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New methods for the detection of underground nuclear explosions

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Problem Statement: The inspection team uses the methods in accordance with article 69 of the CTBT protocol. Study of UNEs, which were conducted in horizontal tunnels and vertical wells at Semipalatinsk test site (STS), showed low efficiency of the claimed methods. This is because in epicentral zones of the majority of UNEs radioactive contamination is absent, while the mountainous terrain with presence of gorges and cliffs makes impossible application of geophysical methods. The purpose is to develop, to improve new methods of detecting location of UNEs, and to estimate their efficiency.

Methodology: Based on the real situation in the survey of UNEs locations in STS, new methods were developed tritium method. In STS the presence of tritium in many environment objects– in plants, in surface and groundwater, atmospheric and soil air is identified. Studies have shown that detectable values of the tritium can be seen after 50 years and more after UNE. Thus, studies conducted in STS, showed the possibility of using tritium as an indicator of an UNE location gas method. Significant part of UNEs is conducted in rocks that contain carbonaceous materials. The presence of underground water and high temperatures contributed to the process of underground gasification of rocks. The composition of evolved gas corresponds to the composition of the gaseous products of thermal oxygen-free decomposition of carbonaceous rocks, as evidenced by high concentrations of methane, carbon monoxide, sulfur dioxide, hydrogen sulfide.

Conclusion: Thus, venue UNE are characterized by the presence of tritium gas anomalies and considering this fact it is possible to solve the inverse problem according to the indications to identify an area with UNE. Recommendation: These methods are currently not officially part of the OSI methods, but can successfully be used to detect both fresh UNE, and UNE that carried out a few decades ago.

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