

Seismic monitoring

Private diplomacy emergent

Washington

A REMARKABLE agreement signed last month would permit a team of US and Soviet seismologists to establish a seismic monitoring station within 200 km of the Soviet nuclear test facility at Semipalatinsk. What makes the agreement all the more unusual, and contentious, is that it was not signed by representatives of the US government.

The agreement came out of a series of meetings between representatives of the Natural Resources and Defense Council (NRDC), a private non-profit organization devoted to protecting the environment, and the Soviet Academy of Sciences. Adrian DeWind, NRDC's board chairman, and E.P. Velikhov, vice-president of the Soviet Academy, signed the agreement in Moscow on 28 May.

Under the agreement, six monitoring stations would be established, three in the Soviet Union near Semipalatinsk and three near the Nevada test site in the United States. All data recorded will be made available to both the US and Soviet governments. NRDC will pay all the travel expenses involved in the project and will take responsibility for obtaining the necessary seismological equipment. DeWind estimates that NRDC will have to raise \$500,000 to get the project off the ground. It hopes to establish the first listening post in the Soviet Union by the end of this month, with two more to follow in the fall. The US monitoring posts will be established only when the Soviet posts are in place.

Thomas Cochran, a physicist on NRDC's senior staff, says the idea for the agreement came from discussion last January on the monitoring of US explosions whose occurrence is not made public. Cochran and his colleagues at NRDC felt that monitoring only the Nevada test site might be regarded as "giving away state secrets", so he devised the bilateral plan.

Although the monitoring sites may provide information about the local geology of the Semipalatinsk region useful for evaluating yields of Soviet nuclear tests, that is not the point of the exercise. Rather, says Cochran, it is to show the feasibility of on-site seismic monitoring, proving that verification is not an obstacle to a test-ban treaty. The Soviet Union is currently observing a self-imposed moratorium on tests, but that may expire on 6 August.

Before the plan can go forward, NRDC must obtain export licences for the seismic equipment. A State Department official said last week that no decision had been made on NRDC's request for a licence, but that the agencies responsible for tech-

nology transfer issues were considering it. NRDC plans to purchase off-the-shelf equipment for the monitoring stations, according to Charles Archambeau of the University of Colorado who acted as a consultant to NRDC. If the export licences are not granted, Archambeau says the project could still proceed using Soviet-built equipment. But Archambeau says that Soviet equipment is not as sensitive as that from the United States, nor is it digital, making data acquisition and analysis more difficult.

Critics of the agreement believe that it will serve only as a propaganda weapon for the Soviet Union. Misha Tsytkin, Salvatori Fellow in Soviet Studies at the Heritage Foundation, a conservative think-tank, argues that the Soviets are adept at manipulating foreigners to serve Soviet goals. Tsytkin believes that NRDC was "irresponsible and out of order" to proceed with such politically sensitive negotiations off its own bat, without government participation or approval. Archambeau concedes that NRDC's plans may undercut current US government positions on arms control. But according to Cochran, something was needed to "get some movement in the arms control arena".

The agreement comes at a time when the United States has announced it plans to end its observance of the unratified SALT II treaty later this year. The government believes that Soviet unwillingness to abide by the terms of the treaty makes it impossible for the United States to do so. But efforts are under way in Congress to force US compliance with the treaty by eliminating funds for projects that would violate its terms; these are unlikely to succeed, however. Supporters of the Soviet test moratorium are also planning to introduce legislation stopping US nuclear testing, although these efforts also face an uphill struggle.

According to a State Department official, the NRDC agreement "may be encouraging" to the extent that it represents a change in Soviet attitudes on verification of the Threshold Test Ban Treaty, which the United States believes the Soviet Union has been violating. But the State Department believes that negotiations that could have such a great impact on arms control and national security should be conducted only between governments.

Frank Press, president of the National Academy of Sciences, sees the NRDC agreement as an "extraordinary event", but says it is too soon to judge its implications. "Arms control has never been a private sector activity before... When books on arms control are written, this will certainly be included." **Joseph Palca**

Soviet industry

Reformers get the wrong man

IT seems that Mr Mikhail Gorbachev's drive to make Soviet industry more efficient is not without its hitches. Last month, none other than the Central Committee of the Communist Party of the Soviet Union intervened to demand the reinstatement of a person who had earlier been wrongfully demoted from his managerial post at the Irbit Chemical and Pharmaceutical Plant.

The Central Committee's special decree dealing with the state of affairs at the plant is revealing. The plant is supposed to produce high-quality supplies for the Soviet medical services, but is run-down, behind in its modernization programme and provides no scope for the development of new ideas and products. These are precisely the conditions condemned by the plenum of the Central Committee held in April 1985.

The Central Committee now says that, instead of trying to rectify these conditions, the director of the plant, with the support of the local party organization, deprived a certain Vadim Bakharev of his post, in charge of production unit Number 2, on the grounds that "he had ignored the opinion of working teams", shown "crudeness" in dealings with his subordinates and had "consistently failed to fulfil his work obligations". Bakharev accepted his transfer to the lower grade of engineer only because of the threat that he would otherwise be dismissed outright.

Bakharev was demoted on 4 December last year. How and when the higher echelons of the party learned what was going on is not clear, but, on 20 April, the newspaper *Pravda* carried a long account of the affair which claimed that, far from being responsible for the shortcomings at the Irbit plant, Bakharev was a lone hero who had fought neglect and inefficiency, and who had been victimized for his zeal.

According to *Pravda*, Bakharev had in reality combined two previous production units together so as to cut costs by 75 per cent and increased labour productivity by 98 per cent (partly by eliminating 36 jobs) at a saving of 300,000 rubles a year. It was not Bakharev but the plant managers who had "ignored the opinion of the working teams" by demoting such a paragon.

A month later, the Central Committee pronounced. The Ministry of Medical and Microbiological Industry was instructed that Bakharev's demotion had been unjustified, and that he must be reinstated forthwith. The ministry was also told to put matters at the factory right, modernizing and re-equipping the production lines and improving the working and living conditions of the workforce. The party

secretary at the plant has been relieved of his post and other officials disciplined.

The Irbit factory is important in the Soviet Union's plans to build a sophisticated pharmaceutical and specialist chemical industry, and should be at the leading edge of the government's new drive for modernization. The intervention of the Central Committee, and the attention it has been given, may be intended as a warning to plant managers elsewhere that they had better put their affairs in order before the drive for modernization gathers momentum and that a random selection of scapegoats will not suffice.

Vera Rich

AIDS research

New foundation begins work

Washington

SUPPORT for research into acquired immune deficiency syndrome (AIDS) has received a shot in the arm from the American Foundation for AIDS Research (AmFAR). The new foundation handed out 20 grants totalling \$1.1 million, mostly for basic research on the biology of the virus associated with AIDS, with a smaller number for drug development and epidemiology. AmFAR's scientific advisory committee was looking primarily for projects demonstrating "fresh ideas", according to a spokesman for AmFAR.

The 20 projects receiving grants were chosen from 146 applications. The maximum \$60,000 grant is not intended to sustain a major research effort, but will instead provide start-up money for new projects.

AmFAR came into existence last September when the AIDS Medical Foundation, based in New York, merged with the National AIDS Research Foundation of Los Angeles. Actress Elizabeth Taylor serves as AmFAR's national chairman, and has been an active force in fundraising. In future, AmFAR hopes to move its financial base away from special fundraising events to long-term commitments from corporations and philanthropic foundations.

Although the \$1.1 million offered by AmFAR is only a small fraction of the \$233 million AIDS budget of the US Public Health Service, there is always enthusiasm for a new source of funds. "Any branch I can shake for support is marvelous," says Murray Gardner of the University of California at Davis, who received a \$60,000 grant from AmFAR to study the structure of the envelope protein of the AIDS virus.

AmFAR can also move more quickly than the federal government. It solicited proposals in January, and made decisions on them just 4 months later. **Joseph Palca**

Rice breeding

Manipulation of cereal succeeds

Tokyo

THE basic techniques for the genetic engineering of rice have been developed in research institutes in Japan. Several laboratories are racing to draw the techniques together so as to be the first to produce a genetically engineered rice plant. The development is important not only because genetic manipulation has so far been mostly confined to dicotyledonous plants but also because rice is the staple food of half the world's population.

The transfer of genetic material into cereal plants has hitherto been held up because they cannot be infected with the *Agrobacterium* species which have provided a simple route to the transfer of genes in dicotyledonous plants. But two new developments have given rise to optimism that genetic manipulation of rice will be possible in the near future.

The regeneration of whole rice plants from protoplasts (single rice cells stripped of their cell wall) is one way. Success has just been reported in print by Professor Yasuyuki Yamada's group at the Kyoto University Research Center for Cell and Tissue Culture (see *Plant Cell Reports* 5, 85; 1986). Two industrial laboratories, a joint laboratory run by Mitsubishi Chemical and Mitsubishi Corporation and Mitsui Toatsu's research laboratory have also described regeneration techniques at research meetings. Each group has its own method and it is too early to know which will prove most practical.

Yamada can regenerate tissue from protoplasts by the simple trick of adding calf serum, commonly used in the culture of animal cells, to his medium; after all, he says, a "plant protoplast is almost the same as an animal cell".

From one culture cell line, Yamada has been able to produce calli (undifferentiated tissue) from 10 per cent of protoplasts, many of which formed roots and shoots and developed into whole plants when transferred to regeneration medium. Although other strains produced calli, only one regenerated whole plants and there is evidence that the adult plants, now out in pots and the fields, are not entirely normal. Further work may thus be needed to make the regeneration method of general use.

The Mitsubishi group, led by Dr K. Shimamoto, appears to have had much broader success. It has successfully regenerated whole plants from protoplasts of five different genotypes, two of them major commercial cultivars. More than 300 plants have now been regenerated, and of these 120 are now growing in paddy fields. They can later be studied in detail for differences from the parent stock.

The innovations behind the Mitsubishi

group's success is that, instead of making protoplasts from rice cell lines maintained for a long time in culture, they have induced calli from rice seeds. The protoplasts so produced are "young" and have strong morphogenic potential. In the past, this approach has not been favoured because cells in fresh culture from seed do not divide — overcoming this obstacle is the secret of Shimamoto's method.

The second group of advances, for the transfer of foreign genes into protoplasts, has also very recently been reported, and depends on the observation that protoplasts prepared from cultured callus cells and treated with polyethylene glycol will take up foreign DNA. Dr Uchimiya's group at the University of Tsukuba has successfully introduced a chimaeric gene containing an antibiotic resistance gene in experiments of this kind. He was not, however, able to regenerate plants from the transformed cells.

With both regeneration and transformation proved possible, the race is now on to "put both techniques in one hand", as Uchimiya says, and to produce the first genetically engineered rice plants. Judging from reports from the five or so laboratories carrying out similar work, the winner should be declared fairly soon.

The question remains of what useful application can come from the research. In theory, the potential is vast, for rice is the major source of carbohydrate for almost half of the world's population. But rice has been intensively improved by breeders for almost a century, while large increases in production can be expected in the poorer countries of Asia simply through extending irrigation. This makes Japanese companies wary about investing heavily in rice research, for even now rice can be grown in Japan only by maintaining an artificial price several times that of the world market.

Early on, genetic engineering may be used to make things easier for the conventional breeder. Male sterile lines, valuable in breeding new strains of rice, are hard to produce by ordinary methods but should be easily made by protoplast fusion. One protoplast carrying the cytoplasmic male sterility factor but with its nucleus inactivated can be fused with the desired strain of rice.

In the longer term there are the possibilities of transferring genes from other cereal crops that seem to perform more efficiently, introducing viral resistance genes and altering genes to improve the quality of the seed protein. Again, there are ten wild species of rice which present an almost untapped reserve of genetic variability. Protoplast fusion will make it accessible. **Alun Anderson**