

Application Analysis of Energy Saving Measures in Oilfield Electrical Engineering

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Abstract: With the rapid development of the social economy, people are paying more and more attention to environmental issues. If society wants sustainable development, it must put energy conservation and emission reduction on the agenda. At this stage, China has vigorously promoted energy conservation and emission reduction, and all walks of life have gradually embarked on the green road of energy conservation. In recent years, energy saving measures has been widely used in China's oilfield electrical engineering. The author explores and analyzes the basic principles of energy saving measures applied in oilfield electrical engineering, and proposes an effective way to apply energy saving measures in oilfield electrical engineering, hoping to contribute to the energy saving effect of oilfield electrical engineering.

Keywords: *energy saving measures; oilfield; electrical engineering; application route*

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1 Introduction

At this stage, the excessive consumption of energy and non-renewable resources are facing a depletion crisis, and the application of energy saving measures in various industries is an inevitable trend. Energy consumption is improved through the widespread use of energy saving measures. The effective application of energy saving measures in oilfield electrical engineering is a focus of the society at this stage, and has achieved certain energy saving effects.

2 Basic principles of application of energy saving

measures in oilfield electrical engineering

2.1 Meet the basic principles of oilfield electrical engineering applications

The basic principle of meeting the application of oilfield electrical engineering means that when applying energy saving measures, not only must the goal of energy conservation be achieved, but also the smooth development of oilfield electrical engineering needs to be met, corresponding to the specific requirements of color field index, color temperature and luminance in oilfield electrical engineering^[1]. In the process of continuous implementation of mining work, oilfield enterprises should integrate energy saving measures into the entire oilfield electrical engineering. It should be noted that in the process of applying energy saving measures, it is not possible to limit the smooth development of oilfield electrical engineering in order to achieve energy saving purposes.

2.2 Basic principles for comprehensive consideration of actual economic benefits

At this stage, the application of energy saving measures in oilfield electrical engineering must adhere to the basic principles of comprehensive consideration of actual economic benefits. We must not only pay attention to the application of energy saving measures, but ignore the actual economic benefits of national conditions and oilfield electrical engineering, resulting in excessive investment in oilfield electrical engineering. This in turn increases the operating costs of the boundary project. Under such circumstances, the use of energy saving measures does not have any meaning, and it is difficult to achieve energy saving effects in a true sense^[2]. Therefore, when applying energy saving

measures in oilfield electrical engineering, the effective operation and benefit recovery of oilfield electrical engineering should be comprehensively considered, so as to effectively avoid excessive consumption of oilfield electrical engineering investment when applying energy saving measures.

2.3 Basic principles for saving unnecessary energy

consumption

The basic principle of saving unnecessary energy consumption is that in the process of applying energy saving measures in oilfield electrical engineering, energy saving should be an important starting point, focusing on unnecessary energy saving parts. See Table 1 for details.

Table 1

| The main steps | Specific contents |
|---|---|
| Analysis of oilfield electrical engineering | In-depth analysis of oilfield electrical engineering to find out which part is not the energy consumption necessary for the development of oilfield electrical engineering projects. |
| Application of energy saving measures | Take appropriate measures to save this part of unnecessary energy consumption. For example, through the analysis of electrical engineering, it is found that the power loss of the transformer is not related to the smooth development of electrical engineering. At this time, it is necessary to reduce the power loss of the transformer, thereby achieving the purpose of energy saving. |

3 Effective ways of applying energy saving measures in oilfield electrical engineering

3.2 Control energy loss on oilfield electrical engineering lines

3.1 Control transformer power loss

For oilfield electrical engineering, the power loss of the transformer is not closely related to the smooth development of the oilfield electrical engineering project. Reducing the transformer power loss will not affect the oilfield electrical engineering^[3]. For this part of energy consumption, energy conservation measures should be actively applied to effectively control it, thereby reducing the power loss of the transformer. In the process of selecting a transformer, oilfield companies should choose a transformer with energy saving characteristics to achieve energy saving purposes.

In the process of implementing oilfield electrical engineering, there is a resistor on the equipment line, and when there is current flowing through the equipment line, power loss occurs^[4]. For the total active power consumption of the equipment line, it is a more objective part. In the process of applying energy saving measures in oilfield electrical engineering, it is necessary to pay sufficient attention to the power loss on the equipment line. In the case that the current on the equipment line cannot be changed, the oilfield enterprise can only reduce the power loss on the equipment line by reducing the power loss on the equipment line, thereby achieving the purpose of energy saving. See Table 2 for details.

Table 2

| Main practice | Specific contents |
|--|---|
| Use a wire with a lower resistivity | A material with a relatively small resistivity is selected as a wire, like a copper core. Compared with wires of other materials, the copper core has a relatively small resistivity, which can be realized as a wire. |
| Shorten the length of the overall wire | When carrying out oilfield electrical engineering, it should be as far as possible to ensure that the overall equipment line is straight, and the low-voltage line should try not to go back to the head line, so as to shorten the length of the whole wire and make the transformer as close as possible to the center of the load. |
| Reasonable setting of low voltage power distribution | For the low-voltage power distribution in high-rise building electrical, it should be as close as possible to the shaft part, so as to fully realize the application purpose of energy saving measures in oilfield electrical engineering. |

3.3 Control wire cross section

In the application of energy saving measures in oilfield electrical engineering, the control of the cross-section of the conductor should be strengthened, and the cross-section of the conductor should be reasonably increased^[5]. In the case of long oilfield electrical engineering equipment lines, it is necessary to control

the cross section of the conductors reasonably and scientifically to meet the needs of the line for thermal stability protection. As the cross section of the wire is increased, the corresponding cost increases. Therefore, when applying energy saving measures, the cross-section of the wires must be properly controlled. Through the use of seasonal load lines, users who use

electrical engineering for long-term use can be used in the stage where some users do not use electrical engineering, thereby reducing the line and resistance, thereby achieving the purpose of energy saving in oilfield electrical engineering^[6].

3.4 Application of comprehensive energy saving technology

Combined with the actual measurement situation of oilfield electrical engineering, rational application of comprehensive energy saving technology, to further clarify the application of energy saving measures in oilfield electrical engineering, and summarize them through various efficient methods. Therefore, formulate practical and feasible energy saving solutions for oilfield electrical engineering. See Table 3 for details.

Table 3

| Main practice | Specific contents |
|---|---|
| Analysis of oilfield electrical engineering machinery and equipment | In-depth analysis of the actual use and specific operations of oilfield electrical engineering machinery and equipment. |
| Increase reactive power compensation device | According to the main characteristics of China's oilfield electrical engineering at the present stage, increase the capacity of the capacitor and increase its power factor, thereby realizing the increase of the reactive power supply capacity of the entire module, thereby achieving the purpose of energy saving. |

For example, the electric motor in the oil field electrical engineering can effectively reduce the reactive power in the line transportation of the equipment. In the case of a motor running at no load, the amount of oil it consumes fully reflects the actual load of the motor. It can be seen that the load of the motor has a close relationship with its capacity. Therefore, it is possible to use the integrated energy saving technology to increase the load and capacity of the motor, thereby causing it to generate the maximum power, thereby solving the problem of insufficient load^[7]. In addition, oilfield companies should promptly replace the motor with insufficient load, so as to effectively avoid the occurrence of related safety accidents.

3.5 Improve and perfect related energy saving technologies

In the process of applying energy saving measures in oilfield electrical engineering, attention should be paid to strengthening the improvement and perfection of relevant energy saving technologies^[8]. In the case that the electric energy cannot be stored, it is highly probable that various changes will occur during the operation of the electric power, and there is usually a waste of power or a shortage of electricity. Relevant technical staff should conduct an in-depth analysis of this problem, timely find the energy consumption generated during the operation of the line, and the difference between the peak length and the valley peak difference. The duration of the current increment is controlled by the serial number and the point flow. Correctly consider the long-term operation of oilfield electrical engineering equipment, strengthen the

improvement and perfection of relevant energy saving technologies, and set technical goals in combination with the sinusoidal current absorption power balance of stable peak waves. Promote relevant energy saving technologies to meet the requirements of these aspects, so as to effectively solve related problems^[9].

3.6 Improve the stability of current and voltage in oilfield electrical engineering

The application of energy saving measures in oilfield electrical engineering must ensure the stability of electrical engineering current and voltage. This is because small changes in current and voltage are highly likely to have a major impact on the normal operation of electrical engineering equipment^[10]. If there is a large gap between the voltage and the rated voltage in the oilfield telecom project, it will not only greatly reduce the running performance of the equipment, but also greatly reduce the efficiency of equipment operation. Even due to the voltage gap is too large, various faults are caused, which eventually causes the equipment to fail to operate normally. In the case of unstable current and voltage, the energy loss of the overall line will increase significantly, and the service life of the equipment will be shortened. Therefore, it is necessary to improve the stability of the current and voltage of the electric engineering electrical engineering. Through the application of energy saving measures, the scientific and reasonable adjustment of the current and voltage can reduce the reactive power loss in the line transmission, thereby achieving the purpose of energy saving.

4 Conclusion

To sum up, the application of energy saving measures in oilfield electrical engineering needs to follow the basic principles of meeting the application of oilfield electrical engineering, the basic principles for comprehensive consideration of actual economic benefits, and the basic principles of saving unnecessary energy consumption. In this way, the purpose of energy conservation is realized in the true sense, thereby improving the economic and environmental benefits of oilfield electrical engineering, thereby promoting the better development of oilfield electrical engineering.

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