

Several techniques of current IAEA safeguards inspections, including materials accounting, containment of materials to specific locations, and use of surveillance cameras and seals, would provide a baseline in monitoring a fissile materials cut-off agreement. But traditional technologies may need to be adapted and new ones developed to reflect the unique requirements of monitoring former weapons facilities, while tracking sensitive but permitted military end uses. In both cases, how to provide needed information without unacceptable loss of sensitive information or health and safety concerns will be a key issue. (This problem also arises in the related initiative of putting surplus U.S. and FSU nuclear weapons material resulting from the START reductions under IAEA monitoring.)

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Negotiations of a CTBT began on January 25, 1994, within the UN Conference on Disarmament (CD), with many issues, most particularly verification, to be settled. Verification of a CTBT will require consideration of a number of factors. The areas to be monitored are widely distributed, increased access to previously restricted areas will be needed, the potentially different nature of the tests to be monitored as well as the possibility that a potential proliferator will test: all need to be reflected in the design of a monitoring regime. The cost and feasibility of the monitoring and analysis operations also are likely to figure prominently. NTM, MTM, ITM, data exchanges, notifications and on-site inspections are all among potential CTBT verification tools.

Both generally and in terms of specific proposals, as thinking has begun about designing a CTBT monitoring regime, the concept of *co-operative monitoring* figures prominently. The Ad Hoc Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Events, a group established by the CD in 1976, has issued a progress report in which it proposes the development, testing and evaluation of an experimental International Seismic Monitoring System (ISMS). The envisaged ISMS has three main elements: a global

network of seismic stations, national data centres and an international data centre. The Ad Hoc Group proposes that the ISMS be the core of the CTBT verification regime, but that it be reinforced by other techniques, including national and international technical means and other means of overhead imagery.

A combination of seismic techniques and overhead imagery would permit a two-pronged co-operative monitoring regime for the CTBT. A CTBT verification regime based on seismic detection would be triggered after a violation had occurred; thus, it is an example of "reactive verification." The addition of overhead imagery—whether NTM or perhaps ITM—provides an opportunity to detect an anomalous situation, for example, construction of a test cavity, positioning of ancillary test equipment and facilities, unique communications, and other pre-test activities, before a violation may occur, allowing time for investigation and response; it could be called "proactive verification." On-site inspection techniques could be employed to add precision to the verification process once it had been triggered by an anomaly, either prior to or after a suspect nuclear test.

#### Synergies Associated with Regional Agreements

While proliferation concerns have exacerbated tensions in the Middle East, South Asia and the Korean peninsula, they are only one of several causes of regional instabilities throughout the world. Other factors include ethnic rivalries, rising nationalism, religious conflict, severe economic problems, scarce natural resources and border disputes. Complete resolution of the underlying sources of these instabilities will be long in coming. More hopeful are intermediate steps, for example, the adoption of confidence-building measures and/or the acceptance of peace operations under the auspices of the United Nations. Political breakthroughs or the weariness of past enemies may also sometimes permit limited but significant political settlements.

