SnT 2025
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE
8 SEPTEMBER ONLINE DAY
9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE

P3.3-607

OSI Radionuclide and Noble Gas Techniques Development Plan post IFE

B. Nadalut, K. Khrustalev, R. Riedmann, P. Labak

Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)

CTBTO PREPARATORY COMMISSION

INTRODUCTION AND MAIN RESULTS

This poster presents a draft development plan for Radionuclide Techniques in on-site inspections (OSI) for the years 2025-2027. It outlines key areas of focus, including improvements in subsoil gas sampling methods, the integration of meteorological data into analysis and advancements in software for data processing. The plan emphasizes the need for enhanced usability of sampling equipment, proposing alternatives to traditional Geoprobe systems, such as lightweight manual direct push equipment and compact Geoprobe-like systems for various soil conditions. Additionally, the paper discusses the importance of vulnerability assessment of the field sampling equipment to ensure the Continuity of Knowledge (CoK) on collected samples. It also highlights the necessity of integrating new technologies into existing OSI frameworks. The development steps outlined include training for OSI staff, feasibility assessments for new sampling techniques and the establishment of maintenance and obsolescence management plans for existing equipment. Overall, this plan aims to streamline OSI processes, reduce health and safety risks and enhance the effectiveness of radionuclide detection and analysis in the context of OSI.

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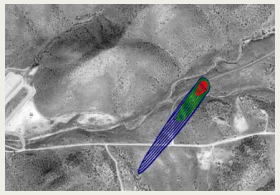
Introduction

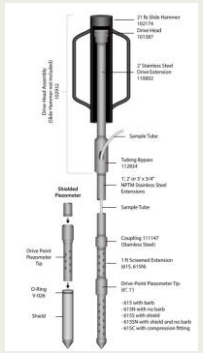
The CTBT On-site Inspection Division (OSI) Field Laboratory is supporting Radionuclide techniques, Particulate (RN, Protocol to the CTBT, Part II, Para. 69(c) and 69(d) and Noble Gas (NG, Protocol to the CTBT, Part II, Para. 69(d)); Based on previous experience and feedback from the surrogate OSI inspectors, we have identified several areas requiring further implementation improvements.

Gas sampling process

- Sampling points preparation – improved usability with manual/powered subsoil self-sealing (stand-pipe) sampling equipment (2-3m depth)
- Subsoil gas sampling isolation from the atmospheric air in rocky soil environments – testing of tarping
- Quick grab air samples directly into scuba bottle/trap – more flexibility in sampling techniques: slow low-power compressor
- Transfer samples in the field to traps instead of scuba bottles – improved logistics and H&S aspects



Smaller lighter compressor with a manual/powered standpipe subsoil gas probe

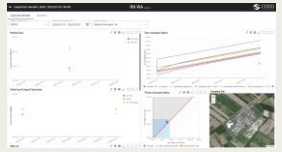


Disclaimer

The views expressed on this e-poster are those of the authors and do not necessarily reflect the view of the CTBTO

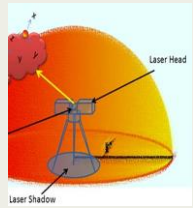
Data assessment and field mission planning tools

- Collect local meteorological data and use local dispersion model based on the Gaussian plume approach for sampling missions planning
- Setup a local Inspected Area RNNG sampling network to rule out external sources – use of integrated automatic sampling like SAUNA Qb, AC and generator units on a trailer in the filed
- Working Area RNNG (WARNNG aka PaNG WA) software tool to help inspectors in data assessment, mission planning and report preparations (in progress)



Vulnerability analysis of the sampling process

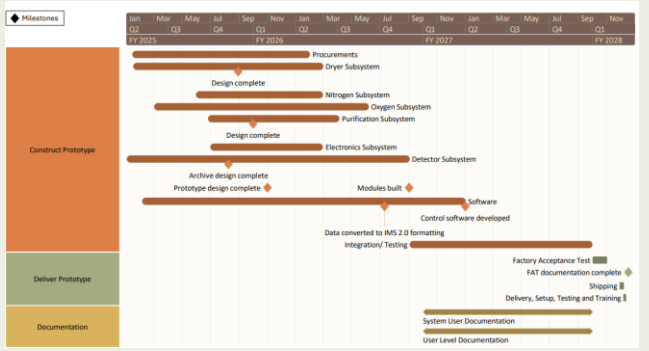
Improvement in the Continuity of Knowledge on collected samples through comprehensive vulnerability analysis and tamper-indicating measures in the field (e.g. virtual sampling area sealing using LIDARs)



PTS-owned Ar-37 sampling and analysis capabilities

Ar-37 system is being built by PNNL under contract with PTS. The system is modular consisting of:

- Purification Subsystem
- Oxygen Reduction Subsystem
- Nitrogen Reduction Subsystem
- Control Electronics Subsystem
- Detector Subsystem



Ar-37 system delivery plan

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