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## Noble Gas Sampling and Detection Methods for On-Site Inspections in Support of CTBT

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The On-Site Inspections (OSI) constitutes the final verification measure under the CTBT, and are conducted to verify States Parties' compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). An on-site inspection is launched to establish whether or not a nuclear explosion has been carried out and during such an inspection, facts might also be gathered to identify a possible violator of the Treaty.

The Treaty lists all activities and techniques that are permitted and one of these is the environmental sampling of noble gases (NG) in the air and underground, which can be deployed at any time during an OSI. The CTBT relevant isotopes are Xe-133, 133m, 131m, 135 and Ar-37. The samples are primarily to be analyzed on-site, although the treaty also allows off-site analysis in designated laboratories if necessary. Stringent procedures ensure the security, integrity and confidentiality of the samples throughout the sampling and analysis process – all taking place in the field.

Over the past decade the techniques for NG sampling, processing and analysis of both atmospheric and subsoil NG samples have been developed further in order to fit to the conditions and requirements during an OSI. This has been a major international effort with a global set of collaborators. Especially during the past three years the efforts intensified in order to finalize the scientific and technical developments for the Integrated Field Exercise, November 2014 (IFE14). This presentation will provide an overview of the current status of the OSI NG sampling regime and the OSI NG Field Laboratory to be deployed in IFE14, together with more technical descriptions of methods and equipment as well as a short discussion on potential future developments and alternative applications as applicable.

### Country or International Organization

CTBTO

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