Preparing for On-Site Inspections

The Treaty verification system monitors the world for evidence of a nuclear explosion. If such an event were to occur, concerns about possible non-compliance with the Treaty could be addressed through a consultation and clarification process. States could also request an on-site inspection (OSI), which is the final verification measure under the Treaty and can be invoked only after the Treaty has entered into force.

The purpose of an OSI is to clarify whether a nuclear explosion has been carried out in violation of the Treaty and to gather those facts which might assist in identifying any possible violator.

HIGHLIGHTS IN 2007

- Selection of potential participants for the 2008 Integrated Field Exercise (IFE) in Kazakhstan
- Receipt of valuable equipment contributions from States Signatories for the IFE, along with logistical support from the host country and sponsorship from the European Union
- Training courses and equipment tests in Austria, Brazil, France, Hungary, Sweden and Ukraine
- Completion of the OSI Test Manual, a version of the draft OSI Operational Manual to be tested during the IFE
- Further elaboration of the draft OSI Operational Manual.

PREPARING FOR THE KAZAKHSTAN FIELD EXERCISE

Under the constant guidance of the Commission, in 2007 the PTS continued preparations for an Integrated Field Exercise (IFE), to be conducted in Semipalatinsk, Kazakhstan, in September 2008, as part of preparations for OSI readiness. The exercise will provide a unique opportunity for the Commission to test in an integrated manner most of the major elements of the OSI system (except drilling and active seismic techniques) during a compressed period of four to five weeks. Valuable input was received from States Signatories for the continuation of preparations and further development of the IFE.

Preparations generated important opportunities to enhance readiness for the complex field mission. Objectives of the IFE preparations in 2007 were twofold: (a) selection of potential participants and their familiarization with the OSI Test Manual and elements of an OSI, such as data collection through overflights, environmental sampling and seismic monitoring activities; and (b) further preparation of the necessary technologies, equipment and tools.

To further elaborate the IFE design and scenario, the PTS worked closely with the host country, making site visits and conducting assessments addressing health and safety, transportation and other logistical issues. A list of equipment to be donated as contributions in kind during the exercise was also created and confirmed. Procurement continued for equipment needed for the base of operations, at which the inspection team will be stationed during the exercise in the field.

During 2007, the PTS also initiated the development of a field information management system (FIMS). The FIMS prototype was successfully tested during previous field exercises and has shown immense value in analysing data in the field. Final refinement and system enhancement will continue during 2008.

DIRECTED EXERCISE INSIDE THE CHERNOBYL EXCLUSION ZONE

Preparations for the IFE have included several directed exercises in previous years, each focusing on the operational testing of specific inspection techniques as well as infrastructure development and logistics. After the cycle of testing specific methodologies for an OSI, the PTS conducted a directed exercise in the Chernobyl Exclusion Zone in Ukraine during the first two weeks of June 2007. The exercise focused on the measurement of radioactivity levels and on the identification of radionuclides, in particular by means of gamma radiation monitoring on the ground and from the air, as well as on environmental sampling and analysis of solids, liquids and gases. Most of these techniques were examined in previous exercises, but the objective during the Chernobyl exercise was refinement of operational procedures in combination with a focused test of the OSI radiation protection regime to ensure the safety of the inspection team.

Environmental sampling equipment used during the 2007 directed exercise in Chernobyl, Ukraine.

Concrete containment surrounding remains of nuclear power plant unit in the Chernobyl Exclusion Zone.

Radioactivity check-up during the directed exercise.

Familiarizing participants with deep resistivity measurement equipment during the OSI advanced training course in Szolnok, Hungary.

DEVELOPING AND TESTING EQUIPMENT

Core equipment collected by the PTS encompasses state of the art technology, such as instruments for high resolution geophysical surveys, gamma radiation monitoring devices and environmental sampling equipment. In the event of an actual OSI, the CTBTO has to be prepared to move approximately 10 tonnes of sensitive core equipment in six days from Vienna to anywhere in the world. Therefore the development and testing of OSI equipment are a priority as far as the OSI objectives of the Treaty are concerned.

An exercise conducted in Seibersdorf, Austria, in June 2007 successfully concluded the development of equipment for bulk gas sampling from atmospheric air and subsoil gas for noble gas analysis. This equipment will be used in the IFE.

Valuable operating experience was gained with the Seismic Aftershock Monitoring System (SAMS) by conducting two field tests, in Sweden in August and during an advanced training course in Hungary in October and November. These two test environments

High resolution geomagnetic survey during the OSI advanced training course in Szolnok, Hungary.

allowed advanced raw data collection and more realistic data processing sequences to be embedded into a small scale simulation. This experience was used to gear up the aftershock system for the IFE. In 2007, procurement of all SAMS equipment was also completed.

Equipment needed for techniques employed in the continuation period of an OSI, which follows the initial period subject to appropriate approval, was purchased and deployed during the advanced training course in Hungary. The equipment consisted of one ground penetrating radar system, one system to conduct deep electrical and electromagnetic surveys, and one geomagnetic system. Further to these techniques, a 'blinded' high resolution gamma spectrometer, which displays only Treaty-relevant nuclides, was successfully deployed during the advanced training course in Hungary and the directed exercise in Ukraine.