



Canada Hosts International Workshop on Seismic Data Exchange

The following article is based on a report prepared by the Department of Energy, Mines and Resources.

Data communications experts from 17 countries met in Ottawa on October 6-8, 1986, to discuss the problems involved in the rapid exchange of digital seismic waveform data. This workshop, jointly hosted by the Arms Control and Disarmament Division of External Affairs and the Geophysics Division of the Geological Survey of Canada (Energy, Mines and Resources), was conducted in support of the activities of the *Ad Hoc* Group of Scientific Experts (GSE) of the Conference on Disarmament, which meets twice a year in Geneva.

Agreed arrangements for the international exchange of seismic data would be needed to verify a complete ban on nuclear testing. The mandate of the GSE, established in 1976, is to define the characteristics of a system that would provide such data exchange with a reliability and speed acceptable to all parties to a comprehensive test ban treaty. This would include the establishment of international data centres that would collect and analyze such data. The United States, the Soviet Union, Sweden and Australia have offered to operate such data centres. The centres would not attempt to determine the character (earthquake or explosion) of a particular seismic event, but would provide its time and location together with other information required for such characterization, including event depth, spectral content and waveform complexity. This information would be made freely available to interested states who could then draw their own conclusions.

The data to be exchanged under this proposed international monitoring system fall into two distinct categories. The first, known as parameter or level I data, is provided by the country on whose territory the recording station is located from the original continuous data trace and consists of basic measurements such as the amplitude of signals



Group photo of participants from seventeen countries who attended workshop on seismic data exchange hosted by the Canadian Government.

detected. It may be either in analogue (e.g., paper) or digital form. The second is known as waveform, or level II data, which consists of the continuous data trace itself. The GSE has focused primarily on the relatively simple exchange of level I data, which consists essentially of telex-type messages. The medium chosen by the GSE for such exchanges has been the Global Telecommunications System (GTS) of the World Meteorological Organization (WMO), primarily because it reaches most countries in the world. The GSE has conducted a number of experiments using the GTS. Canada, along with more than 30 other countries, took part in the most recent of these in 1984.

The exchange of the more useful level II data has proved more problematic. For example, the volume of such data is very large and is not readily handled by a telex-based system such as the GTS. While level I data are more readily transmitted, they suffer from a major theoretical disadvantage in that they represent an interpretation by a given country of its own level II data, which

may or may not be accurate. Hence it would be preferable if the original level II data were available through the data centres for analysis by any party. Until recently, the insistence by the Soviet Union that limits be established on the provision of level II data (only a few times each year in response to specific requests) has given rise to much disagreement within the GSE and impeded progress. However, in July 1986, the Soviet Ambassador to the Conference on Disarmament stated that the USSR wished to promote the exchange of level II data on a large scale by satellite and other means. This apparent change in the Soviet position may give new life to the work of the GSE.

In February 1986, Canada offered to host the above-mentioned workshop for members of the GSE on the technical problems of level II data exchange. This proposal was received favourably by Western delegations, although it did not invoke much initial enthusiasm from the Eastern bloc representatives. (Soviet interest, however, increased after the Soviet statement in July 1986.)

Thirty communications experts from the following 17 countries attended: Argentina, Australia, Austria, Canada, Denmark, Finland, the German Democratic Republic, the Federal Republic of Germany, Italy, Japan, the Netherlands, Norway, Poland, Sweden, the USSR, the UK and the USA. The first-time participation of Eastern bloc countries in such a workshop was encouraging. The Secretary of State for External Affairs, the Right Honourable Joe Clark, and the Minister for Mines, the Honourable Gerald Merrithew, both paid a visit to the workshop and discussed the issues with participants.

The workshop focused on the problems of rapid computer-to-computer exchange of digital waveform data. The most effective way of establishing and using such connections is by the international packet-switched data networks now available in most countries. It was acknowledged that special provision had to be made for those countries, particularly in Eastern Europe, which do not yet have access to such networks.