An Overview of China Intelligent Digital Oilfields Development in 2017

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Abstract. Today's world is at a great time where industrialization has progressed to informationization. The rapid development of information technology is bringing about profound and revolutionary changes. Adhering to the road of informationization is an inevitable requirement of the internet era of big data and an inevitable requirement for meeting the challenge of contradictions and is an inevitable requirement for the transformation and upgrading of enterprises for the rejuvenation and development. China's oil enterprises are facing the new challenges of reform and sustainable development, and we must speed up the information construction in oil fields. Accelerating the oilfield information construction has become a job requirement. This paper introduces influential information forum of China petroleum and petrochemical industry in 2017, including the integration and development of the fifth forum of China Petroleum & petrochemical industry, the fourth intelligent digital oilfield open forum iDOF2017, the Fifth International Conference on Digital Oilfield academic and digital engineering of Daqing Oilfield for oil and gas business scene. This paper introduces the main contents of each conference and new ideas of scholars and experts, so as to provide action guidelines for relevant personnel in the petroleum industry, so that we can work together to promote the robust and rapid development of informatization in oilfields.

Introduction

With the release of China's "Special Plan of Action for Integration of Information and Industrialization", we will accelerate the implementation of "Made in China 2025", promote the integration of "smart manufacturing" and "internet+" and actively build an automated, digitized and intelligent production and operation management of new models to promote quality improvement, transformation and upgrading. Effectively strengthen the network, information security and other information construction, it will make full use of cloud computing, internet of things, big data, mobile Internet and other information technology, information technology to promote industrial development and progress. Since 2017, all petroleum enterprises in China have been carrying out a series of work in the development of enterprise informatization following closely the national strategic deployment. This paper introduces the influential information industry conference in petroleum industry as the main content and introduces the development trend of informatization in petroleum enterprises as industry staff to share relevant information to jointly promote the robust and rapid development of all oilfield enterprise information.

The Depth Integration of Information and Industrialization of Oil Enterprises

In order to promote the deep integration of the two industries in the petroleum and petrochemical industry, we promote enterprises to improve quality and efficiency, transformation and upgrading. China Petroleum and Chemical Information Society, China Petroleum and Petrochemical Engineering Research Association, China Chemical Industry Society held the 5th China Petroleum and Petrochemical Industry Integration Forum for Dual Integration on April 26-27, 2017 in Hangzhou [1]. The main focus of the petroleum and petrochemical natural gas exploration and development of the industry will include storage and transportation, refining and chemical industry, sales, engineering and technical services, construction, equipment manufacturing, integration of two pilot units and enterprise information construction. Datang Mobile, as an important informatization product and service provider

in the petroleum and petrochemical industry, was invited to attend the meeting. Datang mobile application expert Guo Qing delivered a speech titled "TD-LTE Private Network and IoT Solution for Oil and Gas Production Industry" at the conference [2].

Intelligent Digital Oilfield Forum

Open Forum for Intelligent Digital Oil Fields (iDOF) was jointly initiated by professors and experts from six petroleum universities and oil industries, including China University of Petroleum (Beijing), China University of Petroleum (Hua Dong), Southwest Petroleum University, Xi'an shiyou University, Northeast Petroleum University, Yangtze University. The purpose of the iDOF is to further strengthen the relationship between academia and industry in digital oilfield, accelerating the popularization and application of high technology and face to face communication. The iDOF forum has implemented by turns, with the first three sessions being held in Xi'an (Xi'an Shiyou University), Daqing (Northeast Petroleum University) and Wuhan (Yangtze University) respectively.

The Fourth Intelligent Digital Oilfield Open Forum (iDOF2017) was held at the Chengdu Campus of Southwest Petroleum University from July 21 to July 23, 2017. The main topic of the conference was Energy Big Data and Oil & Gas Industry 4.0. The meeting has received positive responses from well-known experts and scholars from China. PetroChina, Sinopec, CNOOC and other oil universities scholars and experts participated in the conference [3].

Topics for iDOF2017 session include:
- Construction and application of big data ecosystem in oil field.
- System science and its application in the construction of intelligent oil fields.
- Energy big data practice model discussion.
- Intelligent digital oilfield cloud computing, internet of things and mobile internet applications.
- Intelligent oilfield application system construction.
- GIS and its application in oil and gas fields.
- Digital reservoirs, digital wellbores and their visualization.
- Intelligent drilling and completion.
- Exploration and development integration of key technologies.
- Enterprise production, management and management of the integration of key technologies.

At the conference, Wang Ling, Vice President of Southwest Petroleum University, reviewed the development of digital oilfields. She pointed out that digital oilfields are based on oil & gas fields and geospatial coordinates. Through mass storage and heterogeneous data fusion, multimedia and virtual reality technology, we will achieve multi-dimensional expression of oil and gas fields. Prof. Cheng Guojian from Xi'an Shiyou University made the keynote speech of "Survey on international intelligent digital oilfields in 2017", summarizing the latest international developments in intelligent digital oilfield. The report covers a wide range of topics and is very informative and has become the highlight of the conference. Prof. Gao Zhiliang from Chang'an University said that data is the number expression of the internal facts of material things. The data can prove the facts, explore the unknown and drive the computation. The future of human society will be dominated by data scientists. According to Wang Quan, deputy director of Daqing Oilfield Information Center, according to quantum thinking, it is difficult for the human brain to understand and organize a high-dimensional world and can only study and manipulate it. The big data is based on an infinite dimension of mathematics and computer way to break through the human brain dimension, and thus find the law of human discovery can not.

In front of the data, the oil field will be a transparent field. In the era of big data, a series of work in the oilfield will be reformed due to the technological leaps and bounds. The development and management of oilfields will be more scientific and streamlined. A number of professors and experts reported their working at the meeting. The report covered the analysis and application of textual and spatial data, the construction of digital oilfields and the solution to the problems of petroleum geology by using big data. The conference will surely further promote the exchange and cooperation between

universities and oilfield enterprises in the construction of digital oil and gas fields, and promote the research of digitization, intelligence in oil and gas fields.

Digital Oilfield International Academic Conference in China

The International Conference on Digital Oilfield is a professional international academic conference approved by the Ministry of Education and supported by the Digital Oil Research Institute of Chang'an University. The conference holds the idea of opening, exchanging, promoting and developing, and focusing on the digital, intelligent and automatic construction of oil and gas fields. The purpose of the meeting is to build a set of academic group, industry, technology, exhibition integration platform, aggregation of new technologies and methods, new equipment and applications. They study together to discuss the problem of development and promote the development of digital and intelligent China oilfield. From October 16 to 17 in 2017, the 5th International Conference on Digital Oilfields was held in Qingdao. The academic conference was co-sponsored by Chang'an University, China University of Petroleum (East China), Sinopec Shengli Oilfield Branch [4].

Experts, scholars and business representatives from Britain, the United States, Spain, Bangladesh, Kuwait and other countries and regions as well as over 200 digital oil field scholars and managers from PetroChina, Sinopec, CNOOC, petroleum universities and the State Geological Survey attended the international conference. Prof. Liu Jianchao attended the opening ceremony and made a speech. He hopes to make his contribution to the informatization, digitization and intelligence construction of China's oil and gas fields by holding an international academic conference on digital oilfields. He also hopes to support the advanced digital, intelligent and big data technologies of China's "Belt and Road". Prof. Lin Chengyan, dean of the School of Earth Sciences and Technology, China University of Petroleum (East China) pointed out that digitization and intelligence are the current trend of oilfield development, the only way for oilfield enterprises to upgrade and upgrade, and an effective means of maintaining competitiveness in low oil price dilemmas. With the help of the Digital Oilfield International Conference Platform, they can conduct a wide range of academic exchanges and promote the rapid development of the digital oilfield.

The conference was held on the main topic of "Letting Data Work, Making Oilfields Smart". A total of six keynote speeches of the conference were held, and 52 experts and scholars made academic reports. The main meaning of this topic is to find ways to find smart oil fields looking for data science and big data technologies and their educational models, looking for digital / smart / big data national technologies and offering "One Belt and Road Initiatives." Scholars and experts give seminar report, rich academic atmosphere. Among them, "looking for smart oil fields" is a key issue. Kang Yuzhu, academician of Chinese Academy of Engineering, Antony Roland Edwards, chief executive officer of British Gypsum Global Consulting Co., Ltd., Wang Yukai, member of National Informatization Expert Advisory Committee, and Jay Hollingsworth, chief technical executive of US energy flow, made reports at the conference.

The conference formed the following consensus: First, smart oil fields are a basic trend in the future development of oil and gas fields. The construction of smart oil and gas fields is an upgrade based on the digitization of oil fields. Therefore, they must consolidate the foundation in a solid way. Without a good infrustration, the smart field is the "towering castle". Second, in China, the construction of smart oilfields is still at the era of version 1.0. At present, the construction of smart oil and gas fields in many oilfield enterprises is still under the demonstration and experimental construction. It is by looking for intelligent oilfield, in order to achieve top-level design, integrity and system construction for intelligent oil towards the version 2.0 target. Third, the construction of intelligent oil field is still in progress. To give a portrait of an intelligent oil and gas field today is to have a "smart brain" in the oilfield.

Oil and Gas Business Digital Engineering Meeting in Daqing Oilfield

Information construction is a systematic and strategic project in the oilfield. It is the key to realizing strong foundation, upgrading and rejuvenating. November 29 in 2017, the site meeting of Oil and Gas Business Digital Project in Daqing Oilfield was held in the Third Oil Production Plant, summing up and popularizing the successful experience gained in information construction in recent years, studying the deployment of the main task of information construction in the next period and accelerating the construction process of oilfield informationization. The meeting stressed that all systems and organizations should take this on-site meeting as an opportunity to step up their efforts in informatization in accordance with the strategic plan of "three-steps walking" and make solid progress in information construction so as to "make a good benchmark and build a hundred-year oilfield" new bigger contribution.

In recent years, in order to adapt to the oil and consolidating the foundation of transformation and upgrading requirements of oil field, all staff must adhere to guidance, strengthen top-level design, strengthen organizational leadership, increase efforts to promote, vigorously implement the "Digital oilfield, Oilfield, Oilfield intelligent wisdom" by three steps strategy. In the organic integration of industrialization and informatization, traditional management and modern management, they have made many positive and effective explorations and practices, and achieved important results. The informatization of oilfields progressed steadily and played an important role in consolidating strong bases and upgrading and upgrading. They have built the integration and sharing of information platform, realized the personnel, equipment, technology and other data and information across regions and across business units, efficient sharing. They explore effective ways to promote the quality and efficiency of the management and organization change, realize the more management accurate, more operation convenient, significantly improve efficiency. They reduced the labor intensity of the production line and changed the traditional way of management, improved the work environment, reduced security risks, improved the safety level. They have accumulated preliminary experience of transformation and development, open up a new way of sustainable development of old oil fields. The transformation and development, and provide a fresh case, explore the way forward for the upgrading of oil field. They build professional team needs. It lays a solid foundation for the construction of digital oilfield, intelligent oil field and intelligent oilfield in the future. At the meeting, Executive Deputy General Manager and Administration executive deputy director in Daqing Oilfield, Wan Jun gave a report on the work of promoting the Daqing oil field oil and gas production business as to determine the overall goal of digital construction, the general idea, stage arrangements and key works in 2018.

Summary

In order to carry out the information construction of oilfield enterprises, we must step up efforts to accelerate and further improve the level of oilfield information. It also inevitably needs to constantly strengthen exchanges and cooperation between universities, research institutes and oilfield enterprises and seek common development strategies. The workers in various oilfield enterprises must form joint efforts to carry out the general requirement of "strengthening top-level design, highlighting the problem orientation, focusing on industrial upgrading and pursuing quality and efficiency". We should further strengthen leadership and meticulous organization, intensify efforts and continue to push forward, and strive to achieve major breakthroughs in information technology development, and play a more important role in the development of oilfield enterprises. To strengthen the top-level design, we must study the direction, path and mode of information construction from the overall and strategic level of the oilfield. We should adhere to production, face to reality, face the future, meet the needs of business and deepen the practical application. Focus on transformation and upgrading, we must give full play to the support of information technology, promote the role of promoting the business to a higher level and higher level forward. The pursuit of quality and efficiency, to improve efficiency and efficiency is as our overall goal.

References

[1] Information on http://www.ciesc.cn/notice/a374.html

[2] Information on http://www.chinaprice.gov.cn/zhbd/35072.html

[3] Information on
http://www.swpu.edu.cn/bgw/content.jsp?urltype=news.NewsContentUrl&wbtreeid=1213&wbn
ewsid=34043

[4] Information on http://zyonline.chd.edu.cn/info/1038/87599.htm