INVESTIGATION OF THE DYNAMICS OF RADIATION POLLUTION AT THE FORMER SEMIPALATINSK NUCLEAR TEST SITE

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The spheres of the previous and current activities of the institutions and authors, including:

IGR :

- geophysical accompaniment of nuclear weapon tests control for nuclear weapon tests and non-sanctioned nuclear explosions at foreign military testing sites;
- treatment of the geophysical methods for investigation of geological structures of the former nuclear testing sites;
- determination of the sites for construction of nuclear power plants, the burials for radioactive wastes;
- registration and forecast of the earthquakes.

JSC "ALTYNGEO":

- prospecting the radioactive raw deposition;
- ecological studies of the territories of the former testing sites and uranium depositions.

ITAM:

- recognition of geo-stationary objects,
- analysis and diagnostics of natural spatial-time scenes.

Authors:

D. Belyashov:

- prospecting uranium depositions,
- geophysical and radio-ecological studies at the former nuclear sting sites

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uranium deposit prospecting;
geophysical and radio-ecological studies at the former nuclear sting sites

Yu. Grinshtein:

- uranium deposit prospecting;
- ecological studies at the territories of the former testing sites and uranium deposits.

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- development of the special protective means;
- experimental data processing and construction of the forecasting models

Investigations Proposed for Possible Collaboration with Foreign Partners. Objective of Investigations To obtain the experimental and theoretical space-time data on evolution of radio-nuclide contamination at the STS territory.

Problem Statement In 1990 aerial gamma-spectrometric shooting of the alienation zone of the STS in a scale 1:300,000 has been performed by the industrial company "Aerogeologiya" as a result of field works. In 1992 the complex aerial gamma-spectrometric and magnetic shootings were carried out by the Southern Kazakstan geological-geophysical expedition of the industrial geological company "Yuzhkazgeologiya" in accordance with the order of the geological-geophysical association "Azimuth". The shootings, covering a region of the coal deposition "Yubileinoe", were made in a scale 1:25,000 (415 sq. km0 and for a south-eastern part of the deposition - in a scale 1:12,500 (115 sq. km). Five years have passed. If analogous aerial gamma-spectrometric shootings are repeated in 1997-1998, unique possibility to build the evolution forecasting model for transformation of radiation fields at STS would be received.

Main Tasks

- To perform aerial gamma-spectrometric shooting of the whole territory of the STS in a scale 1:200,000 with registration of the total spectrum;
- The same in a scale 1:10,000 for the Balapan region;
- To construct the physical-mathematical forecasting models of the dynamics of radionuclide contamination at the STS area.

Scientific and Technical Means, Methods, Approaches

- Aerial gamma-spectroscopy on a base of the crystals of Iodine Sodium, activated by Thallium, volume 25 l, with registration of the total spectrum;
- A set of the software and computational means along with the data bases;
- The aerial gamma-spectrometric standard testing site "Irtysh" - for Cesium-137 and the testing sites "Kora" and "Aidarly" - for natural radio-nuclides;
- Software and computational means for development of physical-mathematical models;
- Expedition equipment for ground testing in the points of the most prominent radiation anomalies.

Expected Results

- The second temporal point, with an interval of five years, on a state of radiation fields at the STS in two scales. Forecasting models for space-time evolution of radiation fields at the ST.
- The results of comparison between the aerial and ground measurements.

A Role of Foreign Partners

- Investigation of correlation between the aerial and ground measurements of radionuclide concentrations in soil.
- Comparison of the results of aerial gamma-spectrometric shootings between those obtained at the foreign and home instrumental and software bases.
- Development of the forecasting physical-mathematical models.