

US/Canada acid rain

Envoys' compromise in dispute*Washington*

A JOINT report on acid rain by US and Canadian special envoys met mixed reactions when it was delivered to the two governments last week. In Canada, there was a cautious welcome for the recognition that acid rain is a serious problem and that scientific knowledge is adequate to assess the effects of control strategies, but disappointment that no specific programme to reduce acid emissions was recommended. In the United States, President Reagan called the report a "step forward" and undertook to study it "carefully", but he avoided endorsing the principal recommendation that the US government should support half the cost of a \$5,000 million programme to demonstrate new coal-burning technologies that minimize acidic emissions.

A Canadian government spokesman said that the report had "brought the acid rain question into the political arena, where it will be solved". Canada, whose tourism and fishing industries stand to lose from damage to lakes and forests, has long held that the scientific evidence justifies measures to reduce emissions from the tall stacks which are the principal sources of long-range pollution. Provincial governments in eastern Canada last year agreed with the national government that they will be responsible for reducing emissions of sulphur dioxide by 50 per cent by 1994. Automobile emissions of nitrogen oxides have also recently been brought into line with the more stringent US standard of 1 gram per mile. The US government, in contrast, has so far refused to acknowledge a link between acid emissions and environmental damage.

Richard Ayers, a lawyer for the Natural Resources Defense Council, says the report is a political compromise which nevertheless allows the utilities to delay action for another five years — well worth \$2,500 million. But a more pessimistic view was offered by Adele Hurley of the Canadian Coalition on Acid Rain, who does "not expect to see the money".

The two special envoys, Drew Lewis (United States) and William Davis (Canada) were appointed last March to try to avoid a political impasse over the issue. There is no question that far more acid emissions find their way from the United States to Canada than in the opposite direction. The envoys say in their report that "it is very clear there is a solid link" between acid precipitation and emissions of acidic gases. Although clean-air legislation enacted in the United States in the early 1970s has improved ambient concentrations, long-distance transport (a result of tall smokestacks) has not improved.

The most widely used method of reduc-

ing emissions from existing plants, the scrubbing of flue gases, is expensive and produces enough waste to be a problem in its own right. New technologies that burn coal with increased efficiency and remove sulphur during combustion rather than afterwards, such as combined cycle gasification and fluidization bed combustion, offer a cheaper way to remove pollutants, but utilities say that they cannot be expected (because their tariffs are regulated) to risk huge sums on unproven technologies.

Meanwhile, the electricity utilities welcome the contention of the Lewis/Davis report that present scientific evidence is insufficient to justify "punitive control". Industry spokesmen point out that utilities have already voluntarily spent \$500 million on research into clean coal technology over the past 5 years, to be followed by another \$500 million over the next 5 years.

The utilities' support for the envoys' recommendations is not altogether surprising because, if adopted, the recommendations would ensure that the US government pays half the cost of technology demonstration projects. The US Congress at the end of last year put \$400 million into clean coal technology, but the industry has undertaken to spend up to \$2,100 million if it gets a promise of support.

Some who have studied acid rain are less happy about the Lewis/Davis assessment that technology demonstrations are what is called for. David Schindler, who

chaired a study on acid rain for the National Academy of Sciences in 1981, said he was "disappointed" that immediate control measures were not recommended and that the report concealed its true purpose of delaying action. Schindler said the evidence implicating sulphur dioxide in the acidification of lakes was "clearly strong enough" to support immediate action and stronger than the evidence on which the use of phosphorus in detergents was banned in the 1970s because of its effects on the Great Lakes.

Jack Calvert, of the National Center for Atmospheric Research, who chaired another National Academy study, said he had hoped the Lewis/Davis report would recommend a reduction in emissions from some of the major polluters in Pennsylvania, West Virginia or Ohio, so that actual effects could be observed and an informed decision taken on whether further controls are likely to be effective. Calvert applauded the report's support for greater efforts to monitor acid deposition, especially dry deposition, which is still not monitored systematically.

Whether the special envoys' work will lead to an easing of tensions between the United States and Canada over acid rain will now depend on the US administration's response to their recommendations, which include the setting up of a joint committee with a US cabinet-level representative.

The issue will be a "priority topic" at a meeting to be held in Washington in March between President Reagan and Canadian Prime Minister Brian Mulroney.

Tim Beardsley

Fusion research**US, Europe, Japan collaborate**

IN an agreement signed yesterday (15 January), the United States, Europe and Japan, traditionally rivals in the search for economic energy from nuclear fusion, formalized a programme of enhanced cooperation in this direction. The agreement, signed at the Max-Planck-Institut für Plasmaphysik at Garching, Munich, commits scientists from the three programmes to hold regular trilateral workshops, to exchange basic data and experimental plans, and also personnel and equipment.

All three programmes are tokamak machines in which ionized hydrogen trapped in a toroidal container by magnetic fields may be heated to temperatures and densities sufficient for fusion reactions to occur. Basic heating is provided by passing a current through the torus, treating the plasma as a secondary winding in a transformer. But supplementary heating is required and, at all three tokamaks, is provided by a combination of high intensity radio waves generated from antennae in the torus walls and the injection of neutral

atoms at high energy.

Present interest at all three tokamaks is in the development of the supplementary heating systems; the problems of magnetic confinement and heating seem to have been solved. The heating system for Japan's JT-60 tokamak is expected to be working by next December, while at the Joint European Torus (JET) at Culham in Britain, the first stage of radio heating has been tested and neutral beam injection is about to be installed. Princeton's Tokamak Fusion Test Reactor (TFTR) is to embark this week on a lengthy experimental run.

According to Donald Grove of TFTR, the new agreement should make the three programmes more productive. "From now until the international fusion conference in Kyoto next November, the three tokamaks are on essentially the same footing", he says. It is hoped TFTR will achieve break-even in energy production, by means of deuterium fusion, by 1987.

Philip Campbell