

Methodological foundations of the philosophical content of the system concepts "ecological state" and "ecological safety" in the use of water resources.

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Abstract. The purpose of this article is to assess the philosophical categorical meaning of the concepts "ecological state" and "ecological safety" in the space and time of the water management object influence zones, hereinafter referred to as the "Activity Object" as a part of the natural-technical system "Natural environment - Activity Object - Population", associated with the use of water resources in a particular branch of economic activity. It should be noted that the "ecological state" concept in the considered space and time of the river basin geosystem, where the quantitative and qualitative indicators of water resources are formed, determines the most important factor of the life activity of the "Population" living in the zones of influence of the "Activity Object" - "Ecological Geological Safety". In the formation of scientific thinking in the field of water resources use in various sectors of economic activity, it determined the class of natural and technical systems' creation and development, in which the central technogenic component is various types of hydraulic structures, making certain changes in the natural processes of interconnection, interaction and relationship of biotic and abiotic elements among themselves in the composition of the "Natural Environment" and the life of the "Population", which form the "ecological state" as a factor of "ecological safety". The system concepts "ecological state" and "ecological safety" are the most important basis in the scientific assessment of the anthropogenic impact level of the "Activity Object" on "Natural Environment" within the spatial limits of basin geosystems when making practical decisions.

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1 Introduction

The system concepts "**System**", "**system approach**", "Component", "element", "**Systems analysis and synthesis**", "**behavior and structure**", "**structure and organization**" are currently used in the creation and development of the technical theory foundations (TTF) class of natural and technical systems "Natural environment-Activity Object-Population" («NE - AO - P») on the use of water resources in various technological processes of economic activities related to a very special and important activity type. It should be noted that the above-mentioned systemic concepts have turned into general scientific and general technical in their status with their philosophical generalization.

For the class under consideration NTS «NE - AO - P» the concept of "**System**" forms a special unity with the natural environment in the spatial limits of the river basin geosystem, where quantitative and qualitative indicators of water resources are formed and almost all types of economic activities are carried out.

The set and interaction of components and their constituent elements as part of NTS «NE - AO - P» has a special behavior in the composition of a more complex basin geosystem, which is higher in the hierarchical row. One of the most important studied processes of interaction, interconnection and relationship «AO» with «NE» and living «P» in the zones of influence is an assessment of the changes introduced in the intensity and directions of movement of flows of matter, energy and information (MEI), defining and shaping "ecological state", on which all life processes in the animal and plant world depend, where vital processes for «P» are the main ones, determined by quality indicators of human health. Therefore, the concept "**ecological state**" in the considered space and time of the zones of influence «AO» basin geosystem determines the need to assess the philosophical significance of its categorization.

2 Results

As the real process of the development of concepts shows "**System**", "**systems approach**", "**systems analysis and synthesis**" and other systemic concepts, the concept "**ecological state**" acquires a general scientific and general technical status in environmental research and, in particular, a very important area related to impact assessment «AO» on the environment (IAE), as a modern regulatory requirement for life support of «P», flora and fauna, defined by the concept "**environmental safety**".

Concept "**ecological state**", formed by technogenic component «AO» in the zones of its influence are determined by the nature, intensity of MEI streams movement in the considered space of the basin geosystem, which affects almost all processes occurring in natural environments (atmosphere; hydrographic river network; in the upper layers of the lithosphere, where groundwater drainage into the river network is formed; soil cover with underlying rocks), which determine life activity «P», flora and fauna both on land and in water bodies (various types of fish, etc.).

At the level of philosophical reflection of reality in the ongoing processes of interconnection, interaction and relationship «AO» with the components in class NTS «NE - AO - P» includes, first of all, regular changes in space and time of the considered basin geosystem, which, on the one hand, enrich the content of already used concepts "**system**", "**systems approach**", "**component**", "**element**", "**system analysis and synthesis**", "**behavior**", "**structure and organization**", on the other hand, it substantiates the philosophical content of the concept "**ecological state**". Philosophical substantiation of the concept "**ecological state**" is determined by the necessary condition for the environmental science development, both in the use of water resources, and in other branches of economic activity.

To substantiate the philosophical content of the concept "**ecological state**" it was necessary to establish its invariant value in various cases of its use in environmental studies of the interrelation, interaction and interrelation processes of various technogenic components, for example, a reservoir hydroelectric complex, an industrial enterprise, an irrigation and accumulation system (IAS), transport highway, etc. with natural environments in the zones of their influence.

Functioning «AO» as a part of NTS «NE - AO - P», for example, in the form of a reservoir hydroelectric complex, forms a special unity with the natural environment, expressing itself as "**ecological state**" in the zones of influence, determined by quantitative and qualitative indicators of the intensity and direction of movement in space and time of MEI flows. Thus, under the concept "ecological state" in the zones of influence of the "Activity Object" in the future we will consider the intensity and direction of movement of flows of matter, energy and information, created by the processes of interconnection, interaction and interrelation of the "Activity Object" in space and time of the basin geosystem with "Natural environments" and the living "Population".

The fact that NTS «NE - AO - P» forms a special unity with the natural environment in space and time of the basin geosystem, acts as an important and fundamental moment of the "**Ecological state**" concept: "Ecological state" «AO» with «NE» «P» as a system in interaction with the environment. In a systematic study of the processes of interconnection, interaction and relationship «AO» with «NE» «P» performed in order to assess "**ecological state**", as an important factor "**Environmental safety**" in the zones of influence «AO».

Because of this NTS «NE - AO - P» - it is not only some whole, made up of certain interacting components, but such a set of components form by their processes interconnections, interactions and relationships "**ecological state**", as in zones of influence «AO» the system under consideration, and to a certain extent in the basin geosystems that are higher in the hierarchical row. Based on the concept «**System**» in concept evaluation research "**ecological state**" studies something other than interconnection, interaction and relationship «AO» with «NE» and living «P», which is determined by the separate qualitative and quantitative indicators, and in an integrated form is expressed as "**Ecological state**" in the considered space of the basin geosystem. Consequently, it is precisely the highlighted points in the definition of the concept "**ecological state**" constitute a certain basis for any variations of this concept in the considered class NTS «NE - AO - P», constitute a certain basis for any variations of this concept in the considered class of "**ecological state**" in the class NTS «NE - AO - P» with the concepts "**ecological state**" in other systems, where, for example, an industrial facility, a transport system, etc. will act as a technogenic component. That will make it possible to get a general scientific and general methodological concept "**ecological state**".

Material formation in the «AO» form as a part of NTS «NE - AO - P» is in constant interaction with other material formations in the form of various elements «NE» (hydrographic river network, geological environment at the base of the pressure front of the reservoir, the surface layers of the atmosphere, etc.) of «P» and at the same time, the interaction changes to a certain extent and, accordingly, is in a state of motion.

The study of the processes of material formation movement, its changes determine the study **behavior** material formation. But the subject of cognition can also be that which moves without considering how the studied nothing moves. Such knowledge is associated with the study of the sphere **buildings** material formation. Consequently, what a researcher can turn into an object of knowledge belongs either to the sphere **behavior** material formation, or to its sphere **buildings**, or to the relationship of "unity **behavior and structure**", where unity lies in conditioning **behavior by structure**.

Behavior is one of the study object's sides as a system: the side is associated with the movement and change of this object and its interaction with other objects that make up the

environment for the studied object of the system. Movement, various changes in the object under study are the results of its interconnection, interaction and relationship with the environment, and for the objects under consideration - the spatial limits of the basin geosystem.

In a philosophical sense **“behavior”** is a concept that fixes universal moments of objective reality, like a change in material formation, for example, «AO» and «NE» under the influence of moving MEI streams, emanating from both natural and man-made objects. **“Behavior”** material formation objectively reflects the unity of the two sides: - changes and inevitable **impacts**. Category **«Behavior»** reflecting the connection of opposite sides in a sense is a synthesis of such opposite categories as "cause" and "effect", when the approach to the object of research as to **system**. Concept **“Structure”** of the material formation («AO», «NE») opposite **behavior** defines the unity of opposites: - a set of elements included in the composition of the components «AO» and «NE» and the set of connections between them - **structures**, integrating components and their constituent elements as a part of the class under consideration NTS «NE - AO - P».

Based on the results of system analysis and synthesis of categorical concepts **behavior** and **structure**, relationship of unity **behavior** and **structure**, **changes** and unavoidable impacts **«cause and effect»**, many elements that make up the components NTS «NE - AO - P», a set of connections between them, **structure**, performing integration in the processes of interconnections, interactions and interrelationships between the components of the system under consideration categorical concept **“ecological state”** determines the dynamics of the intensity and direction of MEI flows movement, arising in the processes of interconnection, interaction and relationship «AO» with «NE» and living «P», in the considered space of the basin geosystem. In a philosophical consideration of the concept **“ecological state”** reflects an objective picture of inevitable changes in natural processes of interconnection, interaction and interrelation of biotic, abiotic elements among themselves in a natural component «NE», as well as in the life of the living «P» in the areas of impact under the influence of under construction or in operation «AO» as a part of NTS «NE - AO - P».

Thus, in the categorical philosophical understanding **“ecological state”** in space and time in the zones of "AO" influence is determined by the processes of interconnection, interaction and interrelation of natural and man-made components among themselves, which causes certain changes in the direction and the intensity of movement of flows of matter, energy and information, which are quantitatively and qualitatively regulated by: - maximum permissible concentrations (MPC); maximum permissible levels (MPL); maximum permissible emissions (MPE); maximum permissible discharges (MPD); maximum allowable withdrawals of water flow rates from a water body (MPW).

Category concept **“ecological state”** in the considered space and time of the basin geosystem under the influence «AO» determines the most important systemic factor – **“Environmental safety”**, defining the protection of the natural environment and the vital interests of a person from the possible negative impact of economic activities associated with the use of water resources, as well as in the event of natural and man-made emergencies at water facilities.

For economic activities on the use of water resources in various industries **“environmental Safety”** - this is the state of objects of protection in zones of influence «AO» when exposed to flows of matter, energy, information in the processes of interconnection, interaction and interrelation of technogenic elements that make up «AO» (complex of different types HTS) with "Natural environments" and living "Population" does not exceed the maximum permissible normative values MPC, MPL, MPE, MPD, MPW.

“Environmental Safety” as a concept of a philosophical category acquires a practical understanding in the system "Object under protection - Source of environmental hazard - Protective measures" («OP- SEH-PM»), where «OP» can act as "Population", "Natural environments" in the "Activity Object" influence zones (Fig. 1).

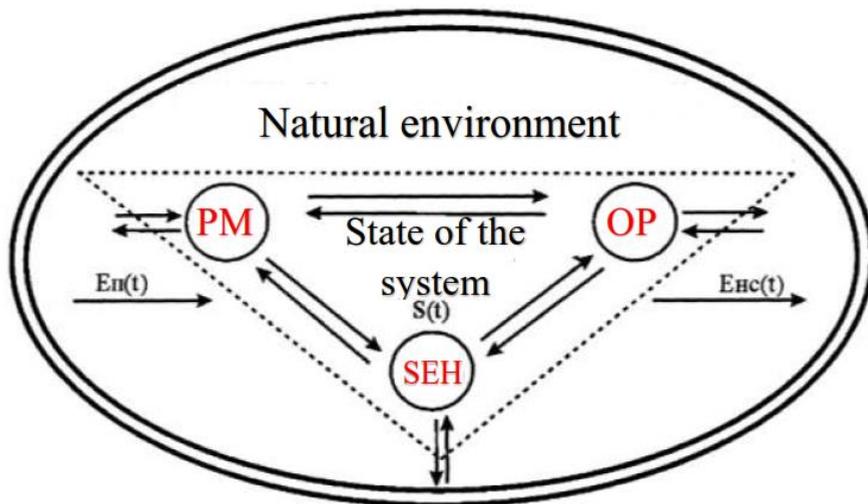


Fig.1. Model of «OP–SEH–PM» system components interaction

3 Conclusion

Based on the results of methodological studies of system concepts "ecological state" and "environmental Safety" in the use of water resources in various sectors of economic activity, an assessment is given of the philosophical categorical understanding of the concepts "ecological state" and "environmental safety", on the basis of which the system definitions of concepts are formed "ecological state" and «environmental safety» for "Activity Objects" in the NTS «NE - AO - P» class.

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