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INFORMATION BASE FOR MONITORING THE STATUS OF FIRE SAFETY AT GAS PRODUCTION

Background
In accordance with the requirements of state standards of information support of enterprises should be carried out through the creation and use of interactive guides that are complex databases. The development of the information environment in general means the unification of the individual components of the system into a single model. Wherein each subsystem is isolated from other parts of the model and decides its own problems.

Aims and Objectives
The development of the information environment of the gas field (in general) needs to monitor the state of fire safety at the facilities of gas production. To implement this goal, it is necessary to generate a database object to bring into a single structure all textual and graphical information describing the process, the rules of the technological mode, general characteristics of plants, raw materials and production process and schemes of gas field production and safe operation.

Methods
Structured description of the processes, the norms of the algorithm to eliminate violations of the process and equipment problems. Criteria of explosion and fire hazards, and ways to eliminate them.

Results
The analysis of the existing text and graphics for the project, designed structure of the knowledge base, the algorithm of interaction of structured documents.

Conclusion
Developed database object gas production for the control of fire is an ordered heterogeneous storage of technical documentation, differentiable on textual and graphical information.

Key words: information environment, database, fire safety, text and graphic information

Development of the information environment in general means association of separate components of system in uniform model. Thus each subsystem
is isolated from other parts of model and solves own problems [1].

**Information system**
The main document describing production of any industrial enterprise is the technological scheme (figure 1) [2]. In creating information systems there is a need of developing all stages for each process separately. Information system includes both technological scheme and the scheme of engineering networks [3], characteristics of process equipment, the scheme of piping for apparatus, and function charts of automation.

**Information environment**
The information environment represents the system built by the hierarchical principle «from the general description to sections and schemes».

Options of windows of the information environment are presented in figures 2 – 4.

The complex of graphic attachments allows to find quickly the necessary information, without touching a huge number of drawings.

Actions for localization and elimination of consequences of accidents are developed for all fire and explosion hazardous production facilities of a gas field.

One of the components of fire hazardous factors are the vessels working under pressure of more than 0,07 MPa. Another component is the combustible, flammable and toxic substances used in the process of preparation for transport. Hydrocarbons which are a part of natural gas and gas condensate, and also methanol (and its fumes) form flammable and explosive mixes with air, and the increased concentration of methanol, glycol, hydrocarbons in the working zone create hazard to the health of the service personnel.

Figure 1 – Window of information system «Technological Scheme of a Gas Field»

Figure 2 – Window of information system

Figure 3 – Window «Plan of Engineering Networks»

Figure 4 – Window of information system «Characteristics of the Process Equipment»

The main technological objects of booster compressor stations (BCS) are explosion-hazardous as the compressed gas with oxygen forms explosive mixes. The turbine installations used as drives are fire-dangerous objects due to their constructive and high-temperature parametrical characteristics in combination with large volume and length of oil system pipelines.

For gas production facilities, it is necessary to
define the main categories of explosion-fire danger and sanitary characteristics of production buildings, rooms and external installations.

Classification of data on fire- and explosion danger of a technological object is shown in Figure 5.

Information on the character of possible malfunctions and emergencies arising in case of non-compliance with requirements to process management, fulfillment of production operations, equipment operation is submitted in the fragment of algorithm of emergency closing-in of a gas field.

Fire protection of objects of the booster compressor stations works in three directions: warning, informing and liquidation.

At creating information systems of industrial chemical and gas processing enterprises that include a large number of elements, it is necessary to make the algorithm of interaction between elements of the system. Below are the system analysis, an example of drawing up the structure of information system and various procedures of its saturation with data and intellectual components [4].

Use of the geoinformation technologies which are a technological basis of creating information resources simplifies the problem of creating structure [5].

The structure of fire protection of gas field facilities may be presented as a hierarchical system.

The developed database is featured by putting in order various stored technical information on the process generally differentiated on text and graphic information [6]. Text information is presented by a set of documents regulating production and its components in compliance with GGOST, OST, standards, norms and instructions [7].

Figure 5 – Classification of data on fire- and explosion danger of the gas production facility

Figure 6 – Lines of fire protection of facilities

**Conclusion**

The information environment of a gas field (generally) provides timely control of fire safety of the gas production facilities. The created database of a facility represents the single structure including all text and graphic information describing technological process, norms of the technological mode, general characteristics of plants and units, raw materials and products of technological process, and schemes of gas field and its safe operation.
References


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