



## SPECIFICATION

### Well-Logging Gamma-Radiation Spectrometry Measurement Set with Cd-Zn-Te (CZT) Crystal

#### 1. Scope

- 1.1. This specification describes the requirements for a Well-Logging Gamma-Radiation Spectrometry Measurement Set (hereinafter referred to as the "System") to be used for gamma-radiation measurements.
- 1.2. The scope of supply includes the System, installation, training of the staff of SSE CERWM State Specialized Enterprise «Centralised Enterprise for Radioactive Waste Management» - SSE CERWM (Ukraine) (hereafter referred to as the "End-User") and testing of the System.
- 1.3. The project aims to assist the End-User in performing the survey of Module B1 of the Pidlisny disposal site by drilling inside the disposal facility for sampling and performing a complete characterization of the samples. The System will be used for the measurement of gamma-radiation distribution, gamma-emitter identification, measurement of gamma-emitter activity in samples and objects, control and monitoring of gamma radiation dose rate in wells - reinforced with polyethylene pipes with diameter of up to 110 mm and depth up to 15 m in the conditions of high gamma radiation fields (not exceed 10 mSv/h) with humidity of 98%.

#### 2. Requirements

##### **2.1. Functional and Performance Requirements**

The System shall meet the following functional and performance requirements:

- 1.1.1. The System shall be used for search of gamma-radiation sources, gamma-radiation dose rate monitoring, gamma-emitting radionuclides identification and activity measurements.
- 1.1.2. The System shall be a portable instrument consisting of multi-channel analyzer and built-in Geiger-Muller counter, interface unit and the external detection unit.
- 1.1.3. The System shall be equipped with:
  - 1.1.3.2. Software for gamma spectrum analysis and mathematical calibration for efficiency.
  - 1.1.3.3. Program for calculating the contribution of isotopes to the dose rate.
  - 1.1.3.4. Software for the possibility of spectrum transmission on a personal computer for further processing and storage.



## **2.2. Technical Requirements**

The System shall meet the following technical requirements:

- 2.2.1. CZT - 060S - detection unit with crystal volume of at least 60 mm<sup>3</sup>.
- 2.2.2. Resolution for Cs-137 (662 keV) at least 15 keV.
- 2.2.3. The detector shall be mathematically calibrated per efficiency and characteristics shall be obtained using MCNP method.
- 2.2.4. Two (2) collimators: at least 20 mm lead, copper layer, stainless steel covering of at least 2 mm, 6 mm hole with cones of 15° and 90°, threaded insert for tripod.
- 2.2.5. Tripod for stationary measurements.
- 2.2.6. Cable length of 20 m.
- 2.2.7. Laptop computer, printer, compatible with the proposed spectrometry system.
- 2.2.8. Protection against dripping water (declination angle of 15°) and dust (in accordance with IEC 60529: IP52).

## **3. Marking**

The System shall have all safety markings in the English and/or Ukrainian/Russian language.

The System shall be clearly marked with designation of the type, model, manufacturer and serial number, manufacturing standard, fragility warnings.

## **4. Packing**

- 4.1. The System, for the shipment by air to the End-User, shall be packed in accordance with international standards that are applicable for the shipment by air of this kind equipment.
- 4.2. All markings on the components and packaging shall be in English and clearly state the address and contact name of the End-User.

## **5. Quality Requirements**

- 5.1. The System shall be manufactured and installed in accordance with the Contractor's ISO quality assurance system or an equivalent quality assurance system.
- 5.2. The Contractor shall document the compliance with this quality assurance system.



## **6. Testing and Acceptance**

- 6.1. The System, prior to shipment, shall be tested for conformance with manufacturer's performance specifications and the minimum requirements specified herein.
- 6.2. The System, after installation at the End-User site, shall be tested by the Contractor in the presence of the End-User to demonstrate that the performance meets the manufacturer's performance specification and the minimum requirements specified in Section 2 above.
- 6.3. The results of the testing of the System shall be documented by the Contractor in an acceptance protocol that shall be signed by the End-User.

## **7. Installation and Training**

- 7.1. The Contractor shall remotely assist the End-User to install the System. The Contractor shall ensure that the System is picked-up by the freight forwarder only after the End-User's site is ready for installation. The Contractor shall inform the End-User two (2) weeks after the receipt of the Purchase Order which are the requirements for installation and site preparation (if any).
- 7.2. The Contractor shall provide a one-week remote (online) training for up to five (5) staff of the End-User in the operation and maintenance of the System.

## **8. Deliverable Data Items**

The Contractor shall provide, in both hard copy and electronic format, two (2) complete sets of operation and servicing manuals and technical drawings in the English and Ukrainian (or Russian) language.