Dressing Combine	2005	896	218
20	Comprehensive use of crude mineral base in Kovdor Ore Dressing Combine	2000	712	230
21	Comprehensive use of quarry rock and waste of concentration factories in basin of Kursk magnetic anomaly	1998	361	65
22	Comprehensive use of cover and surrounding rock for production of construction materials	2002	1589	2480
	Total		9243	4937

*Completion of construction of facilities envisaged in sub- programs.

Addendum 8

Assigned Recovery Levels of Commercial Minerals and Components from Crude Resources (percentages)

Categories	1990 (plan)	1991	1992	1993	1994	1995	2000	2005
I. Recovery of basic commercial minerals during mining								
Coal	86.8	87.2	87.7	88.1	88.6	89	92	93
Iron ore	94.6	95.9	95.9	95.9	95.9	95.9	95.9	96
Manganese ore	93.6	93.8	93.9	93.9	93.9	94	94.5	95
Chrome ore	90.7	89	88.5	88.2	88.5	90.5	90.8	91
Copper ore	92.3	92.4	92.6	92.7	92.8	93	93.5	94
Lead-zinc ore	90.1	90.2	90.3	90.4	90.5	90.5	91	91
Nickel-cobalt ore	94	94.1	94.2	94.3	94.4	95	94.5	95
Tungsten-molybdenum ore	95	95	95	95	95	95	95	95
Tin ore	93	93	93	93	93	93	93	93.5
Bauxite ore	92.3	92.3	92.3	92.3	92.3	92.3	92.5	93.5
Potash salt	49	46.2	46	46.5	46	46	49.5	50.2
Apatite-nepheline ore	92.5	91.5	91.4	91	90.9	91	91.2	91.4
Phosphorus ore	91.8	91.8	91.9	91.9	91.8	92	92.4	92.8
Chrysotile- asbestos	97	97	97.1	97.2	97.4	97.5	97.7	98
Mica- muscovite	93	93.2	93.5	93.7	93.9	94	94.5	95
II. Recovery of commercial components from mineral resources during concentration								
Iron	74.6	74.1	74.2	74.3	74.4	74.5	75	76
Manganese	73.5	73.6	73.7	73.8	73.9	74	75	75.5
Chrome	83.1	83.2	83.3	83.4	83.4	83.5	84	85
Copper in copper concentrate	86.1	86.1	86	85.9	85.8	85.8	86.4	87

Assigned Recovery Levels of Commercial Minerals and Components from Crude Resources (percentages) (Continued)

Categories	1990 (plan)	1991	1992	1993	1994	1995	2000	2005
Lead in lead concentrate	77.7	76.7	76.8	77	77.1	77.3	78.4	80
Zinc in zinc concentrate	75.8	75.8	75.8	75.8	75.8	75.8	80	80.8
Nickel in nickel concentrate	89.8	89.9	89.9	90	91	90.2	89.2	88.2
Tungsten trioxide in tungsten concentrate	67.6	70	70.5	71	71.5	71.8	73	73.5
Molybdenum in molybdenum concentrate	80.1	80.5	80.6	80.7	80.7	80.8	80.9	82
Tin in tin concentrate	70.4	70.5	70.7	70.8	70.9	71	71.5	72
Potassium oxide	80.3	80.8	81.1	81.7	82	82.3	83.3	86.2
Phosphorus pentoxide from apatite-nepheline ore	89.8	90.1	90.1	90.2	90.4	90.4	91	92
Phosphorus pentoxide from phosphoritic ore	73.5	73.4	73.3	73.2	73.1	74	75	76
Mica- muscovite	93.5	93.6	93.7	93.8	93.9	94	94.5	95
III. Recovery of by-products of crude mineral processing								
Use level of petroleum gas	85	88.3	89	91.6	94.5	96.1	96.7	97.5
Sulfur from petroleum gas	94.9	94.9	94.9	95	95	95	95.5	96
Helium from petroleum gas	82.2	82.4	82.6	82.8	83	83	84	85
Ethane from petroleum gas	50.4	51	51.6	52	52.5	53	54	60
Sulfur from natural gas	97	97.2	97.4	97.6	97.8	98	98	98
Helium from natural gas	88	88.4	89.2	89.6	89.8	90	91	93
Ethane from natural gas	28	30	32	33	34	35	40	47
Propane and butane from natural gas	60	59	60	60.5	61	62	65	68
Apatite concentrate from complex iron ore	60.3	60.7	61.1	61.5	61.7	62	64	65
Vanadium pentoxide from converter slag	70	68.5	68.6	68.7	68.8	68.9	71.4	72
Zinc from Ural copper-zinc ore	62	64	66	68	70	71	72	72.5
Sulfur in pyrite concentrate from Ural copper-zinc ore	61.4	62.5	64	65.5	66.5	67.2	69.5	71
Sulfur in sulfuric acid from flue gases of zinc plants	93.5	93.6	93.7	93.8	93.9	94	95	96
Sulfur in sulfuric acid from flue gases of copper smelting plants	62	62.8	64	65.5	66.5	67	70	71
Barium oxide from complex ore	62	62.2	62.4	62.6	62.8	63	70	71
IV. Use of cover and surrounding rock and by-products of concentration throughout USSR, in millions of cubic meters								
		1480	1500	1533	1552	1586	1706	1870

Addendum 9

Volumes and Levels of Production Waste Use

Types of waste	Units of measurement	Quantity of waste used and percentage of annual quantity									
		1985	%	1990	%	1995	%	2000	%	2005	%
1. Waste paper	Thousand tons	2907	71.1	3900	99.3	4700	97.9	5500	98.9	5500	98.9
2. Used polymer materials	Thousand tons	206	11.8	352	13.8	506	16.6	650	18.6	810	21.3
3. Used textile materials	Thousand tons	993	51.4	1190	55.7	1245	56.8	1400	62.2	1600	66.7
4. Used tires	Thousand tons	294.5	29	980	75.4	1200	85.4	1600	100	1900	100
5. Waste petroleum products	Thousand tons	2448	59.7	3000	67	3400	71.8	3800	76	4000	80
6. Phosphogypsum	Thousand tons	3262	17.2	13520	48.1	15000	42.6	16000	32.5	18000	36
7. Pyrite cinders	Thousand tons	3111	88.1	4450	124.1	6000	109	7000	114	7000	115
8. Waste halite	Thousand tons	8034	16.5	17000	28.6	27423	40.2	35000	45.7	40000	50
9. Broken glass	Thousand tons	698	58.2	1100	78.6	1250	79.6	1400	80.5	1800	90
10. Slag from steel production	Thousand tons	10000	40	17000	70.8	24000	100	24000	100	30000	120
11. Blast furnace slag	Thousand tons	47500	93.1	55000	108	60000	130	70000	148	70000	148
12. Ferroalloy slag	Thousand tons	2320	55.2	2900	65.9	4000	87	4700	100	4700	109
13. Ferruginous waste	Thousand tons	1700		4000		5000		10000		12000	
14. Non-ferrous metallurgy slag	Thousand tons	6700	38	10700	57	12500	59	12500	60	18000	82
15. Ashes and cinders	Thousand tons	12600	10.9	13600	12.9	30000	22.2	40000	34.8	60000	40
16. Waste wood	Thousand cubic meters	58500	69	72820	80.9	75410	81.5	78000	82.1	80000	89
17. Used leather materials	Thousand tons	300	90.9	400	93.9	460	97.3	520	100	520	100
18. Solid household waste	Thousand tons	1202	2.6	4898	10.2	8449	15.9	12000	20	15000	23
19. Ferrous metal scrap and waste (including recycled)	Million tons	100.5	100	103.5	100	108	100	113	100	113	100
20. Nonferrous metal scrap and waste	Thousand tons	1785	93.9	2100	95.5	2500	96	3000	96.8	3000	100

Ust-Kamenogorsk Accident Commission Report, Aftermath Examined

PM0711142390 Moscow IZVESTIYA in Russian 5 Nov 90 Union Edition p 2

[Own correspondent V. Mirolevich report under "Returning to an Earlier Article" rubric: "After the Beryllium Attack"; first paragraph is editorial introduction]

[Text] Ust-Kamenogorsk—An extraordinary commission examining the causes and consequences of the accident at the beryllium production facility of the Ust-Kamenogorsk Nuclear Fuel Plant (the "Ulbinskiy metallurgicheskiy zavod" ["Ulba Metallurgical Plant"] Production Association), has concluded its work. (See IZVESTIYA Nos. 257, 258, 259, 261, 263).

To begin with, a few words about a dismal "first" for us: explosions at a beryllium production facility resulting in the discharge of a harmful substance into a city's atmosphere—this is the first accident in the world at such an enterprise.

The commission established that the accident was the logical culmination of years of violations and miscalculations, from the design of the shops to elementary disregard of safety practices. In particular, beryllium powder was continuously settling in a conduit under the shop, and there was no provision in the design for removing it. By the time of the accident around 4,000 kg of beryllium dust had accumulated there.

Firing operations in the shop were carried out without observing the precautionary measures necessary in this kind of plant. There was welding going on in the shop also on the morning of 12 September. A particle of

molten metal fell into an air duct and caused the beryllium to ignite. An air current drew the fire into the conduit under the shop, where there was more than enough "food" for it. Under the influence of the high temperature in the conduit water started separating into hydrogen and oxygen. While the air duct was operating, part of the hydrogen was ejected into the atmosphere. Once the signs of the fire had been detected, the ventilation in the shop was switched off, and the accumulating hydrogen began to explode.

The dust and gas clouds that formed following the explosions blanketed the city, covering a region in which 23 schools, 42 preschool establishments, three technical vocational colleges, and two higher educational institutions were located, along with at least 120,000 residents. Workers and inhabitants were subjected to the effects of beryllium concentrations ranging from 60-890 times the maximum permissible.

The list of causes leading to the accident, miscalculations during its elimination, erroneous actions, and downright inaction account for dozens of points in the extraordinary commission's final document. Essentially they amount to one thing: They didn't expect... But it can also be said: **they didn't know what to do**. And no wonder—even in the plant's civil defense plan all the measures were devised for wartime. A peacetime accident at the beryllium production facility was not prognosticated at all.

The city's civil defense headquarters was not told of the accident, and it was not given information on the beryllium content in the air. At its own responsibility and risk the civil defense headquarters, not waiting for the order obligatory in such instances from a city and oblast leadership in disarray, communicated the instructions available to it, and intended for a calamity at the nuclear fuel plant as a whole, only two and a half hours (!) after the beginning of the accident. On hearing this information combine operators in fields 100 km from the city abandoned their machines to escape from a supposed radioactive cloud. The compilation of a new text, which now omitted the radioactive danger but scarcely mentioned the beryllium menace, continued... in the party obkom [oblast committee]. Thus, almost another hour was lost. During that hour children were either getting out of school or were arriving for the second shift, and, encountering adults wearing respirators, they also tried to protect themselves by using their pioneer scarves. And during that hour the highest concentration of beryllium was recorded in the residential areas of the city.

That then is the high price paid for yet another confirmation of an already well-known fact: That the excessive secrecy of installations does not guarantee peoples' safety. On the contrary, it increases their lack of protection.

And now to the guarantees that an accident of this type will not occur again. The plant leaders do give such guarantees, but their assurances are worth little—in the month following the tragedy there were two more fires at the enterprise...

But, generally speaking, no one is now asking this offspring of the Ministry of Atomic Power Engineering and Industry to promise "not to do it again." During the investigation it became clear that the nuclear fuel plant is situated in the city despite all the existing safety regulations.

But maybe the fears have been exaggerated; possibly the technology is such that the plant discharges only beneficial ozone into the atmosphere, and if there had been no explosion there would have been no reason to closely examine its output. If only that were true. In the several decades of its existence the beryllium facility has still not managed to decrease its emissions to the planned levels. Every 24 hours it ejects into the atmosphere four times more than stipulated by international and national standards. Evidently that is why the department medical service has even officially established a special higher norm for the beryllium content of the organism of Ust-Kamenogorsk inhabitants.

...After the accident 2,700 people were examined at the department medical section. Of these, 236 (including 86 children) were found to have a beryllium level of one and a half to five times the natural background level established for inhabitants of Ust-Kamenogorsk.

"I have signed a decision to halt further examinations," S. Keyzer, a professor from the Leningrad Scientific Research Institute of Maritime Transport Hygiene, told journalists at a briefing organized by those to blame for the accident. "The doses received do not entail pathological changes. However, in the fourth quarter of this year and next year the institute will carry out immunological research among the population."

The general notion of "the population" is actually represented by those same 236 people "branded" with beryllium. Let us stress that they were found to be contaminated following an examination of less than three percent of the inhabitants subjected to the beryllium attack. Statistical methods are used successfully in science, but what are living people "enveloped" in percentages rather than attention supposed to do?

"With good medical treatment we **prolong** the patients' life by a few years," Prof. Keyzer stated at the abovementioned briefing.

But we in our country have developed preparations whose application within the first five days after receiving an increased dose of beryllium significantly decreases the probability of developing lung cancer. This is widely known, yet following the first report of the beryllium accident in Ust-Kamenogorsk only a team of research scientists turns up, and not a single doctor with a bagful of preparations, even if only for the children who had "bathed" in the beryllium clouds. After all,

nothing was known about the true situation in those first days and even "favorable predictions" were few and far between.

Something about the prognoses. The figures for the maximum permissible concentration which the inhabitants of Ust-Kamenogorsk were given and which are the basis for all the conclusions were formulated in 1959. Today it is no secret that many "maximum permissible concentrations" were introduced in our country not through concern for the safety of the individual but, rather, according to the capabilities of the technology.

The research of the Moscow Institute of Biophysics published in 1984 and that of the USSR Academy of Medical Sciences All-Union Oncological Scientific Center's Carcinogenesis Scientific Research Institute affirm that the existing maximum permissible concentration of beryllium does not protect the people against cancer. Maximum permissible concentrations for the air around residential areas should be a lower by a factor.

Readers of IZVESTIYA (No. 263) already know that the presidium of the East Kazakhstan Oblast Soviet of People's Deputies has decided to close the beryllium installation and has declared the oblast an ecological disaster zone.

"This is unrealistic," Ye. Skoz, chief engineer at the Ulba Metallurgical Plant, believes. "Disregarding our customers abroad, we have links with thousands of enterprises in the Union. They cannot do without beryllium. From the economic viewpoint, it is cheaper to build the city in a different place."

From the ecological viewpoint, too: The earth, the grass, the trees, the asphalt, the water, the air—there have been dozens of investigations—are harmful to every living thing here. From a town of 30,000 inhabitants in the 1940's, Ust-Kamenogorsk has become an oblast center with 300,000 inhabitants, thanks to its factories. Today the enterprises that gave rise to the city are killing it. The situation is at an impasse and is typical of many of the country's cities.

How can people continue to live in them? This is not the best time for such a question. From the political viewpoint, too. For instance, the other day the Kazakh SSR [Soviet Socialist Republic] Supreme Soviet discussed the problem of whether or not to include on the session agenda the East Kazakhstan inhabitants' demands that the oblast be recognized as an ecological disaster zone. It voted not to include this issue. No one really doubts that it is not a question there of people living but of people surviving. But the East Kazakhstan inhabitants have a reputation for being "separatists," and they are seeking bilingual equality in the republic more actively than others... So politics has "overshadowed" the ecological problem. In response, the inhabitants of Ust-Kamenogorsk held a citywide protest action 2 November—yet another cry from people in despair.

...In the meantime the military prosecutor's office is carrying out an investigation into the fact of the accident. There is also time for the scientists to argue about the consequences for the city's inhabitants. There is one thing on which neither the Leningrad "shipping experts" nor our researchers or foreign researchers disagree: that everything will become clear in the first 10 years. It is planned to build new laboratories in Ust-Kamenogorsk. It only remains to await the results of the "experiment" conducted on 120,000 people, including the author of these lines and his family.

Novaya Zemlya Nuclear Test Reported; Reassurances of Safety Given

PM2910150590 Moscow PRAVDA in Russian 26 Oct 90 Second Edition pp 1, 6

[A. Pokrovskiy report: "'Zero' Plus One: We Report Details of Nuclear Explosion in Region of Novaya Zemlya Islands"]

[Text] Of course, I would have been more pleased to report fulfillment of the wish all we participants in one of the experiments to verify underground nuclear explosions wrote down on the seismogram that captured the underground echo of an event that occurred a hemisphere away from us: "Let's hope it's the last one."

This was in 1986 at the North Kazakhstan Seismograph Station. And to this day I have kept the document, although our hopes have not fully materialized. This year alone the United States has already carried out seven explosions of new forms of nuclear weapons, France has carried out four, and China two. The Soviet Union had not carried out any until now.

Let us face the truth, however harsh it may be. To carry on "being silent" in these conditions would mean to lag behind the current level of armaments and jeopardize the country's security. But it is not difficult to predict the mixed reaction to this event abroad, and indeed in our country. And, as has become customary in recent times, it will be surrounded by all kinds of conjectures and rumors. Therefore, on the basis of the strengthening principles of glasnost I asked permission to witness an explosion—as far as possible—in order to be able to speak honestly about everything I saw and heard.

To begin with, the nearest point to this event was the office of Vice Admiral G. Zolotukhin, chief of a Navy directorate. Apart from the boss, a group of the specialists who had prepared this test was here. And all information on events at the Novaya Zemlya test site was to be reported here promptly. My new acquaintances were not very talkative before the scheduled "zero" hour.

I understood, because they were visualizing that most tightly sealed deep gallery beneath the mountain where the "item" was sitting motionless. And the numerous sensors of the "Splav" automatic system, designed to tell the experimentalists about pressure, radiation, direction of air flow, and other results of the explosion. And the "Tunets" remote-control automated radiation monitoring system on the surface. And, of course, their comrades the theoretical physicists, the designers of the "item," the workers at the test site who were there now on Novaya Zemlya. It was for their benefit that helicopters would take off to hover above the ground and ships would be in full readiness as "zero" hour approached—if something happened, people would have to be evacuated at lightning speed. Weapons will be weapons, and particularly experimental weapons. And what is more, this one had been lying in the shaft for quite some time for various reasons, including waiting for the right weather from the sea. The wind must be able to carry a radioactive cloud toward the ocean if one should suddenly appear.

"Silence," the admiral said. " 'Zero hour'!"

And literally a few minutes later we heard the following report:

"The experiment has been carried out successfully. According to preliminary data, the situation is normal."

The admiral started reporting to his superiors, and I was told that the data from the numerous sensors was being examined, helicopters were circling the mountain, measuring the parameters of the atmosphere, while above them, a specially equipped airplane was doing the same thing.

And here it is, this detailed report. Of all the information, I will dwell on one thing—currently the most important thing—the level of radioactivity is the same as the natural background.

"Did you hear?" the admiral asked. "This is an official report that has not been embellished for the press in any way, which is something that some people are likely to accuse us of. Yes of course, a military test site is not the place for an evening stroll. We also have specially demarcated security zones there, which, incidentally, are a legacy of the surface experiments. But I and many of my comrades here have served at the test site for many years and have raised children there. Surely we are not our own enemies and we would not be silent if the radiation situation was not being monitored.

"Yes, I understand the concern of the population in the areas near the test site," he continued. "The ecological situation there is alarming. But you have to ascertain where the influence of the test site extends, and where there is careless management. And finally, I would like to mention something else. The—admittedly uninvited—Greenpeace expedition to Novaya Zemlya confirmed our data about the level of radiation there, even to their own surprise.

"Now turn your attention to the following: The million-plus city of Los Angeles is about 500 km from the Nevada test sites. The vacation city of Las Vegas is only about 110-160 km distant from them. And this does not cause alarm among residents or vacationers. Now compare. Murmansk is 920 km from our test site. Arkhangelsk—1,100 km, and Naryan-Mar—620 km. And yet people constantly suspect us of something..." [Zolotukhin ends]

[Pokrovskiy] "So, maybe it's worth opening up the test site for representatives of neighboring areas? Maybe they need to see things for themselves?"

[Zolotukhin] "That's exactly what we are doing. A group of people's deputies is flying out there in the next few days. Would you like to come along with us and view the situation there following this test?"

Yes, of course. So the next report will come from Novaya Zemlya.

Norwegian Disputes Greenpeace Novaya Zemlya Radiation Level Findings

PM2410160190 Moscow KOMSOMOLSKAYA PRAVDA in Russian 24 Oct 90 p 1

[Own correspondent A. Baranov report: "Off the Scale"]

[Text] Copenhagen—Data about the "excessive" level of radiation in the region of Novaya Zemlya, obtained by activists of the international organization Greenpeace during a recent illegal landing on the Soviet archipelago and offered up to world public opinion as a sensation, are overestimated by a factor of 1,000. This was the statement of the Norwegian scientist Britt Salbu, an isotopes laboratory worker at the Norwegian Higher Agricultural School. Her expert analysis has shown that members of the Greenpeace landing team quite simply confused the units of measurement, making a calculation in milliroentgens whereas in fact the radiation was registering on the microroentgen scale. The actual radiation level on Novaya Zemlya, where, as is well known, a Soviet nuclear test range is situated, proved to be surprisingly low, the Danish newspaper LAND OG FOLK notes, citing B. Salbu's statement.

Leningrad Barrier Construction Halted After Government Decision

LD1710125990 Moscow TASS in English 1242 GMT 17 Oct 90

[By TASS correspondent Oleg Serdobolskiy]

[Text] Leningrd October 17 TASS—The construction of an anti-flood dam in the Gulf of Finland has been halted in line with a decision taken by Leningrad Council on Monday [15 October].

The councillors blamed the ecological damage which, according to a survey by the USSR Academy of Sciences'

commission headed by Aleksey Yablokov, a corresponding member of the academy, would be caused to the area.

The commission concluded that the facilities have seriously complicated the ecological situation in the Neva Bay. Pollution of bottom-set grounds in individual areas has increased nearly three-fold in recent years.

The issue was discussed in a very stormy atmosphere. Feelings also ran high outside the conference hall. Lots of telegrams have been sent to the session by advocates and opponents of the project.

Council Chairman Anatoliy Sobchak called for reassigning the personnel, who now work on the project, to build nature conservation facilities, tunnels, grade separations and overpasses in order to solve road congestion in the city.

However, the Leningrad City Council will ask to maintain centralised funding of the dam until 1995, with re-channelling of funds for the construction of local and centralised purifying installations.

Terms for an international contest for the best version of the reconstruction of the dam will be worked out, with every project to be subjected to qualified scrutiny.

The aggregate cost of the project was estimated at about one billion roubles. As of today, 66.5 per cent of the amount has been spent.

Operators of Moscow Nuclear Reactors Resist Outside Supervision

PM2210134990 Moscow IZVESTIYA in Russian 16 Oct 90 Union Edition p 6

[Andrey Illesh article under "Rumors and Facts" rubric: "More about Nuclear Reactors in Moscow"]

[Text] In an article devoted to events at nuclear power stations I asked the "seditious" question: Nuclear reactors are calmly operating right under Muscovites' noses—what kind are they, and why are they operating? On that occasion I spoke mostly about experimental reactors. I wanted to get precise information: How many reactors are there in the capital; to what extent their location within a city with many millions of inhabitants is justified; what goes on inside them; and, of course, how safe these reactors are.

At the time such questions were considered "not for the press." Times, fortunately, are changing, and today I can acquaint readers with the results of an inspection of experimental nuclear reactors; the material was kindly given to us by Candidate of Technological Sciences K. Konoplev, chairman of a commission of experts, and Candidate of Physical and Mathematical Sciences R. Nikolskiy, chairman of a subcommission on safety.

So then, the commission investigated nine experimental reactors located within the city boundaries and presented its results to the USSR Academy of Sciences, the USSR Ministry of Nuclear Power Generation and the Nuclear Industry, and the USSR State Committee for Supervision of Safe Working Practices in Industry and the Atomic Power Industry. A joint conference of these three departments, the academics report, agreed with their findings.

So as not to appear biased, I will cite from the document given to the editors:

"On the whole, the Moscow City reactors that were investigated are being operated safely, and the radiation levels for the population of the adjacent rayons have not exceeded, and do not exceed, background levels. Investigation of the accidents and incidents (?—Illesh) that have taken place does not change the conclusion on safety. The reactors are operated at a high professional level. At the same time specific deviations from the operating norms and rules were found virtually at every experimental reactor. These deviations are far from being of equal importance; some have already been eliminated, but the elimination of the others requires the shutdown of four reactors... During our commission's period of work a commission from the International Atomic Energy Agency was working at two of the reactors—IR-8 and IRT—carrying out an assessment of their safety at the USSR government's request. This commission consisted of experts from Austria, Canada, Poland, and the United States... The commission found that the personnel running both reactors were qualified and well trained. The internal order corresponds to the best standards of nuclear safety. The International Atomic Energy Agency experts assessed other aspects of work higher than our commission."

Further on, the experts ask a question which especially worries people: Even if experimental nuclear reactors are operated safely, how can the possibility and consequences of a catastrophic accident be assessed? After all, nowadays it is the custom to measure all nuclear emergency situations against the yardstick of the Chernobyl disaster... I will again resort to a quotation: "The potential radiation danger of experimental nuclear reactors are hundreds and thousands of times smaller than nuclear power stations... The physical peculiarities of the reactors investigated are such that they possess properties whereby a nuclear chain reaction is automatically suppressed [svoistva samogasheniya yadernogo protsessa]. But despite the extreme improbability, the consequences of potential disasters caused by outside influences must also be considered. The experts devoted particular attention to the need to increase the reactors' defense against probable outside influences: hurricanes, serious earthquakes, and aircraft crashes."

And is it possible anyway to remove these reactors from Moscow—naturally without any marked detriment to

science? This was a difficult question for the commission: After all, extremely topical research is being conducting at these reactors. MR, the most powerful Moscow reactor (with a 40-megawatt capacity), is used for the loop testing of materials [petlevyye ispitaniye materialov]. The commission believes that it is entirely possible to continue the work, which is important to reinforce the safety of nuclear power stations, both those that are already operating and those which are under construction. But the reactor could be transferred from the territory of the Kurchatov Institute of Atomic Energy. In short, a new one could be built—quite a long way from Moscow.

IR-8, the second most powerful reactor (eight megawatts), is used as a source of neutron beams for physics experiments. In the commission's opinion, it is expedient to keep this reactor in the Kurchatov Institute for the purposes of fundamental research and the production of preparations. The remaining reactors have much smaller capacities, and their shutdown is not recommended. And the conclusion: "Naturally, all the demands and proposals of the subcommission on safety must be fulfilled."

And now for what this commission finds it difficult to do. "A large number of comments arose over the fact that the USSR Ministry of Nuclear Power Generation's reactors are monitored by its own departmental monitoring service." What about that then! We have a (supposedly) important monitoring organ—the State Committee for Supervision of Safe Working Practices in Industry and the Atomic Power Industry—but its experts do not have the power to interfere in the affairs of many nuclear installations. In these installations they manage things as before, "inspecting" themselves. But such activity is not only fraught with serious consequences (who wants to wash his dirty linen in public, and what reliance can be placed in the scruples of people inspecting themselves?); it also makes it simply impossible for us to assert that everything is OK in the capital from the nuclear safety viewpoint.

There is no justification for this secrecy which falls within the scope of reason. By continuing to play at being "enigmatic," departments risk undermining their authority once and for all. After all, life shows that, in our country, under the mask of secrecy people are usually hiding their own blunders or potential weaknesses. I was lucky enough to visit Germany's most important nuclear installations with a delegation of Soviet nuclear physicists. Over there they do not keep either the location of reactors or the level of danger from them secret from the people living in the vicinity. In the largest nuclear scientific center, located a stone's throw from Munich with its population of 2 million people, the layman can get all the data he needs for "confidence in tomorrow." The essence of the work carried out by physicists can be secret (a commercial secret, for instance); but the safety level and geography of the "installation" cannot be.

... You will recall that it was nine reactors that underwent the inspection. So there are only nine of them in Moscow? I, for one, will not undertake to answer this question affirmatively. What is more, I possess data which shows that there are many more reactors in the city (and not just experimental reactors). For instance, nowadays departments use the following trick: Not all installations (owing to small capacity, for example) fall into the category of "reactors." But their basic nuclear "nature" is no different because of this...

The commission, as far as I understand, ran into similar "complications": Its conclusion that the Moscow reactors must be placed under the control of an independent state organ—the USSR State Committee for Supervision of Safe Working Practices in Industry and the Atomic Power Industry—as the commissioners themselves confess, "met with huge opposition, both in the course of work and in the aforementioned conference. Nevertheless, this point has been accepted too."

Shall we wait for the decision to be fulfilled?

Researcher Gets Four Years for Isotope Sideline

PM1910145190 Moscow MOSKOVSKIYE NOVOSTI in Russian No 41, 14 Oct 90 p 2

[Unattributed, untitled report from "Moscow Diary" column]

[Text] A secret storehouse to contain cesium-137 isotope sources with a capacity of 1,500 roentgens per hour was set up in a wood not far from Mytischi, in the Moscow region, by former industrial research worker Anatoliy Obruchnikov. An investigation has failed to answer the question: What was his aim in doing this, and why did he manufacture radioactive aqueous solutions? People's Judge Rafael Shakirdzhanov told a MOSKOVSKIYE NOVOSTI correspondent that Obruchnikov himself pleaded not guilty and has blamed the evidence that was found attesting to his guilt on intrigues by Western special services. Nevertheless, the accused's guilt was proven, and he was sentenced to four years' imprisonment. In addition, it was decided to fine Obruchnikov 252,000 rubles. This was the sum spent by Mytishchi Executive Committee on decontaminating a polluted pond and part of the forest.

Environmental Hazards, Obsolescence of Chemical Plants Raise Concerns

914A0026A Moscow PRAVITELSTVENNYY VESTNIK in Russian No 41, Oct 90 p 6

[Interview with Vasiliy Karpovich Borodin, chairman of the All-Union Federation of Trade Unions of Chemical Industry Workers, by A. Sitnov: "A Tearing Away Reaction: Danger!"]

[Text] The situation in the country's consumer market can presently be described in one word: stress. Store

shelves are bare of all kinds of industrial goods, foodstuffs, cultural items and sporting goods. And if we present the "bill" to our farmers for the shortage of food, we can hold our chemical workers responsible for the sparse list of consumer goods so necessary to everyone; after all, it is the chemical sector's work which largely determines the level of society's development and well-being. What has gone wrong in the chemical complex's economic mechanism, how will it work tomorrow, what promises and fears does the market hold for the "chemists"? Our correspondent A. Sitnov discusses this with the chairman of the All-Union Federation of Trade Unions of Chemical Industry Workers, V. Borodin.

[PRAVITELSTVENNYY VESTNIK] Vasiliy Karpovich, there was recently a congress of your federation, which represents over three million workers. How did the congress's delegates evaluate the situation in the chemical complex?

[Borodin] It is clear to each chemical worker that the market cannot be saturated with consumer goods if our key sectors are not adequately developed. On the other hand, chemistry itself is experiencing a severe crisis. Enterprises have been kept within the rigid framework of directive commands and for decades were unable to modernize; today, basic equipment is almost 80 percent worn out. The result is a growth of job-related illnesses and injuries and the recent increase in accidents.

[PRAVITELSTVENNYY VESTNIK] The cost of these accidents is the loss of lives and a storm of public dissatisfaction, where the main demand is "Close the chemical plant!" and the main argument is "We don't want to live next to such an ecologically destructive and explosive neighbor!"

[Borodin] Without a doubt, chemistry must be ecologically clean and technologically safe. And it's not necessary to convince us chemists of that; we are more interested in this than any of the "greens." After all, every day on their jobs our workers have to risk their health and lives and smell all the delights of the "chemical paradise." And this is not our fault, but the tragedy that the country does not have good domestic equipment and the sector's hard-currency wallet has long been empty.

[PRAVITELSTVENNY VESTNIK] Yet under the pressure of loud demands, councils are closing chemical firms, often the only one of their kind in the country. Some 100 chemical plants of the most varied types are now out of operation in the country. In the Ukraine, for example, the demand was recently heard to completely "dechemicalize" the republic...

[Borodin] Our position on this is that the country does not need to be "dechemicalized"; instead, every effort should be made to raise domestic chemistry to world standards. Consider: Japan, with almost no natural resources, produces five times more chemical-based products, while we with our bare shelves and our natural wealth are getting ready to "dechemicalize." Second, I would like once again to cool off the "hotheads" from committing ill- considered acts, to remind them that all the enterprises of the country's various sectors are interconnected and interdependent.

For example, take the present life of smokers. Is their problem really due solely to the shortage of raw materials and tobacco factories? No, the tobacco shortage was "planned" back when the Vladimirskiy Chemical Plant, which produced the material for cigarette filters, fell victim to the "greens," and then the plant producing these filters in Armenia was shut down. Or here's another chain reaction. We know from the newspapers about the phenol leak at the "Khimprom" plant in Bashkiriya and the poisoning of drinking water in Ufa. Part of the production might be halted due to public pressure, and perhaps the entire "Khimprom" will be shut down, but then 2,500 of the country's enterprises will be threatened with complete or partial unemployment in the very near future! These are machine-building, metallurgy, electronic, medical, chemical plants—those who receive the raw materials. As you can see, the alternative is not pleasant.

[PRAVITELSTVENNYY VESTNIK] Are you saying that chemical workers believe that their unions must clean up the sector's conditions, and thus the country's economy? What measures do you feel could enhance the social protection of chemical workers and stabilize enterprises' operations?

[Borodin] Our congress adopted an appeal to the USSR Supreme Soviet and the USSR Council of Ministers, laying out our position on this issue and citing a list of measures which we believe could help the sector. The primary task is to immediately work out together a Comprehensive Program to develop the chemical sectors of industry and ensure the effective ecological protection of workers, the public and nature, and to submit it for consideration to the USSR Supreme Soviet. Imported equipment is urgently needed to improve the ecological situation; enterprises must therefore be allowed to keep up to 80 percent of the hard currency they earn. Chemical workers could be given benefits for 2-3 years, such as a 10 percent reduction in contributions to the state budget, to ensure proper use of equipment. By the end of 1990, lists must be approved of chemical professions to be added to lists 1 and 2 of special retirement benefits, taking into consideration worker collectives' suggestions. Allowing enterprises to independently establish benefits and to form their own social development funds amounting to up to five percent of the wage fund without taxation would also help to restore the prestige of the chemical worker's profession.

[PRAVITELSTVENNYY VESTNIK] And how is your work going with government bodies, in what direction are these meetings going? This is not an idle question, because recently it has been considered "good form" to conduct a dialogue with the government from a position of strength, in the language of ultimatums...

[Borodin] The chemical workers have never based their demands to the Council of Ministers on sectoral egotism or a desire to be fashionable. We have been driven to it by the growing social tension in work collectives. We believe we share with the government an interest in eliminating the accumulated problems in the chemical industry. I believe our common goals are a basis on which cooperation is possible. Contradictions which arise must be resolved by a common search for mutually acceptable solutions. We have no intention of beginning the struggle for our rights with strikes, since we understand very well the price of the loss to the country.

However, I must say clearly that we are not prepared to back down. We are advancing the minimum requirements, which take into consideration the chemical workers' vital interests and the state's interests and capabilities. This is the essence of our readiness for dialogue and compromise.

[PRAVITELSTVENNYY VESTNIK] And one last question. Any economic programs today are intimately connected to the political changes under way in the country. How does the chemical workers' trade union feel about the decisions adopted by the Supreme Soviets of the republics on sovereignty and property?

[Borodin] We believe that many political actions aimed at strengthening sovereignty do not consider the economic consequences.

Without question, our union will support the republics' legal efforts towards political and economic independence, their efforts to become the owners of the enterprises on their territory. This is an objective process, one aimed at breaking the rigid centralization of our life. On the other hand, unlimited decentralization can lead to the appearance of something like feudal principalities, lacking all unity and mutual support. Such an approach is unacceptable for basic industries such as chemistry if we want to avoid future territorially- or ethnically-based conflicts. Our sector's enterprises must remain national property. After all, the level of specialization and cooperation in the sector today is higher than the republics' political integration. Over 70 percent of the output produced is used within the chemical complex; i.e., by enterprises of all the republics. Any political constraints on links, or actions based on the principle of "first to our own, then to others," not to mention a breakdown in economic ties, will lead to the shutdown of enterprises, to their bankruptcy, and ultimately to massive unemployment of chemical workers. We must also not forget that many republics possess unique reserves of raw materials; the work of the entire chemical complex depends on their deliveries. And finally, any enterprise must have a sales market to be profitable. The larger it is, the lower will be the production costs and the greater the profit. Will there remain a single, nationwide market, or will it break up into 15 republic markets and another 16 autonomous regional markets due to hasty political decisions? This is not a speculative question for the workers of the chemical complex, but one concerning their lives today and tomorrow.

Italy, USSR Sign Agreement To Monitor Chernobyl Area

90MI0371A Milan ITALIA OGGI in Italian 19 Sep 90 p 19

[Text] Soviet scientists are requesting assistance from Europe because four years after the Chernobyl accident, they are still unable to monitor the vast area struck by the disaster. The Soviet Academy of Medical Sciences has signed a collaboration agreement with the CNR [National Research Council] and the Tor Vergata University in Rome to monitor the territories of the Ukraine, Belorussia, and Russia closest to Chernobyl (four million inhabitants). The announcement was made at Monteporzio Catone (Rome) yesterday by Anatoliy Romanenko, health minister in 1986 and now director of the Pan-Soviet Scientific Center for Radiation Medicine. The signing of the protocol provides for the establishment of an Italian-Soviet center the initial cost of which is expected to be 70 billion lire. "After the disaster, we evacuated residential areas within a range of 30 kilometers", explained Romanenko, "but it is still difficult to say exactly what the effects of the radiation that spread rapidly over a distance of 200 km will be."

One thing is certain: The number of cases of thyroid cancer has increased. In the Ukraine, the percentage of this type of cancer will increase even further from 0.02 to .5 percent. Over the next 70 years another 400 people will be affected by the disease.

One alarming piece of information confirms the high level of radionuclides present in some foodstuffs, in particular milk, which can contain up to 95 percent radioactivity. Soviet researchers have invented sorbets, candies, and chocolates to block the effects on the organism. Above all, they have developed special fibers capable of filtering out all the components present in the milk, except the dangerous cesium. "But", noted Romanenko, "to date it has been possible to control the lots of densely-populated areas only."

Pros, Cons of Resettlement From Radiation Contaminated Area

91UN0012B Kiev PRAVDA UKRAINY in Russian 9 Sep 90 p 1

[Article by V. Mazanyy: "Resettlement: Pros and Cons"]

[Text] Rovno Oblast—Residents of the villages of the Velikoozeryanskiy Rural Soviet in Dubrovitskiy Rayon, the territory of which was subjected to radioactive contamination following the Chernobyl disaster, are changing their places of residence. The resettled persons will be received on the Kolkhoz imeni I. Franko and the Kommunist Kolkhoz in Mlinovskiy Rayon, where a total

of 700 individual houses will be built. The designing of homesteads and social and cultural facilities is already being completed.

Only four villages in Rovno Oblast will be subject to resettlement. It has been planned that farms in the southern region, where the number of ablebodied persons has been declining every year, will be replenished with human resources in this manner.

"However, a survey has shown that only about 250 families are agreeing to leave their home areas," says V.Ya. Ivanovskiy, chairman of the Dubrovitskiy Rayispolkom. "We are explaining to people that it is necessary to move, for the sake of their health. We have territories where the concentration of contamination is even higher, but the people in Velikiye Ozera and their neighbors live amid radioactively dangerous forests. And they live, as we know, off those forests' bounty. There are no natural pastures there, and for that reason their cattle graze on forest meadows, where there is an invisible danger. Of course, better conditions than the ones in which the resettled people presently live await them. Delegations from the villages of Velikiye Ozera, Shakhi, Rezki and Velikiy Cheremel visited Mlinovskiy Rayon and were satisfied with what they saw there. The forest dwellers will receive plots of land there no smaller than those they have had until now, and they are guaranteed the possibility of living in close proximity to one another, as they did previously. Even their requests to be located close to their present neighbors will be satisfied.

Nonetheless, not everyone is agreeing to move. From every indication, it is evident that the local Meliorator Sovkhoz will continue to operate and engage in the production of livestock feed made of mixed grasses. Liming and other deactivation measures are presently being carried out on its fields, and it will continue to have two schools—a secondary school and a boarding school. In the next few days a 12-bed hospital will be completed; a cow barn is being built on the farm's central homestead, and the network of paved roads is being expanded.

Who knows if the example of the first resettled people will bring others for whom houses have been designated. However, if they lose time, their place may be taken by others. 2,500 citizens have submitted applications for resettlement from the stricken zone in six rayons of Rovno Oblast.

But nonetheless, the majority do not want to leave the land of their fathers. For them, it would seem to be necessary to do everything that the government has already promised. However, as noted at the most recent session of the oblast soviet, a good many organizations and officials personally are guilty of providing inadequate assistance to their suffering countrymen. The radical program of priority measures to deal with the accident's consequences that has been adopted, which is geared to the use of the oblast's internal forces and capabilities, should step up the undertaking, especially in the construction of housing and provision of "clean" foodstuffs, materials, machinery, equipment and medicines.

Ukrainian Measures for Protection From Effects of Chernobyl

91UN0012A Kiev PRAVDA UKRAINY in Russian 9 Sep 90 p 3

[Article by Ukrainian SSR Council of Ministers' Information Sector: "Program of Further Actions"]

[Text] The Ukrainian SSR Council of Ministers has taken a decision on organizing the implementation of the Ukrainian SSR Supreme Soviet's decree "On Urgent Measures To Protect Ukraine's Citizens From the Consequences of the Chernobyl Disaster," and the implementation of measures provided for 1990-1992 by the corresponding State Union-Republic Program.

This document encompasses a wide complex of practical questions in the resolution of which ministries, departments, specialized organizations and research institutions are enlisted. Attention is focused primarily on accomplishing tasks involved in the resettlement in 1991 of people from the areas of Zhitomir, Kiev, Rovno and Chernigov Oblasts that are in the zone of radiation contamination and in which, according to scientists' findings, safe habitation cannot be guaranteed. A list of communities in environmentally sound regions of the same oblasts to which the accident victims will move has already been drawn up. Work to clarify the general environmental condition is presently being carried out in them. Residential buildings with outbuildings, utilities and modern conveniences, and social, cultural, municipal- and everyday- service, trade and production facilities will be built in them for the resettled people. In short, all the necessary conditions will be created for normal living and work, for which nearly 1.9 billion rubles is being allocated.

Incidentally, those who wish will be able to resettle in other regions of the republic, as well. In such cases the Zhitomir, Kiev, Rovno and Chernigov Oblast ispolkoms are supposed to transfer to the oblast ispolkoms of the oblasts receiving the resettled persons, in amounts determined by mutual agreement, centrally allocated capital investments for the construction of housing and social and everyday-service facilities.

The oblast ispolkoms sending builders to build the facilities determined by the government decision are supposed to provide for the organization of their meals, trade and everyday services and medical care, and for the safeguarding of public order.

The Ukrainian SSR State Committee on the Economy, the Ukrainian SSR State Agroindustrial Committee, the Ukrainian SSR Ministry of Trade, and the Ukrainian Union of Consumers' Cooperatives are given the duty of determining the size of state orders for the delivery of meat and dairy products to all-union and republic stocks

in 1991-1992 by Zhitomir, Kiev, Rovno and Chernigov Oblasts, taking into account the amounts necessary for supplying the population living in the controlled zone according to rational consumption norms.

The Ukrainian SSR Academy of Sciences, the Ukrainian SSR State Committee for the Protection of the Population from the Consequences of the Accident at the Chernobyl Nuclear Power Station, and the Ukrainian SSR Ministry of Health are given the task of drawing up next year, relying on the efforts of their departmental research institutions, together with the USSR Academy of Medical Sciences' All-Union Research Center of Radiation Medicine and other research institutions, rational norms and recommendations for the population's use of absorbents and antiradiation protectors in food products, and the Ukrainian SSR State Agroindustrial Committee, Ukrainian SSR Ministry of Trade, and Ukrainian Union of Consumers' Cooperatives are given the task of providing for the production of these items.

It is instructed that methods be developed for conducting agricultural production and the timber industry in accordance with the requirements of radiation safety, and that a detailed study of the radiation situation on the territory that has an elevated level of contamination be completed by the end of 1991.

Measures are being developed to promote the development of effective international cooperation and the use of international assistance in the republic in dealing with the consequences of the Chernobyl disaster.

Importance is accorded to the preparation of a draft republic conception of safe human habitation within territories contaminated by radiation as a result of the accident at the Chernobyl Nuclear Power Station. It should include, in addition to the purely medical aspects, the socioeconomic and psychological aspects of the population's activities within such territories.

The government decision also provides for the drafting of a number of documents connected with implementation of the program for protection of the republic's population from the consequences of the Chernobyl disaster. They include draft laws on the status of the zone of economic disaster and the status of citizens who have suffered as a result of the accident at the Chernobyl Nuclear Power Station, and on the storage, use and burial of radioactive substances and waste formed in carrying out deactivation and other work within the republic's territory.

Proposals are being prepared on procedures for changing over to international norms for permissible radioactive contamination of all food products and agricultural raw materials. They will specify the basic stages of that changeover, the sources for the supplying of such products and raw materials to regions contaminated by radiation, and methods for monitoring their quality. Liability will be established for officials and citizens for the production and sale of radioactively contaminated foodstuffs and other products.

The Ukrainian SSR Council of Ministers has appealed to the republic's labor collectives to do everything within their power to protect people living in radiation-contaminated territories and suffering from the consequences of the Chernobyl disaster.

Belorussian Minister, IAEA Chief Cited on Chernobyl

PM2610123990 Moscow PRAVDA in Russian 25 Oct 90 Second Edition p 4

[Dispatch by own correspondent V. Linnik: "Star Called 'Wormwood'"]

[Text] New York—Yesterday's event—"discussion of the IAEA report"—was number 14 on the UN General Assembly agenda. And it is not surprising that the speech by Belorussian Foreign Minister P.K. Kravchenko during the debates on the report acquired special significance.

Belorussia, he said in his speech, received 70 percent of the discharge of radionuclides from Chernobyl. They "seized hold" of one-third of its territory. One-fifth of the entire population, that is 2.2 million people, nearly 800,000 of them children, became "hostages" to the harmful effects of radiation.

Slavonic languages have the word "chernobyl" meaning wormwood, a bitter grass which in a surprising way is associated with the Chernobyl tragedy, the Belorussian minister said.

The firestorm of World War II took the lives of every fourth inhabitant of the republic. For Belorussia Chernobyl has become a 20th century Golgotha, a grave new trial for the Belorussian people.

A special danger lies in the damage to children's thyroid glands. Already in the southern regions of Belorussia, disease of the thyroid has on average doubled. In the zones affected by radiation, anemia has increased seven to eight times, chronic illness of the nasopharynx has increased tenfold, and the number of congenital defects in newborns has increased 50 to 100 percent.

Belorussia would suppose it to be expedient to create on its territory an international center for the study of as yet unknown radiation and ecological problems and a review of the decision taking procedure in the IAEA on granting special aid to states in the event of transborder nuclear damage and also to institute a special voluntary "Chernobyl" fund to finance relevant international cooperation and aid programs.

The republic, the Belorussian minister stated in conclusion, would also suggest that it is expedient to adopt at the 45th UN General Assembly session a resolution reflecting an understanding of the planetary nature of the catastrophe which has occurred and formulating specific UN steps to mitigate and reduce the global and local consequences of Chernobyl. We also suggest declaring 26

April—the day the Chernobyl accident occurred—an International Day for the Prevention of Nuclear and Other Industrial Accidents.

Immediately after the Belorussian representative's speech I talked with H. Blix, director of the IAEA. "I have first hand knowledge of what the minister was describing," he said. "I have just returned from Belorussia, where I saw with my own eyes the serious psychological problems and anxiety of the inhabitants and saw the need for aid to Belorussia. The IAEA is doing its utmost to help Belorussia. About 100 experts are working voluntarily in the republic. In conjunction with other organizations we are now preparing an all-embracing report with an assessment of the radiation situation and our recommendations."

"What is your attitude toward helping Belorussia within the UN framework?"

"When a request for aid is made in the United Nations, complaints are inevitable from the developing countries, which are afraid of losing their share of the funds allocated to them. After all there are criteria for granting such aid, in particular the volume of GNP per capita."

"Will the report the IAEA is preparing provide additional arguments in favor of granting aid to Belorussia?"

"We shall wait for the report to appear. We must ascertain reliably whether the cases of increase in morbidity are explained by the radiation situation or simply by closer observations and studies in recent years. For instance, the appearance of a calf with two heads would seem an irrefutable argument that mutation processes are there. But similar calves also appear in Argentina."

Belorussia Claims To Be Worst Affected by Chernobyl

LD2510142690 Moscow TASS in English 1318 GMT 25 Oct 90

[Text] United Nations October 25 TASS—Four and a half years after the Chernobyl nuclear power plant accident the world still does now know the whole truth about the disaster, Belorussian Foreign Minister Pavel Kravchenko told a press conference at U.N. Headquarters on Wednesday.

The Belorussian parliament in February appealed to peoples of the world for help. Later, the Ukraine and the Soviet Union issued similar calls.

"The modest Belorussian people have never claimed they are exceptional. However, today we say we are tragically exceptional," Kravchenko said.

"We state that we have suffered from the Chernobyl catastrophe much more than the other Soviet regions. Belorussia accounts for 70 percent of the radioisotopes from the Chernobyl reactor that landed on the Soviet Union.

"Twenty percent of the republic's population, 2,200,000 people, are in the contaminated zone.

"The total direct and indirect losses have reached an astronomical figure of 100 billion rubles, which is eight times the national income of Belorussia.

"According to economists' estimates, the republic's development will remain frozen for three to five years. But we are concerned most of all about the future of the nation, its children and the state of the genetic fund of the Belorussian people.

"It is clear now that we cannot cope with our problems all by ourselves. We have to move people to other areas, build housing in ecologically pure zones and establish control over the radiation situation and the pureness of foodstuffs.

"Our immediate tasks, which we should accomplish within the next few months, include the construction of several hospitals for children and a large house-building plant and the provision of the population with individual dosimeters."

Answering reporters' questions, Kravchenko said there are "quite a few organisations and individuals in the United States ready to aid Chernobyl victims".

"The well-wishing attitude, sympathy and kindness of Americans were a pleasant surprise for many of my compatriots," he said.

Kravchenko expressed gratitude to foreign public, religious and other non-government organisations that responded to Belorussia's call for help.

Radiation, Environmental Concerns in Belorussia

Agriculture in Chernobyl Aftermath

904B0261A Moscow SELSKAYA ZHIZN in Russian 18 Jul 90 p 2

[Article by S. Firsakov, director of the Belorussian affiliate of the NII [Scientific Research Institute] for Agricultural Radiology and candidate of biological sciences; and B. Sukhovtsev, senior scientific worker and candidate of medical sciences: "We Turn to Common Sense"]

[Text] Our newspaper has already written about the situation in the territories that have suffered from the accident at the Chernobyl AES [Nuclear Power Station]. Today we will hear from scientists-radiologists, who came to Belorussia in May 1976 and who all this time have been involved in the problems of agriculture under conditions of radioactive pollution. They know the problem "inside out" and have their own opinion. This includes S. Firsakov, director of the Belorussian affiliate of the NII for Agricultural Radiology and candidate of biological sciences, and B. Sukhovtsev, senior scientific worker and candidate of medical sciences.

After the completion of work in the station's fourth unit, the sphere of the agroindustrial complex became the focus of difficulties. After all, this sphere's basic resources, the country's national treasure—land—turned out to be polluted. But practical workers were not prepared for work under such conditions either by their preceding education or by scientific recommendations. This created considerable difficulties, many of which still have not been eliminated. In addition, the complex specter of radionuclides, of which Cesium-134, Cesium-137 and Strontium-90 (the chemical analogs of potassium and calcium, with which they migrate along the food chain) are "agricultural," also complicated the acceptance of the radiation situation in the APK [Agroindustrial complex].

To the credit of agricultural radiology, its scientists and specialists figured out the situation within a short period of time and made the necessary recommendations for carrying out work. Incidentally, it is generally accepted that we do not have such experience. Today some speak about this out of a desire to justify themselves; others hope to confirm the correctness of their dilettantish judgements—everyone here is equal, they say. But this is not so. A large group of scientists was involved in agricultural radiology after the global nuclear fallout from the testing of nuclear weapons, when the northern hemisphere of the planet was particularly polluted. After the Chelyabinsk accident all of this enabled them to make recommendations in 1973 and 1977 and to produce agricultural products with a radionuclide content that did not exceed tolerable concentrations.

This is why today we are not afraid to say that agriculture received needed and sufficiently knowledgeable recommendations in good time. In addition, in the absence of an equipment base dependable express methods were developed for mass radiation control on the basis of the SRP-68-01 radiometer.

Naturally, because of large-scale pollution and because of the absence of special soil-cultivation equipment it was not expedient to delay while waiting for radiometers. As practice has shown, this would also have been pointless. A clear example of this is the situation involving individual dosimeters, the necessary quantity of which is produced neither in the republic nor in the country as a whole even today. For this reason we proposed a system of measures that would be written into the regular agricultural technology and that would not require exotic means and methods. It includes liming, the application of elevated doses of phosphorus-potassium fertilizers, and the radical improvement of natural and cultivated haylands and pastures.

In addition, immediately after the accident we determined which crops were not to be recommended for cultivation. Production was oriented toward seed farming, the cultivation of feed crops in crop rotations and the use of grain for forage. A methodology was also developed for producing "clean" beef according to two-stage technology.

Today different people assess our work results differently, primarily according to the political situation. For this reason I will simply mention some figures without commenting on them. Whereas in 1986 in Gomel Oblast 66.5 percent of the milk had an elevated radionuclide content, in 1989 the figure dropped to 6.6 percent. In recent years we even made a transition from temporarily-permissible levels to standardizing the content of radiocesium in animal products according to control levels. For milk these levels are stricter by a factor of 2, and for meat—by a factor of 5-8, than national standards and also stricter by a factor of 2 and 1.6 than the norms established by the World Health Organization. This is considerable because it is milk and meat that determine 60 percent of the internal radiation dose.

Incidentally, no one should get the impression of well-being because we are far from that in the "zone." There were some things we were simply unsuccessful in. For example, in the first years after the accident there was the assurance that the predictions of radiologists would also be justified on territories of 40-60 curies. As practical experience has shown, the technology that was being violated under regular conditions did not become a strict norm even under the extreme conditions of radiation pollution. For this reason it is possible that the dose limits of 35 ber [biological roentgen equivalent] is exceeded, and this means that production and residence in these territories become impossible.

Here is a characteristic example. On the territory of Gomel Oblast the percent of "dirty" milk in private enterprises is greater by a factor of 1.5 than in the public sector. The explanation is quite simple—the directors of enterprises are taking the "clean" pastures for themselves. There is the plan, and besides, no one is particularly interested in allocating the "clean" land for private livestock.

Today it is acceptable to rebuke scientists, the health ministry and other departments which in one way or another are involved in this problem for the insufficiently effective work to eliminate the consequences of accidents. There have been errors and sluggishness, and ineffective and expensive methods have been utilized. Specialists recall how much zeolites alone have cost. But there were also examples of intense work and selflessness! I am not speaking about eliminating nonprofessionalism. After all, in 4 years after the accident the question of training agrarians-radiologists still has not been dealt with, something that we have grown tired of insisting upon.

But in our opinion the main error was made at the very beginning, on the very first day, by the government, which did not establish a goal for all efforts. I think that now it is clear to many that in recent years a considerable number of decisions have been made hurriedly and without a consideration of long-term consequences. Something similar occurred here. Let us recall that quite recently a state program for eliminating consequences has been passed. At first not only was there no serious

development of a plan of specific actions and of purely economic decisions but even basic information was made secret. Incidentally, the supporters of the idea of 35 bers do not have any relationship to this.

The suppression of what was being done and with what purpose, the lack of information to large masses of people concerning the effect of radiation on live organisms, the significance of dosage, and the inability to assess the objective radiation situation—all of this as a result created unheard-of stress in the "zone." Add to this contradictions in the publications of scientists and journalists and here you have the situation in which any information on the real radiologic situation is seen as threatening. Under conditions of constant stress over a period of many years outbreaks of any kinds of diseases are possible.

An open argument in the press about a radiation dosage limit of 35 bers over an entire lifetime, which is a natural continuation of NRB-76 and NRB-78/87, was accompanied by a pronouncement on the crimes of specialists who have developed these limits. Sometimes it even seems that we are returning to the times when resolutions were passed on the veracity of a particular proposal and when its value was determined by vote.

Today hardly anyone would dare to decide by vote if Newton's laws, for example, are true. But when it comes to the scientific bases of the idea of the 35-ber dose, this attitude is tolerated.

...Thus, what does the republic's agroprom have to work toward in the near future? First of all, there must be a complete halt to production in places where the radionuclide content may exceed tolerable levels on the basis of the changing of specialties by enterprises and the development of non-traditional branches. Secondly, comfortable working conditions should be created for agricultural workers, including providing machine operators with enclosed cabs, which farmers in other countries have had for a long time. Thirdly, in connection with the movement of manpower out of the "zone" and with the shortage of labor resources we must make the transition to highly productive equipment and the latest technology. Finally, we must create good living conditions and provide good medical services.

At the same time, now after important decision-making by the USSR Supreme Soviet about the harmed Belorussian territories, the conversation is often reduced to removing the population. In some cases the problem is even posed in this way: to resettle people from territories where radiation is 1 curie and higher. But in Gomel Oblast alone 76 percent of the area meets this criteria. Incidentally, this includes the city of Gomel with a population of half a million and a developed industry. We won't even mention expenditures—in places where we are speaking about the safety of people expense is not of decisive significance. But in the choir of many voices where non-specialists prevail it is very easy to loose sight not of the truth but of common sense. It is that to which we turn, understanding at the same time that we are bringing upon ourselves the displeasure of that which was recently non-existent but that now suddenly appeared, like a genie out of a bottle, drunk with freedom.

Let us look at things realistically. We will take into consideration only real dangers. We will decide scientific disputes not by vote but according to what has been studied, examined and proven. Then perhaps it will turn out that resettlement is not the best variant by far for Belorussia? Incidentally, we are convinced of this by the example of the zone which people left and to which today they are returning to live. We are not talking at all about forcing people to stay. But coercive resettlement, when no choice remains, is also not the best variant. This is why perhaps the creation of ideal working and living conditions in "little Holland," where "clean" products are produced according to technologies developed by us, will attract many. Not only will we be able to preserve our production strength, but with a guarantee of the preservation of health and psychological balance of people we will achieve organization of life in the village and will be able to preserve entire cultural levels which would otherwise be destroyed forever if practically all of the Belorussian Polesye were resettled somewhere else.

Incidentally, the only thing that we ask is a rejection of hurried decisions, the tendency toward which in the fifth year after the accident is just as dangerous as the lack of action that characterized the preceding period.

Scientific Leader on Agriculture, Environment

904B0261B Minsk SELSKOYE KHOZYAYSTVO BELORUSSII in Russian No 6, Jun 90 pp 30-31

[Interview with Ivan Ivanovich Lishtvan, vice president of the BSSR AN [AS; Academy of Sciences] and academician, by T. A. Katsnelson: "We Cannot Deprive Our Children and Grandchildren of a Future"]

[Text]

[Katsnelson] Not too long ago our republic was called blue-eyed, an area of forests and swamps. Now you could no longer say this about it. The rivers have grown shallow, many lakes have disappeared and leafy groves and small woods are drying up. Why has this happened?

[Lishtvan] This sad picture is the result of the unthought-out economic activity of man. All of us dreamed at one time of transforming our Belorussia from an agricultural to an industrial republic. In the dawn of Soviet power our fellow-countryman, the talented songwriter Pavlyuk Trus, wrote: "Land, oh land, will you really become a region of smoky factories and machines?" The excessive increase in construction of industrial enterprises and other objects, of central heating plants, and recently of nuclear power stations not only in the republic but in the country as well has brought very sad consequences.

Two problems are facing our common home, planet Earth, as well as our individual homes, be they city skyscrapers or modest village huts. The first is the ecological crisis and the second is nuclear war.

I will stop to talk in more detail about the former. It can be said that at the present time nature is in a pre-crisis state. Why did this happen? Why is the question of saving the environment of man and of all living things on Earth so urgent now? We lived, built, created, transformed and consumed without thinking about how much our land is able to take, how much it can give and what kind of stress it can withstand. It seemed to us that its power and riches were inexhaustible, and that everything that we were doing was useful for both us and nature. It turned out that this was not the case.

An incompetent approach to the use of nature, the dictates of central departments and the activities of contemporary monsters gave rise to problems in our country that are difficult to solve—the disappearing Aral Sea, the pollution of the Volga and Lake Baykal, the virgin lands with their dust storms, the Neva Barrier project, and Kara-Bogaz-Gol...There are many difficult ecological consequences to the activities of ministries and departments in our republic. This includes the Belorussian Polesye and Novopolotsk, Soligorsk and Svetlogorsk, Bobruysk and Mozyr, Mogilev and Grodno. Each industrial city has its own problems. Our republic's capital, Minsk, is included among the cities in which it is ecologically dangerous to live. Tolerated norms have been surpassed by a factor of 4 to 16. There are an average of 213 kilograms of harmful waste annually per resident.

[Katsnelson] Yes, industrially-developed centers are exacerbating the ecological situation to a large extent. What about agriculture? Is its anthropogenic burden on nature really that great?

[Lishtvan] Yes, it is great. You can imagine that the livestock-raising complex earmarked to maintain 108,000 head of cattle stresses the environment as much as a city with almost a million residents. There are many such complexes. Grazing lands for animals created near or sometimes right at water reservoirs and rivers, manure waste that gets into surface and ground water and poorly-equipped storehouses for the storage of mineral fertilizers and poisonous chemicals pollute nature to a considerable degree.

If we speak about ecology in agriculture, here the problem is most urgent because agriculture has to do with the soil—the means for and source of man's existence. All unthought-out interference has a negative effect on soil makeup. And in our republic the soil is poor as it is. It contains 3 percent humus and less. The problem of maintaining a deficit-free balance of humus in the soil is one of our most important economic, ecological and I would say even moral problems. If there is no humus there is no fertility. The concept that was previously in vogue concerning producing large harvests by means of mineral fertilizers and the extensive use of pesticides—chemical agents in the struggle against pests—resulted in great negative phenomena such as the exhaustion of the fertile layer of soil and the pollution of food products and water sources with nitrates and heavy chemical compounds. After all, a good half of everything that was applied to the soil was removed by water.

The reason lies not only in mismanagement and in an irresponsible attitude to nature on the part of many directors but also in a lack of ecological knowledge. After all, until quite recently neither agricultural higher educational institutions nor technical institutes trained specialists-ecologists; lectures are not given on this subject to other types of specialists either. It can be said that all of us are ecologically uneducated, beginning with specialists and directors of enterprises and organizations and ending with rank-and-file workers. This is why not everyone hears the striking of the clock warning us about this really very catastrophic situation.

In order to avoid it it is essential to implement an ecologically-based system for using organic and mineral fertilizers. Mineral fertilizers must be applied in a balance of nitrogen, potassium and phosphorus on a background of large doses of organic fertilizers. This will enable us to reestablish soil fertility and to achieve a positive humus balance and the protection of the environment.

The poisonous chemicals that are used must be of a low-toxicity, unstable and must break down within the time that the crops mature so that they do not pollute them. We must work on this. At the present time scientists of the BSSR Academy of Sciences together with the republic's agroprom are involved in developing a program of ecologically-safe technologies for implementing agriculture. The most important concepts are those of producing clean, high-quality products and of improving soil fertility.

The western regional division of VASKhNiL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin], in forumulating new programs for research in basic and applied problems of the agroindustrial complex in the next five-year plan, must continue to be concerned about and develop methods to create ecologically-safe agricultural technologies. We consider this a fundamentally-important principle.

I must also say a few words about some problems in agricultural management that at first glance appear to be secondary: about protective forest belts that protect the soil from wind erosion and that block the path of harmful carcinogenic wastes of automobiles from roads and railroad lines and that also protect water sources; and about the rules of plowing land to the edges of rivers and lakes and about the extremely careful use of mineral fertilizers there. Lack of adherence to these rules resulted in the death of all living things in small rivers and to the

pernicious contamination with chemicals of the Ushachskiye lakes, Narochi, Chervonoye Lake and other reservoirs.

The assimilation of new lands by means of reclamation did not bring the desired results. Over one million hectares of swamp and shrubland exist in the republic and the area in agricultural lands has not increased because fertile lands were easily given away for non-agricultural use—for construction, roads and man-made lakes. In addition, reclamation itself was not carried out on a scientifically-based level by far. Work had to be carried out not on a large scale but comprehensively, foreseeing not only drainage but also irrigation, i.e., double regulation of the water regimen. This rule was not adhered to here in order to make construction less expensive. Yet folk wisdom states that the greedy one pays twice. As a result we have had soil degradation, sandstorms and the rapid depletion of the organic layer. All of this was facilitated by mismanagement, errors in hydromeliorative building and again by that same command system. For example, on reclaimed land it was not possible to raise intertilled crops, but agricultural workers were forced to do this.

Scientists of the BSSR AS together with other departments are completing the development of a methodology for the efficient use of nature in reclaimed catchment areas with a consideration of ecological processes and the stable carrying out of agriculture. We have developed a new concept of reclamation building and land assimilation. We are using as a springboard the fact that before work begins an ecological-architectural-landscape scheme for organizing the territory must be worked out and large areas must be left in their natural form on a mandatory basis. This will enable us to support the water regimen at the necessary level and to avoid errors that were tolerated during the drainage of the Belorussian Polesye. Without considering these proposals reclamation cannot be carried out in Vitebsk Oblast.

Now about the second problem—Chernobyl. This happened four years ago and its scale is difficult to predict even for the near future. Every new publication in our country gives people more and more alarming information. We agree that there is reason for concern. However, some supporters of "Moscow" ideas, the USSR Ministry of Health and some foreign scientists rebuke Belorussian scientists for the exceedingly bleak picture. Nevertheless the problem does exist, it is hanging over our people and it must be dealt with. All of you have probably read the article, "Catastrophe," by a reporter covering Belorussia for the newspaper IZVESTIYA (No 86, 27 Mar 90), N. Matukovskiy. Our position is explained there. I will remind you of just a few facts. Over 70 percent of the territory that was polluted as a result of the accident is in Belorussia. One-fifth of the population of our republic lives under conditions in which radioactive pollution exceeds one curie per square kilometer. In the strict control zone (15 curies per square kilometer) there are 498 settlements in which 102,000 people reside. About one-third of them are children. In 85 villages (12,000 persons) pollution with radionuclides is over 40 curies. Here people live almost only on imported produce.

When one hears these figures one begins to fear for the future of the people living there. But more frightening is the future of the Belorussian nation when one learns that on the lands that were subject to radioactive pollution (not on all of the hundreds of hectares that have already been removed from turnover, of course) agricultural work is continuing. In some regions of Mogilev and Gomel oblasts "dirty" milk comprises a large percentage. It is processed and the skimmed milk is fed to calves. The contaminated meat is used to make meat-bone meal, which is sent to the republic's hog farms. The dose from food products exceeds by several times the dose of local radiation!

We feel, and this point is included in the State Program for the Elimination of the Consequences of the Chernobyl AES Accident, that the production of food products in the zone should be stopped if clean products cannot be produced. In our opinion, we need a law on criminal responsibility for the production and sale of products with nuclear contaminants. If this is not done, the radioactive danger for the healthy will increase at an even greater rate.

On the other hand, people should not be living in places where clean products cannot be produced. Consequently, we must take immediate measures to resettle them. At the same time in Gomel and Mogilev Oblasts it is essential to implement strict controls over the use of mineral fertilizers and toxic chemicals in order not to exacerbate the ecological catastrophe even more.

[Katsnelson] What is being done by Belorussian scientists to improve the ecological situation and to eliminate the consequences of the accident?

[Lishtvan] It is difficult to respond to this question briefly. I have already discussed many aspects above. I would only add that 20 institutes are working on the Chernobyl problem. Not long ago we created the Institute of Radiobiology. On 1 February of this year a decision was made to create the Institue for Problems Related to the Use of Natural Resources and Ecology. Work is being carried out to create an Institute for Water Problems. An ecological commission attached to the BSSR AS has been created. Creative collectives are working on engineering ecology and distance testing of elements in the natural environment as well as on producing individual dosimeters. The academy is coordinating work in the republic on the problems of the biosphere and the Polesye and on the preservation and efficient use of the Dnepr and Pripyat river basins. (As we know, these rivers suffered most from the accident. A large portion of the Pripyat basin—122,000 square kilometers—can now be used only as an ecological preserve).

In general we are working in accordance with the Basic Directions for the Improved Sanitary Condition and Protection of the Environment and for the Efficient Use

of the Belorussian SSR's Natural Resources. The Chernobyl tragedy and the ecological crisis have placed very complicated problems before us. They must be decided without delay. We must begin by bringing order to our planet, to our city and to our village. We must have an efficient and sparing use of the riches that we have at our disposal—mineral ores, timber, water resources and the atmosphere. After all, until now due to departmental subordination they have been barbarically squandered. For example, in Soligorsk only potassium was removed from the sylvinite ore—the rest was thrown to the surface, thereby incidentally occupying large areas of plowland. Peat and petroleum were used primarily as fuel. Yet after a more thorough processing various materials and products can be obtained from them. Here it is important to introduce waste-free and ecologically safe technologies as soon as possible. All of the reserves that we have must be used comprehensively. The country itself and the republic should not be transformed into the raw materials base for highly industrialized countries.

Sergey Zalygin writes correctly: "We are already in debt to future generations. In using that which by rights should have belonged to them we are thus depriving our children and grandchildren of a future." I would add that we are depriving them not only of the earth's riches but of their very existence on Earth.

Radiation Levels in Food Products

904B0261C Minsk SELSKAYA GAZETA in Russian 7 Jul 90 p 3

[Article by Information Department, BSSR Council of Ministers: "Products and Radiation"]

[Text] The Commission for the Elimination of the Consequences of the Chernobyl AES Accident of the Belorussian CP Central Committee and the BSSR Council of Ministers at its meeting in late June approved republic control levels (RKU) for the content of Cesium-137 and Strontium-90 radionuclides in food products and drinking water. The RKU was developed by the BSSR Ministry of Health jointly with the republic's academy of sciences, BSSR Gosagroprom [State Agroindustrial Committee] and Belgidromet [Belorussian hydrometeorological association].

New Control Levels

Number, Name of Product	Curies/liter; Curies/kg
A. RKU for Cesium-137 Radionuclides	
1. Drinking water	5×10^{-10}
2. Milk, sour milk products, sour cream, pot cheese	5×10^{-9}
3. Oil, condensed and concentrated milk, cheese	1×10^{-8}
4. Dry milk	2×10^{-8}
5. Meat (beef, pork, lamb), poultry, fish, eggs (mixed), meat and fish products	1.6×10^{-8}
6. Vegetable oil and animal fat, margarine	5×10^{-9}
7. Root crops, greens	1.6×10^{-8}
8. Vegetables, fruit	5×10^{-9}
9. Grain and grain products, groats, flour, sugar, honey	1×10^{-8}
10. Canned vegetable, fruit and berry products	5×10^{-9}
11. Fresh mushrooms (cleaned from soil residue)	1×10^{-8}
12. Dry fruit, dried mushrooms and dry wild berries	1×10^{-7}
13. Fresh berries (cultivated and wild)	5×10^{-9}
14. Children's foods (all types; ready for consumption)	1×10^{-9}
15. Medicinal plants and tea	5×10^{-8}
16. Other food products and additives	1.6×10^{-8}
All types of canned food products are sold according to the norms for the year they were produced.	
B. RKU for Strontium-90 Radionuclides	
1. Drinking water	1×10^{-11}
2. Natural milk and milk products	1×10^{-10}
3. Dry milk	5×10^{-10}
4. Thickened and condensed milk, butter	1×10^{-10}
5. Meat (beef, pork, lamb), poultry, fish, eggs (mixed), meat and fish products, vegetable oil, animal fat, margarine	5×10^{-10}
6. Children's foods (all types; ready for consumption)	5×10^{-11}
7. Grain and grain products, groats, flour, sugar	1×10^{-10}

Confirmed republic control levels for 1990 were stricter than the VDU [All-union dose levels]-88 which were in effect until the present time: for milk—stricter by a factor of 2, for butter—a factor of 3, for beef—5, for children's foods—10, and for dry fruit and mushrooms—3. Moreover, in contrast to VDU-88, RKU-90 introduces norms for Strontium-90 for the first time.

The control levels will be in effect for two years (until June 1992). In 1992 they will be reevaluated with a consideration of agrotechnical and agricultural ameliorative measures carried out by BSSR Gosagroprom [State Agroindustrial Committee] during this period of time to decrease the content of radionuclides in agricultural production.

RKU-90 norms are therefore calculated in such a way that the constant ingestion of radionuclides with food products does not exceed the annual dose for internal radiation of 0.17 ber for the critical group of the population.

The control for Strontium-90 content will be implemented according to radioactive cesium with a consideration of the fact that the relationship of Strontium-90 to Cesium-137 in food products is constant for specific products and territories. In this way, adherence to the RKU-90 for cesium on contaminated territories usually secures the RKU for the corresponding product in terms of Strontium-90.

The RKU's established for Strontium-90 cannot serve the goals of efficient controls. Controls with direct determination of strontium content are needed to determine the territories on which products systematically do not satisfy the RKU and need to be discarded.

It should be noted that the RKU for potatoes is introduced only 2 months after a more exact determination of the actual radionuclide content. During this time controls are implemented according to existing USSR VDU's.

Combatting Weeds Without Chemicals

904B0261D Moscow SELSKAYA ZHIZN in Russian 5 Jul 90 p 4

[Article by A. Gulyayev: "'Green Fire'"]

[Text] To extend a helping hand—this is the request of vegetable farmers in Belorussia to the collectives of industrial enterprises, institutions and organizations in the republic.

In order to produce biologically-clean products, and this is the goal now, the use of chemical agents in the struggle against weeds has been curtailed. As a result, a "green fire" is raging on vegetable plantations. A request is also being directed at lawmakers—to change wage conditions for those who will work in the fields. After all, cost accounting in industry does not permit the recruitment of the needed quantity of manpower for this purpose. Builders and planners are being asked to accelerate the introduction of objects for the storage and processing of the harvest.

EUROPEAN AFFAIRS

EC Proposes Cleaner Agricultural Policy

90AN0407A Brussels EC INFORMATION MEMO in English 25 Jul 90 pp 1-2

[Article: "Agriculture and the Environment"]

[Text] The Commission approved on the proposal of Mr. Ray Mac Sharry, Commissioner for agriculture and rural development, a series of measures to make agriculture more responsive to the needs of the environment. The proposals will now be forwarded to the council of ministers and will be a priority according to Council President, Mr. Calogero Mannino.

The central idea is to replace part of the existing extensification scheme by a general anti-pollution measure requiring member states to introduce programmes to reduce usage of fertilisers and plant protection products (pesticides, insecticides, etc.). The reduction in output required to qualify for aid (maximum ECU 180 per hectare in case of annual field crops) would be determined by the member states in consultation with the Commission. It is proposed also to open up the opportunity for the Community to contribute to the cost of compliance with compulsory restrictions arising from putting into effect Community legislation.

Following a review of the present arrangements, it is proposed also that the existing rules on environmentally sensitive areas be subsumed in a broader measure to open up the opportunity for member states to give aid for the protection of the environment and of flora and fauna. Aid for the maintenance of traditional agricultural features and practices beneficial to the environment would be covered also.

A special "top up" (maximum ECU 100 per hectare) to the set aside premium is to be provided for special measures to enhance the environmental condition of land set aside; the set aside premium is to be extended for 20 years in the case of land used for forestry or recognised as having a community interest from the ecological point of view.

Aid (maximum 150 per hectare) is proposed for the upkeep of abandoned land which can lead to special problems especially from the point of view of soil erosion and fires. Aid for afforestation by member states is envisaged also.

Commenting on the proposals Mr. Mac Sharry said that he had been very conscious that the existing arrangements had not been working well and had been keen to remove constraints on introducing programmes to reduce agricultural inputs and to provide incentives for maintaining the countryside in good condition. "Any meaningful rural development policy must take account of the environmental aspects and the interests of agriculture and of the environment as complementary in this. With the growing public awareness of the environment I will be pressing member states to introduce effective programmes and am confident of a good response," he said.

On the question of animal manure, Mr. Mac Sharry said that the complexity of the issues raised required further study. He would be bringing forward a report and proposals on this over the coming months. "For the moment it is not necessary to include animal manure in the present aid scheme. We may need to look at other solutions to this problem," Mr. Mac Sharry added.

EC Adopts Nuclear Fission Program

90AN0408A Brussels EC INFORMATION MEMO in English No P-56, 1 Aug 90 p 1

[Article: "Research Programme In The Field of Nuclear Fission (1990-1994)"]

[Text] Acting on a proposal from Vice-President Filippo Maria Pandolfi, the Commission has adopted a proposal for a specific research and technological development project for the European Atomic Energy Community in the field of nuclear fission safety.

This programme joins the thirteen other specific programme proposals adopted by the Commission on 25 April 1990, aimed at implementing the third Community Framework Programme of Research and Technological Development (1990-1994).

Two aspects of nuclear fission safety are covered in the programme: radiation protection and reactor safety.

Exposure to radiation is likely to have severe consequences on the health and genetic constitution of humans (for example, cancer and congenital malformations). The objective of the programme is to use effective research activity to further knowledge of the effects and risks associated with radiation exposure, in particular those resulting from low radiation doses, in order to permit the elaboration of suitable common safety standards and rules.

The extent of the consequences of the Chernobyl disaster is a reminder of the importance which must be attached to the safety of nuclear power stations. In this respect, research activities will focus on the safety of radioactivity confinement in the event of a nuclear accident. More specifically, they will concentrate on the study of the various stages of development of a nuclear accident, the quality and performance of confinement systems, human error in such a situation and the most effective way of correcting it.

The total financial package allocated to the programme is ECU 199 million over a period of five years (1990-1994). The programme will be carried out by means of shared-cost research projects, direct research activities

undertaken by the Joint Research Centre (JRC), concerted actions and accompanying measures (dissemination of results, training, etc.). The research undertaken by the JRC will be the subject of a separate Council decision.

Italy, FRG Sign Accord on New Olefin Production Process

90MI0341A Milan ITALIA OGGI in Italian 11 Sep 90 p 35

[Text] Montedison's Orion has signed a collaboration agreement in Frankfurt with the FRG research companies Lurgi and Sued-Chemie, for the development of an innovative olefin production process that uses methane instead of petroleum.

The process, which represents an alternative to the steam-cracking of virgin naphtha, is very well-timed given the new international energy scene, and produces the olefins (ethylene, propylene, and butylene) which in turn constitute the raw materials for the production of the most important families of plastic materials and elastomers.

The results obtained to date are very satisfactory and it is predicted that by the end of the year the pilot plant will move into the industrial phase. The agreement was signed for Orion by Montedison's vice president, Italo Trapasso, by Lurgi's director, Hans G. Schlegelmilch and Sud- Chemie's director, M. Schneider. At the same time an agreement was also reached between Orion and Lurgi for the technological development of new urban and industrial waste treatment systems.

Orion, Montedison's advanced research company, was recently established to develop technologically simplified chemical processes to reduce side effects and the quantity of waste by optimizing the use of the molecules, and also to develop products that are increasingly more compatible with the environment.

As far as Montedison's FRG partners are concerned, Lurgi is a Frankfurt-based company involved in the research and engineering sectors, while Sued-Chemie of Munich is among the world's most important companies specializing in heterogeneous catalysis research.

GERMANY

Environment Minister Limits Liability for Clean-Up

91WN0013A Berlin DEUTSCHES LANDBLATT in German 20 Sep 90 p 3

[DEUTSCHES LANDBLATT interview with FRG Environment Minister Dr. Klaus Toepfer, by senior editor Uwe Creutzmann, in Bonn; date of interview not given: "For a Clean Environment in the Heart of Europe"]

[Text] [Creutzmann] With the economic, monetary, and social union on 1 July 1990 the environmental union of the FRG-GDR was also formed...

[Toepfer] Correct. Unfortunately this important fact has faded somewhat from view because of the many other urgent problems that have to be solved. It is apparent, however, that along with the economic burdens that must be taken over from the five states in the eastern part of Germany, there are quite a few ecological ones as well.

[Creutzmann] What plan does your ministry have for the rapid reduction of these burdens?

[Toepfer] Our program is built on two pillars. One is that we must realize that in the eastern part of Germany obsolete capital equipment is economically and ecologically problematic. This means that simply improving present equipment will not make the environment healthy. Therefore new investments are in order in the coming months and years. But we will be very careful to see that in the construction of industrial plants and the like the same environmental norms are maintained as in the states of the Federal Republic. In this way the concern will be diminished of those who think that the eastern part of Germany will be an area of fewer environmental precautions in which many people might be deluded into thinking it would be a good place for cheap investments. If we apply the environmental norms in the unified Germany everywhere equally, we can combat environmental discrepancies south-north and west-east respectively.

[Creutzmann] What tasks have highest priority in the eastern part of Germany?

[Toepfer] For example, it is important to improve the efficiency of the brown coal industry with new, up-to-date equipment. Other problems are the high emission values and the soil contamination in industrial centers such as Espenhain, the Mansfeld area, and the chemical triangle Halle-Bitterfeld. It looks as though, even with the closing down of all the power plants, the limits permissible in the FRG will still be exceeded. Here there is work for years to come.

[Creutzmann] Can there be any new investments at all in these areas?

[Toepfer] In the joint environmental council we decided that construction will also be permitted if the environmental burden is at least lessened. We agreed to this exception to do something to encourage investment. For example, a Federal German firm plans to build a branch copper works in the Mansfeld area with significantly lower emission levels than the old plants there. The emission levels in this area amounted to 1,500 tons in 1989. They will be reduced significantly.

We also decided upon a further exception. It concerns the responsibility for pre-DM liabilities. According to Federal German law, the one who builds on such an area

must take over these pre-DM liabilities. If we were to insist upon this in the area that is still the GDR, we would have to face a first-class investment obstacle. The firms can file a request for release from these pre-DM liabilities.

[Creutzmann] You have spoken about the first pillar of your idea. What is the second?

[Toepfer] The second pillar is the development of a restoration program and its execution. According to the unification treaty we have the task of presenting the first draft of this restoration program for the five new states by 15 November 1990. I think this is an extremely short period of time. The plan will certainly have to be improved later.

[Creutzmann] Is this program constructed according to priorities?

[Toepfer] Naturally. The priority scale is established. Primarily by the effects of pre-DM liabilities on human health. For example, a rapid clean-up of the soil contaminated with dioxin is in order. In the district of Wernigerode in the area surrounding a coke factory the agricultural products of over 200 hectares could not be harvested because they were highly contaminated. My ministry is providing a billion marks to establish pilot projects to start the restoration.

[Creutzmann] What priority does the conservation of nature have?

[Toepfer] Conservation of nature and of national parks in what is still the GDR and in the rest of Germany have a high priority. Here I am thinking of the untouched nature areas in the previous border areas and of the national hunting areas. As you know, we want to establish a European environment academy on the island of Vilm, which previously was only available to a few selected top functionaries of the SED [Socialist Unity Party of Germany]. At the same time, we will be careful to see that in the states of the eastern part of Germany the same mistakes will not be made that were made in the FRG with the opening up of tourism. That is, we will leave flora and fauna on untouched shores and we will not replace beautiful avenues with concrete roads.

[Creutzmann] Recently you took part in the conference in Sweden on the maintenance or restoration respectively of the Baltic area. What important things did you learn for the conservation of this area?

[Toepfer] To restore our European inland sea, the Baltic Sea, we Germans must above all do our homework in the field of ecology. Of the approximately 71 million people living near the Baltic Sea, three million are in Schleswig-Holstein and in Mecklenburg-Vorpommern. Particularly in the latter area it is important to proceed with the connection of houses and industry to sewage treatment plants. For here only 17 percent of the communities and cities are connected to such plants. In Schleswig-Holstein it is 90 percent. When we also remember that 50 percent of the pollution of the Baltic Sea comes from the air, then we see that it is necessary to reduce automobile exhaust gases with regulated catalytic converters.

[Creutzmann] Where in general are the problems in the maintenance of the Baltic Sea?

[Toepfer] Actually, decisions were made in 1988 in Helsinki about the restoration of the Baltic Sea. Unfortunately they were not carried out by the economically weak nations of eastern Europe. Therefore we adopted an internationally agreed upon restoration program in Sweden. Much is expected from Germany, for example, in support of Poland and of the Soviet Union. At present we are helping the city of Leningrad to overcome the consequences of the large, ridiculous dam that cuts off the bay from the city. For at present, Leningrad sewage is being directed into a land-locked lake. The remedy must be sought in effective sewage treatment plants.

The Oder also carries much pollution into the North Sea. Soon there will be progress here, as well. I am pleased that at my suggestion in Sweden a combined restoration of the Oder by Germany, Poland, and the CSFR was decided upon. This is very important, not only from an ecological, but also from a socio-political point of view. For we do not want to make the Oder into an environmental dividing line between eastern and western Europe, but rather into an attractive waterway in the heart of Europe.

Soviet-Built Nuclear Reactors To Be Shut Down

PM2410132590 Moscow SOVETSKAYA ROSSIYA in Russian 23 Oct 90 Second Edition p 3

[TASS report: "Germany: Dangerous Reactors"]

[Text] The FRG Government has informed Soviet officials that in the middle of December it will close down five nuclear reactors constructed with the USSR's aid on the territory of the former GDR, inasmuch as they do not meet safety requirements and the cost of their reconstruction is too high.

According to a newspaper report, it is a case of the four units of the Lyubmin [name as transliterated] nuclear electric power station near Greifswald and a single unit at the "Rheinsberg" Nuclear Electric Power Station.

In the opinion of IAEA official representatives, Germany's decision will lead to the growth of demands to close down at least 26 similar reactors scattered over the territory of East Europe and the Soviet Union.

To a question from a TASS correspondent, Bertold Gyuke [name as transliterated], a spokesman for the FRG Ministry for the Environment, Nature Conservation, and Reactor Safety, replied that as of today only one unit is in operation at the nuclear electric power station in Greifswald. The remaining units have been switched off.

Krupp, Dornier Develop Sea Pollution Detector

90MI0344A Stuttgart LASER & OPTOELEKTRONIK in German Aug 90 p 16

[Text] Krupp MaK Maschinenbau GmbH in Kiel and science partners have jointly developed complex measurement sensors for aerial sea pollution monitoring commissioned by the BMFT [FRG Ministry of Research and Technology]. The firm will also supply the entire mission equipment for the measuring system in the Do 228 carrier aircraft. The main contractor is Dornier Aviation GmbH, Oberpfaffenhofen. The new measuring system will have a whole series of improvements as compared with its predecessor. In particular, it is designed to supply more accurate oil detection measurement readings, trace even extremely low levels of pollutants, identify accumulations of algae, detect other noxious chemicals, perform more efficiently in the dark and in poor atmospheric conditions, facilitate the operator's job by improving operating convenience, and allow greater mission range and duration. The new carrier aircraft will also be less noisy. The nucleus of the mission equipment to be supplied by Krupp MaK is the central operator station. A modern, modular design computer system will process all the measurement data there, operate the system components, and present the results on a new LCD [liquid crystal display] in easy reference from. A side-looking radar device detects oil pollution. An infrared/ultraviolet (IR/UV) scanner functioning as a passive measuring system meters the infrared and ultraviolet radiation emitted by the surface of the sea in the vicinity of the pollution located. It then processes differences in intensity between polluted and non-polluted water surfaces into relative layer thickness information. Nikon mirror reflex cameras, which can superimpose the flight data needed to corroborate the evidence onto the photographs, and a TV camera a system consisting of three high-performance video cameras are used for documentation and monitoring. A new microwave radiometer that still has to be developed will evaluate the microwave radiation emanating from the surface of the sea in three different wavelengths. It will calculate quantitative thicknesses of oil and similar layers in the 50 to 2000 micron range. Another new development is the laser- fluorosensor for taking active measurements of micron-thick layers. In this process, a laser probes the sea surface, and the highly sensitive optical sensor analyzes the signal reflected off the surface. In addition to detecting layers, this sensor also classifies the types of oil, identifies any other fluorescent pollutants, and locates and maps algae. The new Data Down Link system provides air to ground communications. After the flight, the ground evaluation station processes the measurement data collected during the mission into a compact, informative document.

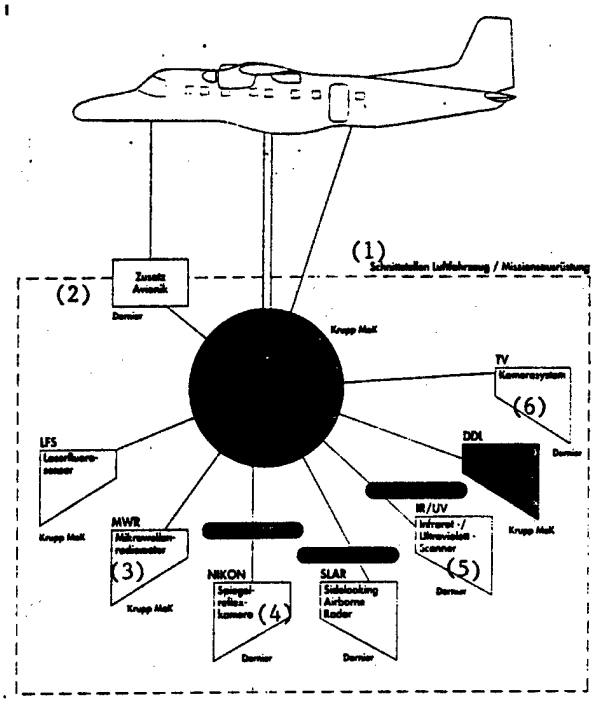

Diagram of the Measuring System for Sea Pollution Monitoring.

Key: 1. Aircraft/mission equipment interfaces; 2. Avionics input; 3. Microwave radiometer; 4. Mirror reflex camera; 5. Infrared/ultraviolet scanner; 6. Camera system; 7. Central operator station.

Research Ministry Strenghtens Wind Energy Program

90MI0351A Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German No 34, 22 Aug 90 p 7

[Text] Based on calculations by scientific institutes, the Federal Ministry of Research estimates that the FRG's wind energy potential will represent a coal equivalent of 1.5 million tonnes by the year 2000. This would be about one percent of current electricity production in the Federal Republic. After hydroelectric power, wind power is the renewable energy closest to the primary energy sources from the economic point of view. The Federal Ministry of Research and Technology (BMFT) estimates that electricity generating costs of 20 pfennigs/kWh can be achieved using medium-sized 100 to 300 kW capacity plants of windswept locations on the coast or on offshore islands. Dr. Riesenhuber stressed in Bonn that every kWh of electricity generated by wind energy meant that the environment would be spared about one kilogram of carbon dioxide. He announced that the target of the major experiment "100 MW Wind," launched last year to develop new plants reaching an overall output of 100 MW within five years, will be stepped up to 200 MW from the middle of next year.

ITALY

1991 Environmental Funding Program Outlined

90MI0372A Milan ITALIA OGGI in Italian
20 Sep 90 p 19

[Text] The Ministry of the Environment has several good intentions for 1991. Numerous initiatives are being planned by Environment Minister Ruffolo for the coming year. Expenditures are estimated to be approximately 1.395 trillion lire, of which 62 billion 20 million lire for the current account and 1.334 trillion lire for the capital account.

The most immediate initiatives include creating a protected areas system that will cover at least 10 percent of the Italian territory, salvaging and preserving the quality of water resources, differentiated garbage collection, new waste disposal plants, and reclaiming polluted areas. Other projects include: reducing air and noise pollution, launching a national scientific and technological research project for the environment, and setting up an environmental data base. All this will cost approximately 1.4 trillion lire, that is 32 billion more than the previous year. Current account expenses will be reduced in 1991. As far as the capital account is concerned, a large portion of the expenses will go to reducing air and noise pollution in urban areas (500 billion lire), operations designed to reduce the amount of pollutants discharged into the Adriatic sea (464 billion lire), and the development of projects to reduce pollution (300 billion lire).

Other investments will go to Sardinia, and in particular operations designed to safeguard the metropolitan area of Cagliari (30 billion lire) and a program for the protection of the hydrogeological area of the Flumendosa basin (30 billion lire).

The Ministry's liabilities remain high in any event and are estimated to exceed 1.463 trillion lire as of 1 January 1991. However, Ruffolo's balance-sheet does boast a reduction in liabilities in comparison with last year (when they came under the item "transfers"). Therefore, the Ministry will be able to spend 2.859 trillion 608 million lire in 1991. In addition, the budget briefly illustrates the Ministry's projected expenditure for the 1991-93 three-year period. The indications, as provided for under current laws, show a decrease in projected spending: 1 .024 trillion lire for 1992 and 376 billion 60 million lire for 1993.

Titanium Dioxide Plant Recycles Carbon Dioxide

90MI0359A Milan ITALIA OGGI in Italian
15-16 Sep 90 p 19

[Article by Paolo Rossi Castelli: "Carbon Dioxide Becomes A Liquid. And Profitable"]

[Text] Carbon dioxide flows from the yellow and blue pipes of a chromium-plated pump, similar to a gas pump. It is liquid and extremely cold (-25 degrees). Touching it means "losing" several layers of skin. However, nobody at the Tioxide plant in Scarlino comes into direct contact with this substance, the number one suspect in the trial against the greenhouse effect. Since those ice-cold pipes are connected directly to the tanks of large trucks, the Tioxide plant no longer emits even a single molecule of carbon dioxide (CO_2 for insiders) into the atmosphere.

In its natural state, CO_2 is a gas but the Tioxide company prefers to liquify it (by lowering its temperature and increasing pressure) for more convenient transportation. All of us emit carbon dioxide when breathing, but this colorless and apparently harmless gas is also produced in large amounts by cars, factories, and heating systems. Until recently it was even emitted from the tall smokestack of the Tioxide company which is located just behind a long beach in the Maremma district. The plant which is unique in Italy and produces titanium dioxide (an indispensable substance to paint any object white), also emits carbon dioxide as an undesired element. Now however, with an exceptional system all the carbon dioxide is captured, purified, and sold to whoever needs it: primarily to producers of mineral water and soda water, but also to freezer companies (who use CO_2 to obtain low temperatures) and companies treating liquid waste. The new "carbon dioxide devouring" machine, has made Tioxide one of the least polluting companies in Italy. This is an impressive record for a company which had been considered a negative industrial symbol until 1988, due to the tonnes of red sludge that were discharged each day into the depths of the sea, off the Corsica coast.

The president and managing director of Tioxide S.p.A., Franco Ceccherini, explained: "The present achievement is not accidental of course. We have sought to introduce a new corporate approach, to demonstrate to ourselves and others that it is possible to reconcile the environment with progress. The first stage was completed with the transformation of mud into inert gypsum, which is used in the building industry or to salvage degraded areas. The second stage will begin in the next few days and involves eliminating carbon dioxide emission into the atmosphere completely. And more remains to be done."

This "turning point" has been highly acclaimed by the under secretary of the Environment, Piero Angelini, who cut the inaugural ribbon of the plant in Scarlino, yesterday. However, even the Pope made an appearance in the same factory last year to make an appeal in favor of a "morally acceptable" coexistence between man-made machinery and nature.

Tioxide's plant has a production capacity of 20,000 tonnes of liquid CO_2 a year, which could reach 40,000 and even 60,000 when working at full capacity. There are only two other similar plants in the world, one in the United States and the other in Yugoslavia, but much smaller and for the most part experimental. The plant cost 4 billion lire (the complete operation however

required 38 billion lire) and practically operates by itself under the supervision of two technicians.

To implement this new facility, three leading companies in the sector (Siad, Igi, and Samac) established the new Anidride Carbonica Srl company, which receives CO_2 from Tioxide directly through a long pipeline and makes it marketable. "We are certainly not fooling ourselves into thinking that we can eliminate the 20,000 tonnes of CO_2that Tioxide delivers us annually from the face of the earth," Siad's assistant managing director, Giangiacomo Caldara stated. "A good half of this gas will be added to mineral water or used in freezing plants and from there it will be released into the atmosphere again. However, at least a part of it will 'die' by chemically binding itself to some other substance. In any case, we will have contributed to slowing down the extraction of natural carbon dioxide from the bowels of the earth."

Approximately 50 percent of the CO_2 currently used in Italy for industrial purposes (140,000 tonnes a year) is of natural origin, but is mixed with undesired substances when extracted from the subsoil. The remaining 50 percent is obtained as a by-product of petrochemical processing. This, however has certain disadvantages. "We suspect," Caldara explained, "that some months ago Perrier was 'betrayed' by polluted carbon dioxide rather than polluted stratums". The water was not polluted but rather the bubbles contained hydrocarbon residues.

Plastics Recycling Plant Established

90MI0358A Milan ITALIA OGGI in Italian 15-16 Sep 90 p 20

[Text] The environmental research center and plastics recycling plant of Monteco, a Montedison group company, will be inaugurated in Ferrara today. The goal of the research center is to identify and analyze traces of pollutants in the various environmental substrates and waste. The Ferruzzi group assure that this facility, which was established because of the production requirements of its sister company Montedipe, will become increasingly useful for the national chemical industry's environmental policy. The company will therefore provide research, know-how, new technologies and management assistance to other users, particularly the public sector. Monteco's interests also include a greater attention to environmental damage, primarily in the Po Valley, the Po and its basin, as well as the Adriatic coast. This has resulted in the establishment of a new laboratory for micropollutants.

As far as the plastics recycling plant is concerned, for which the initial investment was 5 billion lire, it is now ready to enter into operation. Its tasks will include identifying the most suitable procedures for the treatment of various recycled materials (urban waste, car scraps, electric household appliances, furniture). Furthermore, treated materials will be tested and suggestions will be made for the most suitable applications of the recycled products. The goal of the initiative is to encourage recycling.

NETHERLANDS

Wind Energy Program Strengthened

90AN0387A Antwerp DE FINANCIEEL-EKONOMISCHE TIJD in Dutch 24 Jul 90 p 8

[Article: "Concern for Environment Gives New Impulse to Windmills in the Netherlands—Government Wishes To Reach 1,000 Megawatts by Turn of Century"]

[Text] Amsterdam (Reuter)—Recently, more and more windmills have been appearing in the Dutch landscape. They do not, however, resemble the picturesque wooden windmills for which Holland was famous for over 600 years. Instead, they are streamlined metal structures. The Netherlands is currently working on the largest wind-energy program since sails were replaced by steam and internal combustion engines.

Windmills owe their popularity to their ecological character: They do not contribute to the greenhouse effect because they generate electric power without fossil fuels. The traditional windmills, which were used mainly for drainage purposes, determined the appearance of the Netherlands to a great extent. Their modern counterparts have much smaller impact: Experts believe that even in the windy Netherlands, they can only be used as a complement to other sources of energy.

However, as the Dutch government is now subsidizing 40 percent of the installation costs of wind turbines, wind turbine capacity is expected to more than double this year. Ad van Wijk (University of Utrecht) confirms that a lot of new windmill fields are presently under construction thanks to the incentive program. He estimates that total wind-energy production in the Netherlands will increase from 40 megawatts at the end of 1989 to 90 megawatts in early 1991 and to as many as 400 megawatts in 1995.

The government's objective is to reach 1,000 megawatts by the turn of the century. According to the Association of Electricity Companies (SEP), this wattage will replace only 200 megawatts of conventional power because of the irregular availability of wind. Existing power stations can generate up to 15,000 megawatts a year.

High Cost

Recently, oil prices were at their lowest level since 1973, making wind energy a comparatively expensive alternative. One kilowatt-hour of electricity generated by wind energy is believed to cost 0.16 guilders, whereas the cost of conventionally generated power amounts to 0.07 guilders, which is less than half. Yet, advocates of wind energy argue that the difference in price is much smaller

when taking into account the environmental costs. Furthermore, technical improvements are gradually making wind energy less expensive. Van Wijk estimates that the price for 1 kilowatt-hour of wind energy will drop to 0.12 guilders by 1995, while that of conventional electricity is to go up by 0.05 guilders if the carbon dioxide emission rate is to be reduced by 95 percent. According to scientists, carbon dioxide and other gases tend to retain heat in the atmosphere, thus contributing to the greenhouse effect.

Over the next 4 years, the Netherlands seeks to stabilize the carbon dioxide emissions. To achieve this, it is investigating the introduction of dissuasive taxes. "The warming up of the earth is a new item on the agenda," declared Leslie de Zilwa, chairman of the Ijsselmij, the largest Dutch producer of wind energy. In his opinion, not only capital and fuel costs must be taken into account, but also the social costs (the cost for ridding the environment of carbon dioxide and other gases). The Ijsselmij intends to build 25 new turbines, each 30 meters high, at its windmill field in Urk. The turbines, which generate 300 megawatts each, are supplied by WindMaster Nederland, a subsidiary of HMZ from Sint-Truiden.

"There are numerous surveys which provide ample proof that the potential for wind energy is far greater than the assumed 1,000 megawatts: 3,000 or 4,000 megawatts is definitely within the bounds of the technical possibilities," says Frans van Hulle from the Dutch Association for Wind Energy. However, there are also some opponents to wind turbines: They feel that, clean though wind energy may be, the wind turbines are ruining the landscape. That problem could be solved by building fewer but taller turbines, which generate more power per square meter and are less damaging to the landscape. The average power generated by the 400 or so wind turbines which are presently in operation in the Netherlands is only 100 kilowatts, compared to 250 to 500 kilowatts for the newer models. Elsewhere in Europe (for instance at HMZ in Sint-Truiden) experiments are being performed with installations producing 1,000 kilowatts or more. Near the Scottish Orkney Islands, there is even a wind turbine capable of generating 3,000 kilowatts.

SWITZERLAND

Martigny Water, Soil Pollution Dispute Detailed

90WN0302A Lausanne L'HEBDO in French
6 Sep 90 p 20

[Article by Philippe Barraud: "Ecology's Lapses"—first paragraph is L'HEBDO introduction]

[Text] It is war at the Vorziers site in Martigny. At stake is the cleanup of industrial land packed with heavy metals and stray hydrocarbides. The state is watching from a distance....

With 40 years of factory work, from 1935 to 1975, to his credit, it is understandable that Frederic Gay-Balmaz had tears in his eyes as he walked the virtually bombed out site where the industrial complex of the Nitrogen Products Company [SPA] once stood. The location is Vorziers, northeast of Martigny. The worker's memory is excellent. He recalls precisely each building, the products made there, and the incredible risks run by workers in the French-financed company, which came to Martigny because electricity was cheap. The story of this company that respected neither its workers nor the environment, has something Zolaesque about it. From 1907 to 1972, the SPA filled neighboring ponds with every kind of, as even the experts call it, "filth." The residues of its various products include lime cyanamide (fertilizers), lime, carbide, nitrogen phosphate, sulfuric acid, and nicotine (insecticides). Found among the waste products are sodium carbonate, soda lye, sulfuric acid and active lime, lead (5.5 metric tons), copper (50 metric tons), sodium sulphate, cadmium sulphides, thallium (4.4 metric tons), arsenic (7.3 metric tons), zinc (10 metric tons), and mercury (70 kg). Besides these truly dumped substances, the ground under former buildings has been polluted in various ways, essentially by fuel oil. To make matters worse, the entire area is located on a groundwater table. The latter is not used for drinking water, but for watering gardens and doing dishes. Or rather, was used: the Cantin family, which drew from it for years, has stopped. Complains Mrs. Cantin: "For the last several months, it's been the color of gasoline! Oily, disgusting." Commune officials came and took samples, but have not been heard from since.

Martigny commune had the laudable intention of allocating this newly vacant land to cottage industry and residential use. It therefore signed a preemption act with the land's owner, Rene Thommen, in Bettingen, then relinquished the site to four of the neighborhood's manufacturers: Daniel Fournier, Bompard Ltd., Martinetti Brothers, and Marti Materials Ltd. The administrators of these companies are all radical persons of note, close to the president, Pascal Couchepin. Daniel Fournier is president of Dorenaz, while Gabriel Grand (Bompard Ltd.) is deputy. In exchange, the industrialists promised to vacate the land they occupied with their plants in the Bourg. The commune meant to allocate those lands, advantageously located at the southern entry point of Martigny, to housing and beautification. Nothing out of the ordinary in that, if one overlooks an episode that superbly demonstrates the really prodigious flair of the businessmen: the Fournier and Martinetti companies had been renting the land they occupied in the Bourg for quite some time. Suddenly, in 1988, they bought it for less than 2 million Swiss francs. Their hunch was admirable: a few months later, the Martigny commune rezoned the land for construction, and our entrepreneurs promptly resold their property, pocketing a handsome profit of 7 million. Admittedly a perfectly legal, but morally lackluster, operation.

There is undoubtedly immanent justice however, even in real estate transactions. The lands purchased in

Vorziers—the former factory—predictably proved to be partly unuseable in the short term because of ground pollution, which will have to be cleaned up. And that is where things took a dramatic turn: In a sinister setting of land turned upside down and reeking of former factory oil—the whole thing is reminiscent of a Bilal story—a battle is raging. Scientists, politicians, civil servants, lawyers, and ecologists are mercilessly waging war on one another, in an explosion of criminal lawsuits, appeals, analyses, and second expert opinions, not to mention personal attacks and private disputes.

The president of the Environmental Protection Society (SPE), National Council member Rene Longet, is denouncing the irregularities he alleges took place on site. Basing his case in particular on the expert reports of an Octodurian geologist, Daniel Kissling, he is condemning the lack of precautions taken during demolition of the factory, followed by the mixing of polluted soils during ground exploration. In Daniel Kissling's opinion, "because of a total lack of knowledge of the methods to be used in this very special case, an unreasonably large amount of work was done (....) Now, not only is it impossible to treat the whole area as one unit, but the stirring up of the sediments (....) has increased the risks of detergent pollution due to rainwater." In another report, the geologist tears apart the impact study done at the request of Martigny commune by the Tissieres engineering office, which controls the Vorziers cleanup. According to him, the study, ridden with gaps and failing to fulfill its mandate, obscured the problem of the demolition area—obviously primordial. Events have proved him right: significant heavy oil pollution was discovered around the well for pumping water to cool the machines. Contrary to what Pascal Couchepin stated on last 12 August, it is not "a few liters" of fuel oil, but much more—hydrocarbons in old underground pipes, for which no blueprint exists. "We are in perfect control of the situation," retorts Gilles Wust, an employee at the Tissieres Office in charge of the pollution. "I dig until there are no more hydrocarbons, and the soil removed will be treated. And the commune has not imposed any spending limits." Pascal Tissieres defends his impact study, describing the expert second opinion of Daniel Kissling as a "pack of lies" motivated by "a desire to do harm."

According to Rene Longet, the arbiter should be the cantonal Environmental Protection Department. But the latter, he says, is not doing its job: "It protects industry instead of the environment." The department, which is at the heart of the debate, is accused of systematically employing delaying tactics, yielding to the jobs blackmail of industry, and confining itself to a policy of information lockup. There is the Martigny affair, but also that of Saint-Maurice's Bois Homogene Company, another eloquent example. Since 1986, the company has been granted successive stays in the requirement that it obey a clean-air ordinance. Today, to the great disappointment of neighbors and ecologists, air pollution is continuing apace, despite a decline.

Confronted with the Environmental Department's inertia, Rene Longet has alerted the Federal Environmental Office several times, asking that it straighten out the situation. He is seconded in that initiative by the Sedun attorney, Alain Cottagnoud, one of whose clients living in Vorziers was the target of intimidation tactics by Martigny industrialists who tried to have him evicted.

Though the cries for help are stacking up on the desk of the Federal Office—which stubbornly insists it is "examining the matter"—the Valais administration is bracing itself. It is even experiencing some surprising lapses: The entrepreneur Daniel Fournier was able to demolish existing buildings on his lot, then rebuild his factory, totally illegally. His permits were not "effective" as required in Valais. Despite opposition, formal notices from the state, and complaints, Daniel Fournier blithely continued work. A curious attitude for a commune president, and strange inertia on the part of the state, so prompt to crush the simple citizen who carves out an unauthorized skylight. "I've never seen anything like it," storms Mr. Cottagnoud. "Are we really living in a state ruled by law?"

Officials at the Environmental Department deny any opposition to change: "We are the ones who first noticed the problem!," protests Francois Veuthey. He points out that his department was the first to alert Martigny commune about possible pollution of the groundwater table and to request soil analyses. He also rejects charges of negligence, and asserts: "We practically defined cleanup methods." The chemically dumped soils could be left where they are, provided lateral protective measures were taken, an airtight cover was placed, and a system for monitoring the table was set up. What is sure, in any case, is that the Environmental Department is having real existential problems—on whose side is it?—and still has a long way to go in communicating with the public and ecological leagues.

The final question to be solved in Martigny is who will pay for the Vorziers cleanup: The state will have none of it, since the law stipulates it must eliminate "movable" waste dumped by unknown parties. Since this is not the case in Martigny, the new owners of Vorziers will have to dip into the till. It will cost a great deal, but much less than the magnificent capital gains made from the sale of the Bourg lands....

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