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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Rapid analysis method of radionuclides by gamma
spectrometry under emergency
(English Translation)**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by the National Health Standards Committee Radiological Health Standards Committee.

This standard was drafted. Radiation Protection and Nuclear Safety Medical Institute of China Center for Disease Control and Prevention, Tsinghua University, Academy of Military Medical Sciences Institute of Radiation Medicine and Radiation Medicine, Institute of Radiation Medicine, Shandong Academy of Medical Sciences, Xinjiang Uygur Autonomous Region Center for Disease Control and Prevention.

1 Scope

This standard specifies the rapid analysis method for the sample radionuclide gamma spectrometer in emergency situations.

This standard is applicable to emergency conditions, emergencies or qualitative identification of gamma radionuclides in original samples and quantification in a short time.

The gamma radionuclide activity concentration in the sample was analyzed.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document.

For undated references, the latest edition (including all amendments) applies to this document.

GB/T 5750.2 Standard Test Method for Drinking Water Standards Collection and Preservation of Water Samples GB/T 11713 General method for high purity gamma spectroscopy WS/T 184 gamma-ray spectrum analysis method for radionuclide in air

3 Terms and definitions

The following terms and definitions apply to this document.

Emergency

Rapid action is needed to mitigate unconventional conditions that pose harm or adverse consequences for human health and safety, quality of life, property or the environment.

Emergency monitoring Radiation monitoring for the detection or identification of radioactive contamination or radiation levels of persons and places in an emergency situation.

4.1 Weighing equipment

Analyze the balance, or an electronic scale that can be accurate to 0.1 g.

4.2 Sample box

The sample box used for the measurement shall be of the same material, size and capacity as the sample box used for the efficiency scale. Cylindrical type is preferred in emergency situations Sample box or Marlin Cup sample box that matches the size of the detector.

4.3 Sample crushing and shaking device

The sample pulverizing and shaking device includes a commonly used chopping and pulverizing shaking device such as a mortar, a cutter, and a food processing machine.

4.4 High Purity Germanium (HPGe) Gamma Spectrometer Measurement and Analysis System

High purity germanium (HPGe) gamma spectrometer measurement and analysis system, energy response should be covered between 40 keV ~ 2 000 keV, the specific available energy the range of quantities is determined by the energy scale and the efficiency scale. Further use and specific configuration of high purity germanium (HPGe) gamma spectrometer measurement and analysis system See standard GB/T 11713.

4.5 Standard source

The standard source refers to a standard sample of known radionuclide activity concentrations. Includes energy scale standard source and efficiency scale standard source. It fired the gamma ray energy should cover the energy range of the nuclides in the emergency situation. It is known that the activity concentration of the radionuclide should be traced back to the national benchmark.

See Appendix A for radionuclides that may be involved in the emergency response. See Appendix B for radionuclides that may be released from nuclear power plants.

4.6 Passive Efficiency Calibration Software

The passive efficiency calibration software is software that obtains the relationship between energy and efficiency through computer simulation. Passive efficiency calibration software contains unique characterization parameters for the detectors used and can be used in conjunction with spectral analysis software. Use the actual standard when using passive efficiency calibration software the quasi source is verified.

5.1 Sample Collection Principle

5.1.1

Sampling personnel should be personally protected from radioactive contamination.

5.1.2

Monitoring of sampling sites in emergency situations should take into account local meteorological conditions, at the highest concentration of predicted pollution, dominant downwind direction and population Dense areas are properly encrypted.

5.1.3

Before the sample is collected, the gamma radiation level around the collection site should be patrolled and recorded, and surface contamination detection can be performed if necessary.

To determine the extent and extent of radioactive contamination, focus on samples collected in areas with high levels of pollution.

5.1.4

The collected samples should be double-labeled and numbered, and the sampler, sampling date and time, sampling amount and sampling location should be recorded in detail.

Information such as latitude coordinates).

5.1.5

Samples of food and drinking water collected should be representative. Combine the sampling season with the local dietary structure, giving priority to open-air growth food.

5.1.6

The methods and tools used for sample collection shall not cause contamination of the sample to be tested and result in loss of the nuclide to be tested. Sample collection container If reuse is required, care should be taken to avoid cross-contamination.

5.1.7

During the emergency period, in principle, radioactive monitoring of food or drinking water should be carried out daily. The sampling amount of food or drinking water should generally