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Specification of realtime supervision and management information system for power generation enterprises

发电企业生产实时监管信息系统

技术条件

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Table of Contents

Foreword

This Standard is drafted according to the rules given in GB/T 1.1-2009 *Directives for standardization - Part 1: Structure and drafting of standards*.

This Standard was proposed by China Electricity Council.

This Standard shall be under the jurisdiction of Electric Power Industry Thermal Automation and Information Standardization Technical Committee.

Drafting organizations of this Standard: Xi'an Thermal Power Research Institute Co., Ltd. and China Huaneng Group.

Main drafters of this Standard: Ge Xin, He Xin, Yang Dong, Guo Sen, Fan Weining, Li Zhenhua, Wang Zhihui and Zhu Guihong.

Comments or proposals in the implementation of this Standard shall be feed-backed to Standardization Management Center of China Electricity Council (No.1, 2nd lane, Baiguang Road, Beijing, 100761).

Specification of realtime of supervision and management information system for power generation enterprises

1 Scope

This Standard specifies the hardware and software configuration, applications, system security, documentation, acceptance and other technical requirements of realtime supervision and management information system for power generation enterprises.

This Standard applies to the management of plan-design, purchase, acceptance and other processes of realtime supervision and management information system for power generation enterprises.

2 Normative references

The following documents are indispensable for application of this document. For the dated documents so quoted, only the dated versions apply to this document. For the undated documents so quoted, the latest versions (including all modification sheets) apply to this document.

GB4208 Degrees of protection provided by enclosure (IP code) (GB 4208-2008，IEC 60529:2001, IDT)

GB/T8567 Guidelines for computer software product development documentation (GB/T 8567-2006, ISO/IEC JTC1 SC7N2106-1999, NEQ)

GB/T 17859 Classified criteria for security protection of computer information system (GB/T 17859-1999, DOD 5200.28-STD, NCSC-TG-005)

GB 50229 Code for design of fire protection for fossil fuel power plants and substations

DL/T 262 On-line calculation guide for coal consumption of generating units

DL/T 924-2005 Specification for supervisory information system for plant level of fossil fuel power plant

DL/T950 Guide for power plant identification system

State Electricity Regulatory Commission No.5 Order - Electric Power Secondary System Security Protection Regulation

State Electricity Regulatory Commission Electricity Regulatory Safety (2006) No.34 - Electric Power Secondary System Security Protection Overall Program

3 Terms and definitions

For the purpose of this document, terms and definitions defined in DL/T924-2005 AND the following terms and definitions shall apply.

3.1

Realtime supervision and management information system

Information system that supervises and manages the production process through production process realtime/ historical data platform for power generation enterprises based on multiple power plants (companies).

3.2 Supervisory information system for plant level; SIS

Realtime supervision and management information system that service for realtime production process comprehensive optimization of the whole plant through production process realtime/ historical data platform for thermal power plant.

[Definition 3.1 in DL/T 924-2005]

3.3

Function computer and client computer

Computers or servers with SIS application functions and management functions are called function computers, including database servers, application software function computers or servers, system backup servers, anti-virus servers, maintenance and management computers, etc. Other computer working stations in the system are called client computers. [Definition 3.2 in DL/T 924-2005]

4 General

4.1 The implementation of the system shall be able to be done step-by-step according to the actual requirements and technology development plan-design. The system shall insist on reliable, versatile and scalable principles.

4.2 The metrological unit shall comply with national standards and provisions for common physical and legal metrological units. The data-marker design shall follow the requirements of DL/T 950.

4.3 The data scale of realtime/historical database shall be determined according to requirements of system construction and development. The collection content and collection code of data shall be standardized and unified; the data information processing shall be standardized and unified; the accuracy, comparability and maintainability of data at measuring points shall be ensured; the function of checking the data quality shall be provided to facilitate the check and maintenance of data.

hot plug/unplug redundant power supplies and hot-plug / unplug redundant fans. Non-core switches can use parts according to the specific situation.

5.2.2 Database servers

Use redundant arrays of inexpensive disks shared by database servers; it can use independent storage systems shared by networks. It can use database server systems with redundancy configuration or fault tolerant database server systems. Database server systems with redundancy configuration shall support the automatic failure switch-over through cluster working mode.

5.2.3 Data source interface stations at power generation enterprises

5.2.3.1 Use redundancy mode; the caching of data shall be able to include at least production process information within one week; Support the wake-one-LAN and be able to send the data in buffer memory to the database server automatically when the network communication returns to normal.

5.2.3.2 Remote communication shall be able to do with collection stations at power plants; the unit running information shall be able to obtain from the collection stations at power plants in real time.

5.2.4 Data collection stations at power plants

5.2.4.1 Use redundancy mode; the caching of data shall be able to include at least production process information within one week; Support the wake-one-LAN and be able to send the data to caching them in the database server automatically when the network communication returns to normal.

5.2.4.2 Do not alter and configure the control internet under power plants, Do not control the manufacturing process directly; it shall not affect the control function of the underlying production control internet.

5.2.5 Function computers and client computers

Set different operations and system access limits according to the functions of the function computer and client computer. Client computers shall only be equipped with basic supervision and inquiry functions to production processes without system management function.

5.2.6 Peripheral equipment

Configure systems and date backup equipment. Backup equipment can be magnetic tape drive equipment or read / write light disk drive equipment. When conditions are ripe, it can use magnetic tape backup systems or disk arrays.

5.2.7 Cabinets, cables and arrangement

5.2.7.1 Network backbone equipment and function computers shall be installed in standard computer rooms; the rooms shall be taken with security measures preventing non-system maintenance personnel from operating.

5.2.7.2 The protection grade of cabinet enclosure shall comply with requirements of grade IP54 in GB 4208; the cabinet door shall be equipped with conductive door closing strip to improve the anti-RF interference ability; heat dissipation space and air filter apparatus shall be taken into account in cabinet arrangement. Temperature detection means shall be installed in the cabinet, which can alarm automatically when the temperature is too high.

5.2.7.3 Terminal strips, cable clamps, cable troughs and wiring troughs equipped in cabinet shall use products made from flame resistant materials. The fireproof requirements of interconnection communication cables, signal cables, twisted pairs (including contact pieces of two ends) between equipment and fireproof requirements and others shall comply with relative provisions of GB 50229. Meantime, flame retardant cables shall be selected according to conditions in the cable-laying site.

5.2.8 Power supply and environment

5.2.8.1 Network backbone equipment and function computers shall have two power supplies, among which one is an uninterrupted power supply (UPS).

5.2.8.2 Power supply shall have at least 25% of margin. In the case where UPS loses AC power supply, UPS can guarantee to provide power for the system for at least 30 minutes.

5.2.8.3 The system can run continuously in the power plan site environment with large electronic noise, radio interferences and vibration without decreasing the system performance.

5.2.8.4 Various anti-noise technologies, including optoelectronic isolation, common mode rejection rate, reasonable grounding and shield shall be used in system design. When electromagnetic interference and radio frequency interference at 4.8W in a short time or in an instant with working frequency of 400MHz~500MHz are sent by equipment 1.2m away from electrical equipment, it shall not affect the normal working of the system.

5.2.8.5 The system shall be able to run continuously when the ambient temperature is 0°C~50°C and the relative humid is 10%~95% (no condensation).

5.2.9 System clock

Equip a set of satellite clock equipment to provide unified clock calibrations signal for the whole system.

5.3 Software system

5.3.1 Operation system

The computer operation system configured for the system shall comply with requirements of 7.4.1 in this Standard. The database server operation system shall have functions of

5.4.5.4 The database server platform shall be able to provide standardized ODBC / JDBC / OLEDB and other open database interfaces and to provide function-calling interfaces and to embed visual scripting programming language for applications through methods based on component object model technology, application programming interface (API) or software development kit (SDK) to support the development of application function software.

5.4.5.5 The database system shall be equipped with a serious of basic easy client software with component technology; it mainly includes drawing function software, database configuration tools, dynamic display and data updating software, software for bar chart and tendency chart generation, display software, report development software and so on.

6 Application functions

6.1 Basic application functions

6.1.1 Collection, remote transmission and long-term storage of production data

6.1.1.1 Achieve the quick collection running parameters (analog quantity and switching quantity0 of power plants and units and other realtime data within supervision and management range. The collection frequency of the system shall reach the second level.

6.1.1.2 For power plant that has established plant level SIS, it shall directly collect data from the plant level SIS send to the realtime database at power generation enterprises.

6.1.3 For power plant that has not established plant level SIS, it shall collect data from the control system interfaces provided by the power plant and send to the realtime database at power generation enterprises through one-way physical isolation means.

6.1.1.4 Provide interface automatic caching function. Once the data network is interrupted, the data interface shall be able to cache data locally and write them into the database automatically after the network recovers. The caching time shall not be less than one week.

6.1.1.5 Provide the function of monitoring the data collection interface status and warning function.

6.1.1.6 Provide the function of entering data manually. Data that cannot be collected in real time can be acquired through data filing or reports with fixed format automatically.

6.1.2 Inquiry, monitoring, analysis and statistics of main running parameters

6.1.2.1 Collect, inquire and monitor main running parameters according to functional requirements, so as to achieve the comparison and statistical analysis of running parameters among power plant and units, and to know the running situation of main equipment, to keep abreast of the overall health of the unit and strengthen the monitoring

7 System security requirements

7.1 General requirements

7.1.1 The security level of the system shall be determined; a complete security strategy shall be taken to the system according to State Electricity Regulatory Commission No.5 Order, State Electricity Regulatory Commission No.34 Order and GB/T 17859 to ensure the running security of the system.

7.1.2 The range involved in system security protection shall include malicious codes, unlawful attacks and misuses,

7.1.3 Comprehensive prevention measures shall be taken in technology and management for system security.

7.2 Network structure security

7.2.1 The network security shall be protected according to different security level for the connection BETWEEN system network architecture AND external network, SIS system network and production process control system.

7.2.2 When the system connects with power plant production process control system network, it shall install network one-way physical isolation devices among system networks.

7.2.3 The system network structure shall be able to pass the test conducted by national computer security department, and shall be able to prevent external network virus from intrusion and from damaging the system trough illegal invasion.

7.2.4 Set the parameters of security mechanism provided by the operational system effectively; take use of the filtering and shielding function provided by TCP / IP communication protocols, routers, switches and firewalls; limit the system access right; customize the network access among data collection interfaces to prevent possible attack; there shall be authorization limits to administers and users to system data release and display and inquire operation.

7.3 Network anti-virus and anti-hacking strategies

7.3.1 The network shall be set with a separate anti-virus server or anti-virus service functions, and shall be installed with anti-virus software and anti-hacking software certificated by national computer security department.

7.3.2 System administrators shall upgrade antivirus software and virus database regularly, and conduct a comprehensive virus scanning and anti-virus to computer equipment in the system regularly. Conduct at least one comprehensive virus scanning and anti-virus each month.

7.3.3 The system network shall be done with system vulnerability testing and repair

requirements. The acceptance test reports are complete with correct data and with signatures of relevant authorities.

9.4.1.2 In the case that the basic functions of the system agreed in the contract between the supplier and the demander meet the requirements, run for at least 60 days continuously along with the information objects.

9.4.2 Completion acceptance requirements

9.4.2.1 In project completion acceptance, check the test reports of exit-factory acceptance AND acceptance of site installation and commissioning first, and confirm them. If necessary, carry out spot check and test according to the situation. In completion acceptance of imperfect projects at above stages, carry out strict tests and checks.

9.4.2.2 The main tasks of the project completion acceptance include acceptance test to main functions and performances AND assessment to the comprehensive acceptance of the whole system. The acceptance test to system shall be carried out according to Annex A.12 in DL/T 924-2005; the acceptance test to application software shall be carried out according to contents of Annex A.1 in this Standard.

9.4.2.3 Check each items of functions and indicators of database; carry out sampling test to realtime data and accuracy of decompressed data; calculate the standard deviation; assess the overall performance of database.

9.4.2.4 Acceptance test to application software functions: test application software functions; give a correct and comprehensive evaluation to each application function; submit a comprehensive evaluation report to application software functions.

9.4.2.5 System security acceptance tests: carry out inspection and acceptance to the system security, including operation systems, communication protocols, switches, firewall settings, user authorization, role definitions and other security steps; evaluate the system security performance.

9.4.2.6 System availability acceptance test: the system availability shall not be less than 99.9%; the assessment of system availability shall be done according to requirements of DL/T924-2005. The acceptance test range of system availability shall include the system itself and the data collection stations at power plants.

9.4.2.7 System reliability evaluation shall be done according to requirements of DL/T 924-2005.

9.4.2.8 Acceptance of documentation shall be done according to requirements of Chapter 8 in this Standard.

Test acceptance time		Acceptance-party signature		Supplying-party signature	

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