Chapter 15

The Information Construction of Wind Farm Based on SIS System

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ABSTRACT

In the wind farms, fans are widely distribution with large amount and they are away from the monitoring center, working environment is poor. In order to ensure the safe and stable operation of the wind farms, the wind power operation requirements need to be satisfied, own better function performance and stability of remote monitoring system to improve the management efficiency. In view of this, the power group increasing highly requirements on wind farm group management, but at present, the single SCADA system which the fan manufacturers offered has failed to meet the requirements. On the basis, this article designs the wind farm supervisory information system (SIS), and realizes wind farm cluster control, data analysis, performance optimization and fault warning.

1. INTRODUCTION

Along with the global resources and environment worsening, the development and utilization of new energy has gotten more attention. While, comparing with traditional energy sources, wind energy is a clean renewable energy. In addition, the availability of wind energy is widely distributed around the globe. Because of these unique advantages, wind power has become an important part of sustainable development in many countries. Large-scale wind power operation will increase uncontrolled power output, which will generates a lot of pressure for electric power dispatching. The power grid dispatching can only pull restricted to reduce wind power influence on power grids, which gets a lot of wasting of energy. Therefore, establishing wind power generation enterprise information construction platform just like fan short-term power prediction, generator fault prediction and wind power remote monitoring can provide timely, complete and accurate information service, help enterprises to improve the wind power modern management level, and achieve data sharing.
2. THE PRESENT SITUATION OF THE WIND FARMS REMOTE MONITORING SYSTEM

Currently, the wind farm supervisory control and data acquisition (SCADA) system are provided completely by fan manufacturers, the main problems are shown as follows:

1. **Compatibility Issues:** There are more than 40 companies engaged in research and development wind generator, and more companies are developing proprietary fans components or complete machine. Large-scale wind farm are generally provided by multiple vendors, the manufacturers of SCADA systems are not compatible, different types of fans lack of effective monitoring and management studies, it is difficult to unified maintenance and management.

2. **Information Development Level:** At present, the problems of wind power still concentrate in the reliability of wind power generation, power prediction, and Security to the grid, etc. In the SCADA software, the application of information and centralized data collection is still the degree of showing. It is only available to supply operator real-time data and historical data without deeper level of information development, such as condition monitoring, fault diagnosis, operational guidance and so on.

3. THE OVERALL DESIGNING AND SOLUTION OF WIND FARM SIS SYSTEM

We are currently using remote monitoring system for wind farms, which refer to the experience of thermal power project. Using OPC technology, we have integrated the data that is from different fan manufacturers, and gathered real-time data of run fans and remote communication of booster station. The Vestore is used as large real-time database storage platform, and this system can realize the remote monitoring, data analysis and processing, provides management with the power plant in the various operating statements, on the basis of this, we also realize equipment fault diagnosis and life management of fans, wind power prediction, and other functions.

Remote monitoring system for wind farm should include the following function modules: real-time data collection and monitoring, remote centralized control, performance statistics and analysis, fault early warning, life management, output statistics and forecasts, operation optimization. The functional design should include three levels. First, the underlying data collection and monitoring, namely: using OPC technology to achieve real-time collection for fans and booster station, which save in real time / history stored in the database. By the way, it is shown in web as configuration mode. The second is the upper fault warning analysis, life management function, which including: equipment failure records, fan performance comparison, statistics and fan life management. The third level is a fan of the forecasting and planning, which is on the basis of meteorological data and historical data. This module can get fan’s model to predict short-term and even medium-term output forecast for the power grid to provide scheduling support.

The module used to implement specified data collection from existing SCADA systems and substation system. Base on the Web application technology and Browse/Server(B/S), when data uploaded to data center, users can access via IE overview of wind resources and wind farms, an operation status, substation operation, real-time wind data and other information, real-time operating status of individual fans, all kinds of alarm and fault information. this feature provide wind farm running status of monitoring real-time power and other information for leaders, and they can easily check the production of key information, including core businesses of production manage-
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