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METHODOLOGY FOR ASSESSING THE BACKGROUND STATE OF ATMOSPHERIC AIR DURING MINERAL PROSPECTING AND EXPLORATION

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Assessing background air quality during mineral exploration differs significantly from later operational stages. The main features are large license areas, remoteness from industrial centers, and the absence of approved mining project designs. These factors require differentiated methods depending on the level of technogenic pressure. Some zones need only the regional background data, while others require additional studies to identify local pollution anomalies. The goal is to justify a rational set of methods that ensures reliable environmental information while maintaining cost-effectiveness. The first mandatory element is obtaining official background concentration data from the national hydrometeorological service. This data serves as a baseline for subsequent comparisons. An effective indirect method is the analysis of atmospheric precipitation, including snow surveys. Snow cover allows integrated assessment of pollutant deposition over large areas without a stationary monitoring network. Soil sampling provides the opportunity to retrospectively assess the accumulation of heavy metals and other substances from the air. Bioindication methods – assessing lichens, tree needles, and physiological changes in plants – help identify the integrated ecosystem response to pollution. To ensure reliable results, regulatory requirements must be followed: standardized placement of observation points considering wind rose, a unified sampling procedure, and an approved list of controlled indicators. The proposed approach combines official data, indirect observations, soil and bioindication methods, ensuring high reliability of environmental information at early stages of subsoil use while preserving cost-effectiveness.

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