

Canadian CD submission on non-seismic technologies significantly updated the understanding of the types of sensors and imagery available from current commercial satellite systems and how these systems are evolving. The CD should continue to examine the role of overhead imagery for CTBT verification.

A number of non-seismic technologies and their potential applications, which were included in the Canadian submission to the CD in May 1993 and the subsequent presentations, clearly have relevance to verifying a comprehensive test ban treaty. Canada will continue to support the CD in its exploration of these methodologies and consider making further submissions on selected ones in the search for an effective, yet affordable, verification regime.

Clearly, in 1993 the understanding of the performance and design requirements of a seismic network has advanced considerably through the work of the GSE and the active contributions of its individual participating states. The 1992 verification conference in Montebello, Quebec made a particularly significant contribution in this regard. Major gaps in knowledge remain, however, and these relate to:

- a) assessments of effectiveness;
- b) detection standards;
- c) other design parameters; and
- d) cost, including cost-effectiveness.

The GSE will need some direction from the CD on these matters if it is to move to fill these knowledge gaps as it proposes to do through testing the concept by January 1995.

The Canadian submission to the CD in May 1993, and subsequent presentations, sought to fill some of the information gaps, both with regard to chemical detection from the air and at ground level, and with regard to the other technique of surveillance of atmospheric radionuclides. In both of these cases, much work needs to be done to determine performance capabilities, effectiveness and cost parameters. Much of the required information, however, could only be obtained from countries that have conducted nuclear tests. One of the reasons for the Canadian submission and presentation in May was to attempt to prompt countries that have, or could get, the information to do so and share it with others.

In sum, the Swedish text puts down the appropriate markers with regard to air-borne sensing and inspection, and to

ground-level inspection. The operational parameters will need, however, to be further explored through trial inspections and more detailed consultations with knowledgeable experts.

It is important to utilize to the maximum extent what we have learned so far as a foundation for our continuing efforts towards achieving a comprehensive nuclear test ban treaty, as directed by the mandate of the nuclear test ban *ad hoc* committee. To accomplish this, Canada has concluded that the time has come to provide a process whereby the input of technical experts can be more productively consolidated within our substantive work on specific and interrelated test ban issues, including structure and scope as well as verification of compliance.

We have come to the conclusion that this can be best done by adding related technical strands to the existing seismic focus of the Group of Scientific Experts, as suggested by Australia on June 24. We note in particular in this context that work needs to be done on the relevance and feasibility of atmospheric radiation, infrasound and hydroacoustic monitoring. These methodologies have data collection, analysis and dissemination requirements similar to those of a global seismic network and, thus, the GSE's experience may make that body an appropriate forum for exploration of these non-seismic methods.

Of course, different technical expertise would be required to deal with these new subjects in the GSE. The GSE may also need to modify the organization of its work to accommodate these new responsibilities. In the final analysis, the GSE has been structured in such a way as to be responsive in its support of the test ban treaty negotiations.

To recap my comments:

- As an active participant in the GSE, Canada supports the role proposed in the Swedish paper for a seismic monitoring network, although a number of the parameters of the network will need further refinement as the work of the GSE progresses.
- On balance, Canada supports continued exploration in the CD of the relevance of atmospheric radionuclides monitoring for CTBT verification and the parameters of a hypothetical network for

such monitoring.

- Canada will continue to engage actively in the CD on the role of overhead imagery for CTBT verification. Absence of this verification methodology from a CTBT text would be a serious omission.
- A number of other verification methodologies, which have emerged in the past few years, clearly have relevance to verifying a CTBT. Canada will continue to support the CD in its exploration of these methodologies and consider making further submissions on selected ones.

Canada supports continued exploration in the CD of on-site inspections for comprehensive test ban verification. "Challenge" inspections, and perhaps in some special cases routine and close-out inspections, are needed for effective CTBT verification.

To conclude, it is worth emphasizing that, except perhaps with respect to work on an international seismic data exchange network, we are still in the early phase of our efforts to redefine a viable and effective verification package for a CTBT. We all recognize that the seismic data exchange network will likely form the core verification method for a CTBT. In Canada's view, other methods also have a valuable contribution to make to test ban verification.

To the credit of Sweden, its draft treaty underlines the value of using a variety of

Much remains to be done in defining a viable and effective CTBT verification package. The CD can provide useful guidance.

complementary verification methods. Operating synergistically, such a package of methods can provide the most cost-effective approach to CTBT verification in the long run. We must concentrate on constructing a verification system that will stand the test of time. It must be flexible enough to adapt to new circumstances, such as the advent of new verification requirements and methodologies. It must be resilient enough to withstand heightened political tensions; indeed, it must provide a bulwark for refuting inaccurate suspicions about violations that might exacerbate tensions. ■