PROFICIENCY TEST PROGRAM FOR CTBT RADIONUCLIDE LABORATORIES

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ABSTRACT

Sixteen radionuclide laboratories in various parts of the world support the network of radionuclide air sampling stations being established for verification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT). These laboratories corroborate the data provided by these stations, as part of the QA/QC program of the network and in particular to confirm by gamma spectrometry, the presence of fission products and/or activation products in air samples. Since 2000, the Provisional Technical Secretariat (PTS) of the CTBT Preparatory Commission has organized annual Proficiency Test Exercises (PTEs) in various laboratories. This paper presents a snapshot of the IMSC laboratory network, the basis and process for certification of radionuclide laboratories, design of the PTE and criteria for assessment of PTE results. General trends in the performance of laboratories in the PTE since the first exercise in 2000 are presented.

BACKGROUND

- Radionuclide laboratories perform additional sample analysis (or re-analysis) by high-resolution gamma spectrometry of a suspect sample to verify the presence or absence of fission and/or activation products.
- Radionuclide laboratories also analyze:
  - Station samples as part of radionuclide network QA/QC program (4 samples per year)
  - Station back-up samples when a station is down
  - Samples from station visits (e.g. site surveys, certification visits)

CERTIFICATION OF LABORATORIES

Certification process of radionuclide laboratories
- Main requirements for certification:
  - Quality system
  - Documented procedures for IMS sample analysis
  - Good quality of analytical results

PROFICIENCY TEST EXERCISES (PTEs)

Certified laboratories are required to participate in the PTE. Results of PTEs are reviewed as part of surveillance assessment to ensure that laboratories are able to maintain the level of accuracy and precision of nuclear identification and measurement required to reliably confirm or verify spectral data from radionuclide stations.

Frequency of PTE:
- Annually

General objectives of PTE:
- Assess the capability of the laboratories to reliably confirm or verify spectral data from radionuclide stations.
- Monitor laboratory proficiency on IMS sample analysis on a periodic basis
- Provide States Signatories with confidence that data quality of radionuclide laboratories meets the standards required for the CTBT verification regime.

Types of samples
- The test samples have nuclides selected from the list of fission products (FP) and activation products (AP) relevant to CTBT. Nuclide and activity selection are designed to test for ability to identify and accurately measure activity of nuclides exhibiting characteristics such as:
  - Cascade summing
  - Spectrum convolution
  - Interfering nuclides
  - Low energy nuclides
  - Activity levels close to Minimum Detectable Activity (MDA)
  - Benchmark or common nuclides

APPLICATIONS OF PTE RESULTS

- Used by the PTEs in the certification process of uncertified laboratories and in the periodic monitoring of laboratory performance during certified operations
- Used by laboratories as part of their quality system to assess any need for corrective actions

REFERENCES


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