Секция 3: Средства создания и поддержки проблемно-ориентированных систем, основанных на знаниях, и экспертных систем

При эффективной механической (первичной) очистке БПК в сточных водах снижается на 20-30% , также в 2 раза сокращается содержание взвешенных твердых частиц.

Современная биологическая очистка (вторичная) сокращает содержание твердых частиц и БПК на 85%, а доочистка (третичный процесс) снижает количество примесей до 99%, в результате чего качество сточных вод доводится до соответствия необходимым нормативным показателям. Аналогичный результат дает усовершенствование и модификация оборудования разнообразными дополнительными установками для глубокой очистки.

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RESEARCH OF PROBLEMS AND TECHNOLOGIES FOR THE DEVELOPMENT SCHEME OF DATA NATIONAL STANDARD DATA TRANSMISSION FOR RUSSIAN OIL & GAS COMPANIES

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The main objective of the research is the development and implementation of methods of formation of XSD schema object descriptions and data parameters used for the transmission, processing and storage in the process of drilling and oil production in the domestic oil company.

The current state of the information infrastructure of the oil companies can be described as a system that is far from a single function of all of its components. In various parts of the production process of oil extraction and drilling are used little or not at all compatible compatible devices and software technologies, which often create difficulty and hinder the production process due to late or too long and interpretation of data between the target species. The prevalence of foreign technology and controllers (more than 80% of fishing) is not conducive to the development of domestic production of hardware and software solutions for the oil companies.

Data standardization in the development and production of hydrocarbons took the character of de facto standards in almost all major oil producing and service companies in the world. The initiator of the standards is the consortium "Energistics", http://www.energistics.org, formed and funded by leading oil companies of the world.

Developed three main data transfer standards:
1) WITSML (1.3.1, 1.4.1, 2.0) – widely used in the drilling of wells, data in on-line mode are transmitted to WITSML support standard server from the server, the geological model of the deposit collects data and builds on them geological section. It is used by leading companies - "Weatherford", "Halliburton", "Schlumberger", etc.;
2) PRODML v1.3. – data transmission standard for production processes. Integrates with WITSML v1.4.1.1 and partially compatible with it. It occurs apparently the integration of all standards in a single data transmission standard for the oil and gas industry.
3) RESQML V2.0.1 – Data transmission standard state of the underground part of the deposit, using data from various subsurface sensors including fiber. For data transfer protocol developed new ETP optimized for the needs of the oil companies.

The data from surface and underground sensors formed on estuarine SCADA- controllers and process control systems, production and reservoir pressure maintenance (RPM). Next, they enter the software agent and PRODML RESQML standards and sent to PRODML and RESQML server where it is stored in the database. Digital model of the deposit as required is drawn to the server, and uses this data to build a model of the current field. Analyzing predicting the behavior of an underground tank in different versions water injection in the reservoir pressure maintenance and selection of oil it produces optimal extraction algorithm. The

model generates a set of commands actuators (pumps, valves t. D.) and forwards them to the control systems and controllers.

First, the data standardization of oil and gas industry, the economic benefit will provide information on the infrastructure-transparent data can be received and processed anywhere in the enterprise information space. Data standardization will accelerate the formation of a truly intelligent field, with fully automated production of hydrocarbons. In Russia, no domestic standards for data transmission is not used or is being developed, mainly used outdated standards or type LAS WITS. Developed successful SCADA- system (telescope +), a large number of controllers to control production. There are domestic deposits "Geonaft" simulation package. However, they are used to transmit data or outdated foreign standards or is not compatible with anything personal.

Scheme of data transfer standard data - is a certain agreement describing the special designations of drilling and oil production data in a strictly fixed form. As part of this research is expected to create a schema using XML technology - to develop and register a domestic XSD data description scheme. XSD - a text file, which describes the rules for creating objects and their properties in XML, files.

Essentially, data schema defines the structure of data transmitted from the field to consumers. If you are using a data standard, you can bring only standardized data. The structure of the database schema consists of objects, sub-objects and data to them (well, the trunk, the well parameters, etc.) The basis of the data scheme is proposed to take the structure and organization of these schemes WITSML 2.0, but this structure is intended to define only the basic elements of the scheme data having the same value, both in Russia and abroad. Getting started with the need to develop domestic data circuits using all the accumulated experience of the domestic production of hydrocarbons. Create task data scheme is not simple, requires a survey of thousands of specialists and super specialists for evaluation of proposals received, but here you can use the Internet, which greatly accelerate the development of these schemes. As the data transmission protocol can be developed to use "Energistics" specifically for these purposes, ETP protocol. In this case, we can proceed as follows:

1) Creating a dedicated website (forum), which will allow access only to specialists of the oil industry, where all the participants will submit their proposals on the formation of these schemes;
2) Cooperation with domestic firms - taking options with their specialized equipment with the subsequent expansion of these schemes on the basis of assumed parameters;
3) Analysis of data from research organizations and educational institutions to address the problems in the oil and gas industry.

In the end, after the creation of the national database schema description, it will be possible to approve and register the product information in the Ministry of Industry, with the subsequent realization of the following products:

1) Agent converting data from sensors drilling and oil production to XML, according to national data description scheme;
2) The database, designed to support the condition of the domestic and international standards WITSML;
3) The server transmission, processing and storing incoming data.

These components are implemented with the orientation of the equipment that is most common in the domestic industry for the most easy integration into an existing manufacturing process of the oil companies. From a logical point of view WITSML document it consists of entities, which are described under the general provisions of the XML standard. In this case, the documents described and stored data on the wells, particularly detailed information about the drilling process at any time, the fixed equipment or system software to collect data about the drilling process. Access to the server via the HTTP protocol that allows access to the server from any device that has Internet access.

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