COMPLEX ECOLOGICAL ESTIMATION OF MAN-CAUSED POLLUTION STATE OF POPULATION AGGREGATE TERRITORY STATE

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Research Aims. The aim of the research is to implement the complex technique of environmental repercussion based on interconsistency of MIPS analysis and ecological risk, connected with the socioeconomic object state, with the health risk for the systems of systems study, based on the complex ecological system (CES) concept. According to the research aim, the following issues are to be made:

1)to determine the MIPS- and risk analysis technique of the researched objects in the ecological safety system in order to define the ecological compatibility rate (negative no effect on the objects of biosphere and human being);

2)to calculate the ecological state assessment of man-induced impact in accordance with the defined technique and provide the recommendation concerning the abidance of ecological safety requirements.

Research results analysis. The aim of the corporate approach, concerning the decrease of socioeconomic consequences after the man-induced and natural emergencies and ecological risks minimization, is to provide modern approaches of man-made and natural safety regulation on the basis of the systems of systems approach, which is determined by the formation of the complicated corporate research object, as well as the estimation of the ecological risk, based on the MIPS- and risk analysis, for this object and its integral parts.

In accordance with so called corporate approach of ecological analysis, the following should be made:

1)to form the appropriate corporate ecological system for the research object: to define economic, social and ecological components (the latest is in the focus of our attention)

2) to find out the economic component of MIPS numbers in order to determine ecological state of components; to define the value of ecological risk and health risk, correlating the latest with ecological state of ecological-and-economic component of the CES;

3)to find out the connection between the influence of CES socioeconomic component on ecological system in the form of functional dependence of health risk from the ecological risk of natural (state of environment) and man-induced (discrepancy of economic content according to ecological safety request) origin.

In our work we have analyzed the source of water supply pollution tendency on the basis of experimentally obtained monitoring data of research area, according to the following factors: organoleptic properties (chromaticity, translucency), general characteristics (pH, alkalinity, general hardness), chemical characteristics (chlorides, iron, Ca, synthetic surface active matters (SSAM)), toxicological (ammonia, NO_3, NO_2) and microbial characteristics (microbial number, coliform index). Taking into account the hazard assessment, according to the pollution rate change tendency (environmental pollution index) (fig. 1).

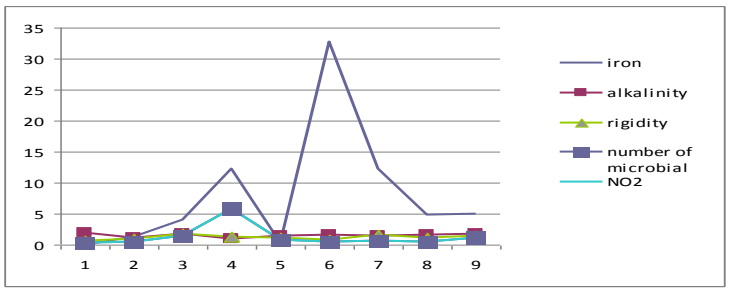

Figure 1. Pollution tendency diagram on each block of the hazard area

Consequently, the range is an ecological hazard for the environment. The drainage system of the region appeared to be the most affected by the man-induced influence. The monitoring data concerning assessed the dangerous condition of drinking wells and calculated their ecological risks:

$$Risk = -ln(P), P = \frac{\sum n_i}{N},$$

where $\sum n_i$ is the sum of all cases exceedance of antipollution standards value, i.e. $\sum n_i = \sum \frac{C_i}{ГДК} > 1$ (table 1).

Table 1 – Environmental Risks

	5 Pushkinskaya Street	15 Pushkinskaya Street	Lermontova Street	Mayakovskaya Street	Prospect Budyonnogo
Iron	0,57	0,579	0,63	0,33	0,1
Water alkalinity	0,169	0,11	0,3	0,4	0,17
Water hardness	0,078	0,17	0,00025	0,15	0,6
Microbial	0,11	0,33	0,025	0,45	0,89

number					

Summary. Probabilistically entropic and risk-analysis analysis for ecological hygienic assessment of anthropogenic loaded territories given in the article: internal and external levels influence is determined on source water supply. Approaches determined to account the ecological component in definition of population health risk.