



Hengyi Industries Sdn Bhd
恒逸实业（文莱）有限公司

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Equipment Classification and Process Management System

设备分级与全过程管理制度



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	Equipment Classification and Process Management System 设备分级与全过程管理制度				
	Doc No.	HYBN-T3-07-0001-2024-2	Ver No.	2	Page 1 of 39

1 Purpose

目的

This System is hereby formulated to standardize the equipment classification and whole-process management and to define the responsibilities of departments and relevant personnel at all levels in equipment classification and whole-process management.

为规范设备分级与全过程管理，明确各部门及各级相关人员在设备分级与全过程管理中的职责，特制订本制度。

2 Scope of Application

适用范围

This System is applicable to all departments of the Company.

本制度适用于公司各部门。

3 Terms and Definitions

术语和定义

Equipment means Equipment Management equipment, power equipment, electrical equipment, instrumentation, metering equipment, etc.

设备：指机械、动力、电气、仪表、计量等设备。

4 Management Responsibilities

管理职责

4.1 Specified administrative authority

归口管理部门

4.1.1 Equipment Management Dept. is the specified administrative authority of the Equipment Classification and Process Management System. It shall be responsible for formulating (revising) the Equipment Management System and organizing the specialized examination, assessment and comparison of the Equipment.

机械动力部是设备分级与全过程管理的归口管理部门，负责制(修)订设备管理制度，组织设备专业检查、考核、评比。

4.1.2 Be responsible for organizing and reviewing the plans for plant shutdown and maintenance (including partial defect elimination), equipment repair and update reported by the Operation Department; Organize the implementation of the approved plan; Organize the quality inspection and completion acceptance of major equipment overhaul and device shutdown maintenance.

负责组织、审核运行部上报的装置停工检修（含局部消缺）、设备修理、更新计划；组织实施经批准后的计划；组织重要设备大修、装置停工检修的质量检查、竣工验收。

4.1.3 Be responsible for review of renewal/abandonment judgment and renovation scheme of important equipment, and for signing the technical appendices of repair, renewal and technical renovation projects.

负责重要设备更新判废鉴定、改造方案的审核；负责修理、更新和技术改造项目的技术附件签署。

4.1.4 Be responsible for organizing preparation of the list and the annual reserve quota of spare parts and accessories and for mapping, substitution and plan approval of spare parts and accessories.

组织编制备品配件明细表及年度储备定额；负责备品配件测绘、替代以及计划审定。

4.1.5 Be responsible for the annual inspection plans of the Company's boiler, pressure vessel, pipeline and other special equipment and organizing the implementation of such plans, and for reviewing the inspection scheme.

负责公司锅炉、压力容器及管道等特种设备年度检验计划并组织实施；审定检验方案。

4.1.6 Be responsible for planning and establishment of the highest metro-logical standard and value trace-ability system and for the value transfer and tracing of metering equipment.

负责策划和建立最高计量标准及量值溯源体系，开展计量设备的量值传递和量值溯源。

4.1.7 Be responsible for managing the online monitoring system of physical objects and equipment of fixed assets and for overhaul and renovation of buildings and structures.

负责固定资产的实物及设备在线状态监测系统管理；负责建筑物、构筑物的大修与改造。

4.1.8 Be responsible for investigation, handling and statistical report of an equipment accident, for establishment of major equipment defects management records and for organizing rectification.

负责设备事故的调查、处理及统计上报工作；建立重大设备缺陷管理台帐并组织整改。

4.1.9 Be responsible for archive management of design and construction drawings and as-built documents for unit shutdown overhaul and annual repair, equipment renewal plan, and for organizing the operation department to establish technical document of Equipment.

负责做好装置停工大修和年度修理、设备更新计划设计施工图纸、竣工资料的存档管理工作；组织运行部建立设备技术档案。

4.1.10 Be responsible for examination and supervision of the equipment inspection and maintenance and the work that shall be well done by an outsourcing organization as required by the Contract.

检查、督促设备检维修工作以及外协单位按合同要求应做好的工作。

4.2 Coordinated management departments

协同管理部门

4.2.1 The Scheduling & Dispatch Dept. is responsible for preparing and transmitting to lower levels the annual overall network of unit startup and shutdown, timely circulating a notice on terrible weather information, and implementing precautions.

计划调度部负责编制、下达年度装置开停工总体网络；及时通报恶劣气象信息，落实防范措施。

4.2.2 The HSE Dept. is responsible for management of fire and gas accident protection equipment, supervision and direction of site safety of each department, and organizing the investigation into an equipment accident.

HSE 管理部负责消防、气防设备的管理，对各部门现场安全进行监察、指导；组织设备事故的调查。

4.2.3 The Materials Supply Dept. is responsible for material procurement, putting materials in storage, taking care of them, applying for and maintaining the material codes.

物资装备部负责物资采购，做好物资入库、保管以及物料编码的申请、维护。

4.2.4 The CEO's office is responsible for the daily maintenance of buildings and ancillary facilities (except elevators and air conditioners). ; Equipment file archiving.

总经理办公室负责建筑物、构筑物附属设施（电梯、空调除外）的日常维修；设备档案存档。

4.2.5 The Information Management Dept. is responsible for reviewing each department's purchase of computers and ancillary equipment and other electronic office equipment, selecting the type of network equipment, server, terminal and ancillary equipment, and signing the technical appendices.

信息管理部负责审核各部门计算机及附属设备等办公电子设备购置；负责网络设备、服务器、终端及附属设备选型，签订技术附件。

4.3 Executive departments

执行部门

4.3.1 The operation department is the executive department of this System.

运行部为本制度的执行部门。

4.3.1.1 Do a good job in the daily management of equipment inspection and problem rectification in this department. ; Establish equipment account, technical files and equipment contracting system for all staff.做好本部门设备检查、问题整改等日常管理工作；建立设备台帐、技术档案以及全员设备承包体系。

4.3.1.2 Carry out relevant maintenance work regularly according to the prepared equipment maintenance plan to ensure the equipment is in good condition.

按已编制的设备维护计划定期开展相关维护工作，确保设备完好。

4.3.1.3 Be responsible for organizing the abandonment judgment and renewal type selection of general equipment, participating in abandonment judgment important equipment, applying for maintenance, overhaul, renewal and renovation of Equipment, taking part in design review and equipment type selection of technical renovation project, and managing construction on site.

组织一般设备的判废鉴定和更新选型；参与重要设备的判废工作；负责设备维修、大修、更新、改造的申请；参与技术改造项目的设计审查、设备选型；负责现场施工管理。

4.3.1.4 Be responsible for developing the safe operation rules of equipment and for the prevention, judgment and emergency treatment of an equipment fault.

负责制定设备的安全操作规程以及设备故障的预防、判断和紧急处理。

4.3.2 The Electrical Operation Dept. is responsible for the operation and operation management, maintenance and repair, renewal and type selection for application of electrical equipment.

电气运行部负责电气设备的运行和运行管理、维护和修理、更新和应用选型。

4.3.3 The Instrument Control Dept. is responsible for the operation and operation management, testing and calibration, fault analysis, maintenance and repair, renewal and type selection for application of instruments.

仪表控制部负责仪表设备的运行和运行管理、检测和校验、故障分析、维护和修理、更新和应用选型。

4.3.4 The equipment maintenance department is responsible for the daily maintenance, overhauling and emergency repair of the mechanical parts of the company's main production equipment, the update and application selection of overhaul equipment.

设备检修部负责公司生产设备机械部份的日常维护和检修、抢修，检修设备的更新和应用选型。

4.3.5 The executive departments are responsible for submitting of their respective metering equipment calibration plans and cooperatively completing the calibration, comparison and intermediate check of their respective metering equipment. The Electrical Operation Dept. the Instrument Control Dept. and the Lab Dept. shall be also responsible for managing and calibrating the self-calibrated metering equipment.

各执行部门负责本部门计量设备校准计划的申报，配合完成本部门计量设备的校准、比对和期间核查；电气运行部、仪表控制部、质量检验部同时负责自行校准计量设备的管理和校准。

5 Management Content

管理内容

5.1 Classification management

分级管理

5.1.1 The Company's equipment is classified as important equipment (see Appendix 1) and

general equipment.

公司设备划分为重要设备（见附件 1）、一般设备两类。

5.1.2 The Company's equipment is managed at two levels, i.e. the company-level management with the Equipment Management Dept. being responsible for equipment management across the Company and mainly responsible for management of important equipment, and the operation department-level management with the operation department being in charge of equipment management of its own department.

公司设备管理实行公司、运行部两级管理:机械动力部负责全公司的设备管理，并主要负责重要设备管理，为公司级管理；运行部负责本部门的设备管理，为运行部管理。

5.2 Whole-process management

全过程管理

5.2.1 Type selection of equipment

设备选型

5.2.1.1 Type selection principle: Adopt new equipment, materials and structures whenever possible based on the principle of keeping technologically advanced and also consider standardization, serialization and generalization of equipment to meet HSE management requirements.

选型原则：以技术先进为原则，尽量采用新设备、新材料、新结构，同时考虑标准化、系列化、通用化，满足HSE管理要求。

5.2.1.2 Type selection for renewal of equipment shall be applied for by the project department and reviewed and approved by the Equipment Management Dept.; before initiation of important equipment renewal, the Equipment Management Dept. organizes technical and economic appraisal and the equipment type selection is submitted to the Company's leader in charge for review and approval; with regard to type selection for renewal that need have its design commissioned, the equipment department is responsible for its application, the Equipment Management Dept. is responsible for review and approval and for commissioning the design, and technical and economic appraisal must be made for important equipment before its design is commissioned.

设备更新选型由项目所属部门负责申报，机械动力部负责审批；重要设备更新立项前由机械动力部组织技术经济论证，设备选型报公司主管领导审批；需委托设计的更新选型，由设备所属部门负责申报，机械动力部负责审批并委托设计，重要设备委托设计前须经技术经济论证。

5.2.2 Equipment procurement

设备采购

5.2.2.1 Materials Supply Dept. shall make purchase in accordance with technical requirements submitted by the Equipment Management Dept.

物资装备部应根据机械动力部提报的技术要求进行采购。

5.2.2.2 Prior to procurement of important equipment and such general equipment as is specially required in terms of performance, the Equipment Management Dept. is responsible for organizing to sign the technical appendices.

对于重要设备、性能有特别要求的一般设备，采购前应由机械动力部负责组织签订技术附件。

5.2.2.3 For important equipment, in-factory supervision shall be implemented and the intermediate quality inspection shall be strictly conducted; besides, accessories specified in the technical appendices shall be provided.

重要设备应实行驻厂监造，严格中间质量检验；并提供按技术附件规定的配件。

5.2.2.4 After equipment has been purchased, the Materials Supply Dept. shall organize relevant departments to conduct factory acceptance; if any equipment fails to pass the acceptance, the Materials Supply Dept. shall contact the Supplier for its disposition.

设备购入后由物资装备部组织有关部门进行入厂验收，验收不合格的由物资装备部与供应商联系处理。

5.2.2.5 All departments shall specify the specification & model and selection requirements during handling the procurement application procedures; in the case of any change at the time of procurement (ordering) by the Materials Supply Dept. the purchase cannot be made until the change has been confirmed by equipment using department and Equipment Management Dept.

各部门在办理申购手续时，应写明规格型号、选用要求，物资装备部在采购（订货）时，如有变更，应经设备使用部门和机械动力部确认后采购。

5.2.3 Equipment installation

设备安装

5.2.3.1 Newly purchased equipment shall be installed by the construction contractor appointed by the Equipment Management Dept. after it has passed the acceptance.

新购置的设备验收合格后，由机械动力部安排施工单位进行安装。

5.2.3.2 Equipment installation must be entrusted to a construction contractor with corresponding qualification, and the construction contractor shall make a thorough construction plan and a strict quality assurance system.

设备安装须委托有相应资质的施工单位，施工单位应当制订周密的施工方案和严格的质保体系。

5.2.4 Equipment test run

设备试运

5.2.4.1 After equipment has been installed, the construction contractor shall prepare a test run scheme and the Equipment Management Dept. is responsible for review of the test run scheme of important equipment; the department in which the equipment is located is responsible for review of the test run scheme of general equipment and for participating in countersigning the test run scheme of important equipment.

设备安装后由施工单位编制试运转方案，机械动力部负责重要设备试运转方案的审核；设备所在部门负责一般设备试运转方案的审核，并参与重要设备试运转方案的会签。

5.2.5 Equipment acceptance

设备验收

5.2.5.1 Upon completion of equipment renewal or new equipment construction, the Equipment Management Dept. organizes relevant department for “three inspections and four determinations” and for intermediate handover and completion acceptance of project after problem rectification.

设备更新或新增设备施工完毕后，由机械动力部组织相关部门进行“三查四定”，问题整改后进行项目中交和竣工验收。

5.2.5.2 The Equipment Management Dept. shall organize relevant organizations to file the as-built documents immediately upon handover and acceptance of project.

机械动力部在项目交工验收后，及时组织相关单位做好竣工资料的归档。

5.2.6 Equipment records

设备台帐

5.2.6.1 Equipment records must be established for such equipment, facility and system as constitute fixed assets and as can be independently used and complete a certain means of production.

凡构成固定资产，能独立使用并完成一定生产手段的设备、设施系统，须建立设备台帐。

5.2.6.2 A technical file must be established for each set of production equipment from the time of putting it into use to the time of scrapping it. The contents must be detailed and the records must be real, accurate and complete.

要求每一台生产设备从投用至报废建立技术档案，内容要具体详细，记录真实、准确、齐全。

5.2.7 Equipment use and maintenance requirements

设备使用和维护要求

Refer to 5.3 of this System.

参照本制度 5.3的规定。

5.2.8 Equipment maintenance

设备检修

Comply with *Equipment Maintenance Management System*.

参照《设备检修管理制度》执行。

5.2.9 Scrapping and renewal

报废与更新

5.2.9.1 The operation department shall carry out equipment scrapping and renewal in a planned way according to actual operation state of Equipment and in compliance with the *Fixed Assets Management System* and the *Equipment Repair, Renewal Plan and Cost Management System*.

运行部应根据设备实际运行状况有计划进行设备报废和更新工作，具体参照《固定资产实物管理制度》、《设备修理、更新计划和费用管理制度》执行。

5.3 Requirements for operating and maintenance personnel

使用和维护人员要求

5.3.1 Operating personnel

操作人员

5.3.1.1 Operating personnel must receive specialized technical training and pass examinations before they take up their posts. Special equipment operating personnel must also obtain the special work permits before they take up their posts.

操作人员必须经过专业技术培训，经考试合格后方可上岗操作，特种设备的操作人员还必须取得特种作业证后方可上岗。

5.3.1.2 Operators should have "four understandings" and "three understandings" of the equipment they operate (that is, "understanding the structure, principle, performance and use" and "knowing how to use, maintain and troubleshoot"), strictly abide by the operating rules, and are not allowed to run over temperature, pressure, speed or overload; Do a good job of standardized sanitation and maintenance of equipment on site, and keep the windows bright, the ground clean, the ditch bottomed out and the equipment clean and tidy.

操作人员应对所操作的设备做到“四懂”、“三会”（即“懂结构、懂原理、懂性能、懂用途”和“会使用、会维护保养、会排除故障”），严格遵守操作规程，不准超温、超压、超速、超负荷运行；做好设备现场规格化及维护保养工作，保持窗明、地净、沟见底、设备整洁。

5.3.1.3 Strictly implement the patrol inspection system. Inspect and monitor the equipment according to the specified inspection route and time, and fill in the corresponding operation, defects and monitoring records.

严格执行巡回检查制度。按规定的巡检线路和时间对设备进行检查、监测，并填写相应的运行及缺陷、监测记录；

5.3.1.4 Implements the equipment contract system. Establish the equipment contracting list, complete the inspection of contracted equipment on time every month, eliminate the problems that can be handled in time, and feed back the inspection results to the monitor, who will fill in the "Registration Form for Inspection Problems of Contracted Equipment" and report it.

执行设备承包制。建立设备承包清单，每月按时完成对承包设备检查，对能处理的问题及时予以消除，并把检查结果反馈给班长，由班长集中填写“承包设备检查问题登记表”并上报。

5.3.1.5 Standby equipment shall be inspected before use and cannot be put into operation until it is confirmed to be normal; equipment lubrication shall meet the requirements of "five determinations" and "three-stage filtration".

备用设备在使用前应进行检查，确认正常后方可投入运行；对设备润滑做到“五定”和“三级过滤”。

5.3.2 Equipment leaders -in-charge

设备管理人员

5.3.2.1 Equipment leaders -in-charge shall conduct daily and weekly equipment inspection on schedule and keep records, focus on understanding of the operational and technical status of

the equipment in the unit or area in the charge thereof, register and timely arrange the disposition of the faults and defects in operation. The deputy operation department leader in charge of equipment is responsible for organizing the monthly inspection of equipment and timely organizing the rectification of any problem found in monthly inspection.

设备管理人员应按时开展设备的日、周检查并做好记录，着重了解所主管的装置或区域内设备运行和技术状况，将运行中发生的故障、缺陷登记，并及时安排处理；对重要设备进行巡检；运行部主管设备的副部长负责组织设备月检查，对月检查中存在的问题，及时组织整改。

5.3.2.2 The equipment leaders review and confirm the problems and defects found during the routine inspection and equipment contracting inspection of the operators, and feed back the handling opinions to the team, and handle them according to the procedures for merging equipment defects and faults, and do a good job in closed-loop management.

设备管理人员对操作人员日常巡检、设备承包检查过程中查出的问题和缺陷进行复查、确认，并将处理意见反馈给班组，按设备缺陷及故障处理程序进行处理，并做好闭环管理工作。

5.3.2.3 Equipment leaders in charge shall supervise and inspect the operators' implementation of regulations and systems on regular turning and switching of standby (stopped) pumps, equipment patrol inspection and monitoring and management of rotating equipment status, as well as on-site standardization work, so as to ensure that the equipment in this department is in good condition.督促、检查操作人员对备用（停用）机泵定期盘车和切换、设备巡回检查和转动设备状态监测管理等规定、制度的执行以及现场规格化工作情况，确保本部门设备处于完好状态。

5.3.2.5 Equipment leaders -in-charge shall properly conduct the monthly pump vibration test and report the results; they shall arrive at the unit site immediately upon receiving the equipment problem reflected in the unit to analyze the faults, make handling schemes and conduct whole-process tracking.

做好每月一次的机泵测振及上报工作；接到装置反映的设备问题后，应及时到达装置现场进行故障分析、制定处理方案，并全过程追踪。

5.3.2.6 They shall strengthen site management to reduce the phenomena of escaping, spilling, dripping and leakage.

加强现场管理，减少装置的跑、冒、滴、漏。

5.3.2.7 With the help of information management means, do a good job in the management ledger and record filing of all kinds of equipment in this department; Closed-loop management of related records and problem rectification should be done for the implementation of SCE equipment (safety-critical equipment) maintenance plan; Report all kinds of professional reports required by the mobile department on time.

借助信息化管理手段，做好本部门各类设备管理台账、记录归档；对于 SCE 设备（安全关键设备）维护计划的执行情况要做好相关记录、问题整改的闭环管理工作；按时上报机动部所需的各类专业报表。

5.3.3 Process technicians

工艺技术人员

5.3.3.1 Process technicians shall conduct daily inspection of the operating personnel's implementation of process cards and strictly control the temperature, pressure, component mix proportion and other process indexes affecting safe operation of equipment.

工艺技术人员每天检查操作人员工艺卡片执行情况，严格控制影响设备安全运行的温度、压力、组份配比等工艺指标。

5.3.3.2 Be responsible for preparing technical documents related to equipment for unit; supervise and urge operating personnel to operate in accordance with operating procedures.

负责编制装置设备相关技术文件；督促操作人员按操作规程进行操作。

5.3.4 Emergency response. When the equipment breaks down or the normal operation of the device is affected due to equipment reasons, the equipment management personnel of the operation department should go to the site to deal with it in time and report to the leader of the motor department, who should lead the team of professional engineers of the department to the site to guide the operation department to deal with it, and at the same time inform the equipment maintenance department, the electric sports department, the instrument control department and other departments to do the corresponding maintenance work on the site.

应急响应。当设备发生故障或因设备原因影响装置正常运行时，运行部设备管理人员应及时到现场处理，并向机动部领导汇报，机动部领导应带领本部门专业工程师团队到现场指导运行部处理，同时通知设备检修部、电气运动部、仪表控制部等部门到现场做好相应的维保工作。

5.3.5 Equipment Maintenance Dept., Electrical Operation Dept. and Instrument Control Dept. (hereinafter referred to as "the Maintenance Dept.")

设备检修部、电气运动部、仪表控制部（以下简称维保部门）

5.3.5.1 The Maintenance Dept. shall conduct patrol inspection of Equipment Management and electrical instrument discipline and timely report any fault information found to the operation department. It shall conduct patrol inspection on specified contents along specified routes at specified time, and inquire equipment operation of unit operating personnel. Any defect found shall be timely reported and actively eliminated.

维保部门要做好机电仪专业巡检并及时向运行部反馈发现的故障信息。巡检应当做到：按规定的巡检内容、路线、时间要求检查，并向装置操作人员了解设备运行情况；发现缺陷及时上报，并积极予以消除。

5.3.5.2 The Maintenance Dept. must ensure 24 hours of duty, and rush to the site immediately upon receiving a notice on equipment fault to confirm the fault, present handling scheme or suggestions, and organize manpower for maintenance, and timely report a major problem (if any) to relevant departments and leaders.

维保部门须保证 24 小时值班，在接到设备故障通知后，立即赶到现场确认，提出处理方案或建议，并组织力量检修，重大问题应及时向有关部门和领导汇报。

5.3.5.3 The maintenance department shall upload the necessary equipment inspection and maintenance records of each device to the equipment management system in time.

维保部门应把各装置必要的设备检维修记录及时上传至设备管理系统。

5.4 Equipment perfectness management

设备完好管理

5.4.1 Equipment is technically classified as perfect equipment and imperfect equipment. The perfectness criteria of equipment shall comply with the *Petrochemical Equipment Perfectness Standard* of Sinopec.

设备的技术状况分为完好和不完好，设备的完好标准执行中石化《石油化工设备完好标准》。

5.4.2 Counting equipment perfectness ratio: The operation department is responsible for counting perfectness ratio of equipment (except for electrical equipment and instruments) in this department; the Electrical Operation Dept. and the Instrument Control Dept. are responsible for counting the perfectness ratio of electrical equipment and instrument in the charge thereof respectively.

设备完好率统计：运行部负责统计本部门设备（电气、仪表除外）完好率；电气运行部、仪表控制部负责统计所管理的电气、仪表设备完好率。

5.4.3 Calculation method of perfectness ratio of equipment in use: Perfectness ratio of equipment in use=Quantity of perfect equipment in use/total quantity of equipment in use×100%. See Appendix 2 for details about statistical coverage and calculation method of equipment quantity.

在用设备完好率计算方法：在用设备完好率=在用设备完好台数/在用设备总台数×100%。设备台数统计范围及设备台数计算方法详见附件 2。

5.4.4 The operation department shall collect the statistics for the following main technical indexes on a monthly basis and report them to the Equipment Management Dept.:

运行部每月应对下列主要技术指标进行统计并上报机械动力部：

5.4.4.1 Instrument integrity rate, putting-in-service proactively rate and automatic control rate; Effective utilization rate and failure rate of key units (especially special care units); Equipment intact rate and important equipment intact rate; Leakage rate of static sealing point, etc.

仪表完好率、投用率、自控率；关键机组（专指特护机组）有效利用率、故障率；设备完好率和重要设备完好率；静密封点泄漏率等。

5.4.4.2 Static sealing leak point management: Static sealing leak points must be registered on hanging signs indicating the leak detection time, leak position, hanging sign number and the measures taken or measures to be taken in the next step; leak points at important positions must be intensively monitored to ensure they are controllable; leak points that have been eliminated shall be timely cancelled to form closed-loop management.

静密封泄漏点管理：静密封泄漏点须挂牌登记，注明泄漏发现时间、泄漏部位、挂牌号及已采取的措施或下步准备采取的措施等；对重要部位的泄漏点须加强监护，确保泄漏处于可控状态；对已消除的泄漏点及时注销，形成闭环管理。

5.4.4.3 Statistics for static sealing leak points: The operation department is responsible for collecting statistics for static sealing leak points of process equipment, process pipeline and pump equipment of this department. Refer to Appendix 3 for detailed scope of statistics for static sealing points.

静密封泄漏点统计：运行部负责统计本部门工艺设备、工艺管道及机泵设备静密封泄漏点。静密封点统计范围详见附件 3。

5.5 Technical file management

技术档案管理

5.5.1 Technical files of equipment are subject to company-level and operation department-level management, and records shall be established for managing technical files of equipment.

设备技术档案实行公司、运行部两级管理，设备技术档案管理应建立台帐。

5.5.2 Three sets of complete as-built documents (including electronic editions) shall be established after overhaul and renewal of important equipment; within one month upon completion of maintenance, the construction contractor shall be responsible for establishment and handover of as-built documents. As-built documents of equipment must include complete contents and accurate data and have each item number (such as repair number and renewal number) indicated, and be submitted to GM's Office, Equipment Management Dept. and the equipment operation department respectively for filing; within one month upon maintenance of general equipment, the construction contractor shall submit the as-built documents to the equipment department, which shall complete the filing of as-built documents within one month upon receipt of them.

重要设备经大修、更新后要建立三套完整的设备竣工资料（含电子版），在完成检修后一个月内，施工单位负责做好设备竣工资料的建立和移交工作。设备竣工资料要求内容齐全、数据精确，同时注明各项目编号（如：修理号、更新号等），分别交总经理办公室、机械动力部、设备所在运行部存档；一般设备检修后施工单位应在一个月内将竣工资料交设备所在部门，设备所在部门在收到竣工资料一个月内完成建档工作。

5.5.3 Four sets of complete as-built documents of equipment must be established for a technical renovation project. Within one month upon passing the completion acceptance, the construction contractor shall be responsible for establishment and handover of as-built documents of equipment. As-built documents of equipment must have each item number (such as technical measure number) indicated, and be submitted to GM's Office, Equipment Management Dept., Scheduling & Dispatch Dept. and the equipment department respectively; the equipment department shall complete the filing of as-built documents within one month upon receipt of them.

技术改造项目要求建立四套完整的设备竣工资料。在竣工验收合格后一个月内，施工单位负责做好设备竣工资料的建立和移交工作。设备竣工资料要注明项目编号（如：技措号等），分别交总

经理办公室、机械动力部、计划调度部、设备所在部门，设备所在部门在收到竣工资料一个月内完成建档工作。

5.5.4 Technical files of equipment mainly consist of: equipment card (including technical characteristics such as equipment item number, name, specification & model and main technical parameters, manufacturer, installation location and commissioning date), list of auxiliary equipment, rotating equipment pre-commissioning records, equipment installation instructions, major defect records, equipment inspection and overhaul records, replacement and corrosion of main accessories, equipment accident records, equipment running time records (for important equipment, the time of shutdowns and startups, continuous running time, annual accumulated running time, accumulated running time over the years and the reason for shutdowns shall be recorded; for general equipment, the annual accumulated running time and the accumulated running time over the years shall be recorded), technical renovation records of equipment, various power procedures (including running, operation, test, safety, accident handling and other procedures), primary connection diagram of power supply system, records of DCS control system, interlock protection system diagram, etc.

设备技术档案主要包括：设备卡片（包含技术特性：如设备位号、名称、规格型号及主要技术参数、制造厂、安装地点、投产日期等）、附属设备明细表、动设备联动试车记录、设备安装使用说明、重大缺陷记录、设备检验、设备大修记录、主要配件更换及腐蚀情况、设备事故记录、设备运行时间记录（重要设备记录每次停、开时间、连续运行时间、年累计运行时间、历年累计运行时间及每次停车原因；一般设备记录年累计运行时间和历年累计运行时间）、设备技术改造记录、各类动力规程（包括运行、操作、试验、安全、事故处理等规程）、供电系统一次接线图、DCS 控制系统台帐、联锁保护系统图等。

5.6 Interface Division between Equipment Management Disciplines

设备管理专业界面划分

See Appendix 5.

见附件 5。

6 Supervision and Inspection

监督检查

Equipment Management Dept. is responsible for supervising each department's implementation of the Equipment Classification and Process Management System and incorporating it into the Company's performance management for regular inspection and assessment.

机械动力部负责对各部门执行设备分级与全过程管理情况进行监督，并纳入公司绩效管理，定期进行检查和考核。

7 Associated Procedures and Records

关联程序和记录

7.1 Associated procedures

关联程序

7.1.1 Equipment Classification and Whole-Process Management Procedures

(HYBN-T2-07-0001-2018-2)

设备分级与全过程管理程序 HYBN-T2-07-0001-2024-2

7.1.2 Management Procedure for Technical File of Equipment (HYBN-T2-07-0002-2024-2)

设备技术档案管理程序 HYBN-T2-07-0002-2024-2

7.2 Associated records

关联记录

7.2.1 Defective Equipment Registration Form (HYBN-T7-07-0001-2018-1)

不完好设备登记表 HYBN-T7-07-0001-2018-1

7.2.2 Summary of Registration and Handling of Problems from Contractor's Equipment Inspection (HYBN-T7-07-0002-2018-1)

承包设备检查问题登记处置汇总表 HYBN-T7-07-0002-2018-1

7.2.3 Weekly (Monthly) Checklist of Equipment (HYBN-T7-07-0003-2018-1)

设备周(月)检查表 HYBN-T7-07-0003-2018-1

7.2.4 Key Unit Operation Status Form (HYBN-T7-07-0004-2018-1)

关键机组运行状况表 HYBN-T7-07-0004-001-2018-1

7.2.5 Technical Status Form of Equipment (HYBN-T7-07-0005-2018-1)

设备技术状况表 HYBN-T7-07-0005-2018-1

7.2.6 Statistical Table of Static Sealing Leak Points (HYBN-T7-07-0006-2018-1)

静密封泄漏点统计表 HYBN-T7-07-0006-2018-1

7.2.7 Template of Equipment change application and acceptance form (HYBN-T7-07-0162-2024-1)

设备变更申请与验收表模版 HYBN-T7-07-0162-2024-1

7.2.8 Template of Equipment Management Monthly Report (HYBN-T7-07-0169-2024-2)

机动部月报模版 HYBN-T7-07-0169-2024-2

7.2.9 Template of Application Form for Boiler or Turbine Shutdown

(HYBN-T7-07-0173-2019-1)

机炉停工申请表模版 HYBN-T7-07-0173-2019-1

8 Supplementary Rules

附则

8.1 This System is under the jurisdiction of Equipment Management Dept.

本制度由机械动力部归口管理。

8.2 This System is drafted by Equipment Management Dept.

本制度起草部门：机械动力部。

8.3 Equipment Management Dept. is responsible for the interpretation of this System.

本制度解释权归机械动力部拥有。

8.4 Revision, preparation and approval of this System are shown in table 1:

本制度版本编制和审批情况见表 1:

Table 1 Revision, preparation and approval of document

表 1 文件版本编制和审批情况

2	2024-04-01	Pan Xiaoming 潘小明	Zhao Tingyun 赵挺云	Xu Ye 徐野	Chen Liancai 陈连财
Revision 版本	Issued date 颁布日期	Prepared by 编制人	Reviewed by 审核人	Authorized by 审定	Approved by 批准人

9 Appendices

附件

Appendix 1 Important Equipment Classification Standard

附件 1 重要设备划分标准

Appendix 2 Statistics for and Calculation Method of Equipment Quantity

附件 2 设备台数统计及设备台数计算方法

Appendix 3 Statistical Method of Static Sealing Points

附件 3 静密封点统计方法

Appendix 4 Equipment Classification Catalog

附件 4 设备分类目录

Appendix 5 Interface Division between Equipment Management Disciplines

附件 5 设备管理专业界面划分

Appendix 6 Detailed Rules for Operation and Management of Water Cooling Equipment

附件 6 水冷设备运行管理细则

Appendix 1

附件 1

Important Equipment Classification Standard 重要设备划分标准

1 Classification standard of important dynamic and static equipment (excluding power plant equipment, electrical equipment and instruments)

重要动、静设备划分标准（不含电站、电气及仪表设备）

1.1 Towers with diameters $\geq 3200\text{mm}$ or with diameters $\geq 2000\text{mm}$ and design pressure $\geq 4.0\text{MPa}$.

直径大于等于 3200mm 或直径大于等于 2000mm 且设计压力大于等于 4.0MPa 的塔器。

1.2 Hydrogenation vessels with design pressure $\geq 10\text{MPa}$ and volume $\geq 20\text{ m}^3$.

设计压力大于等于 10MPa 且容积大于等于 20 立方米的加氢容器。

1.3 Heat exchangers: 1) Threaded locking ring heat exchanger; 2) Flexible tube-sheet heat exchanger; 3) Heat exchanger with heat exchange area $\geq 1500\text{ m}^2$; 4) Heat exchanger with heat exchange area $\geq 500\text{ m}^2$ and design pressure $\geq 6.4\text{MPa}$; 5) Heat exchanger with heat exchange area $\geq 250\text{ m}^2$ and design pressure $\geq 10\text{MPa}$.

换热器：1) 螺纹锁紧环换热器；2) 挠性管板换热器；3) 换热面积大于等于 1500 平方米的换热器；4) 换热面积大于等于 500 平方米且设计压力大于等于 6.4MPa 的换热器；5) 换热面积大于等于 250 平方米且设计压力大于等于 10MPa 的换热器。

1.4 All spherical tanks.

所有球罐。

1.5 Storage tank with a volume $\geq 50000\text{ m}^3$.

容积大于等于 50000 立方米的储罐。

1.6 Heating furnace with design heat load $\geq 10\text{MW}$.

设计热负荷大于等于 10MW 的加热炉。

1.7 Various alloy steel (except for 16MnR) reactors and regenerators; reactor, heater and vaporizer for flexicoking, and three-stage cyclone separator.

各类合金钢（16MnR 除外）反应器、再生器；灵活焦化三器、三级旋风分离器。

1.8 All specially maintained equipment.

所有特护设备。

1.9 Material pumps with shaft power greater than or equal to 600kW.

轴功率大于等于 600kW 的物料泵。

1.10 Material pumps with shaft power greater than or equal to 250kW and medium temperature greater than or equal to 350°C.

轴功率大于等于 250kW，介质温度大于等于 350°C 的物料泵。

1.11 Water pumps with shaft power greater than or equal to 1000kW and head greater than

100m.

轴功率大于等于 1000kW、扬程大于 100 米的水泵。

1.12 Pumps with shaft power greater than or equal to 200kW and head greater than or equal to 1000m.

轴功率大于等于 200kW、扬程大于等于 1000 米的泵。

1.13 Compressors and fans with shaft power greater than or equal to 500kW.

轴功率大于等于 500kW 的压缩机、风机。

1.14 Turbines with rated power greater than or equal to 500kW and used for driving compressors and electric generators.

额定功率大于等于 500kW 用于驱动压缩机、发电机的汽轮机。

1.15 Refrigerators with shaft power greater than or equal to 400kW.

轴功率大于等于 400kW 的冷冻机。

1.16 Special valves with electrohydraulic actuators.

带有电液执行机构的特种阀门。

1.17 Air coolers with design pressure greater than or equal to 10MPa.

设计压力大于等于 10MPa 的空气冷却器。

2 Classification standard of important power plant equipment, electrical equipment and instruments

电站、电气及仪表重要设备划分标准

2.1 All classes of electric generators.

所有发电机类。

2.2 35kV transformer

35kV 变压器

2.3 110kV transformer

110kV 变压器。

2.4 Motors with power of 2000kW and above.

2000kW 及以上电动机。

2.5 Medium pressure and above steam boilers.

中压及以上蒸汽锅炉。

2.6 Turbines.

汽轮机。

2.7 Water pumps (including motors) with shaft power greater than or equal to 1000kW and head greater than 1000m.

轴功率大于等于 1000kW、扬程大于 1000 米的水泵（含电机）。

2.8 Air compressors and fans (including motors) with shaft power greater than or equal to 500kW.

轴功率大于等于 500kW 的空压机、风机（含电机）。

2.9 Electrostatic precipitator (boiler).

电除尘器（锅炉）。

2.10 Instrument category. A complete set of DCS, ESD(SIS), CCS, DEH systems used by the main device and specific UOP control system, SCS control system and foreign trade flowmeter.

仪表类。主装置使用的整套 DCS、ESD（SIS）、CCS、DEH 系统和特定的 UOP 控制系统、SCS 控制系统、对外贸易流量计。



Appendix 2

附件 2

Statistics for and Calculation Method of Equipment Quantity

设备台数统计及设备台数计算方法

1 Statistics for Equipment Quantity

设备台数统计

1.1 Scope of statistics

统计范围

1.1.1 All in-use, standby and stopped equipment meeting the requirements of fixed assets (excluding stockpiled, life, medical, analysis instruments and tools, etc.) shall be included in the scope of statistics for equipment quantity.

凡在用、备用和停用的具备固定资产条件的设备（不包括库存、生活、医疗、分析仪表及工具等）都属于设备台数的统计范围。

1.1.2 New and modified units and such equipment as is officially delivered for use upon completion of its technical renovation shall be included in the scope of statistics from the date of notice sent by the Equipment Management Dept.

新建和改造装置、技术改造项目竣工并正式交付使用的设备，按机械动力部通知日期起列入统计范围。

1.1.3 Equipment whose installation has been completed and which has been officially delivered for production but not been used, and equipment stopped for a long term due to change of production plan shall be included in the scope of statistics.

已安装竣工并正式交付生产但未使用的设备，以及因生产方案变动而长期停用的设备列入统计范围。

1.1.4 After having been unsealed, mothballed and idle equipment shall be included in the scope of statistics from the month when its procedures are handled and approved.

封存、闲置设备启封后，从办理手续并经批准的当月起列入统计范围。

1.2 The following equipment shall not be included in the scope of statistics:

下列设备不列入统计范围

1.2.1 Removed, transferred and scrapped equipment shall not be included in the scope of statistics from the month when its procedures are handled and approved.

拆迁、外调、报废设备，从办理手续并经批准的当月起不列入统计范围。

1.2.2 Mothballed and idle equipment shall not be included in the scope of statistics from the month when its procedures are handled and approved.

封存、闲置设备，从办理手续并经批准的当月起不列入统计范围。

1.2.3 Stockpiled equipment which has been received from the materials department but not been installed shall not be included in the scope of statistics.

已从物资部门领出但未安装的库存设备不列入统计范围。

1.2.4 Process pipes, cables, structures and buildings shall not be included in the scope of statistics.

工艺管道、电缆、构筑物、建筑物等不列入统计范围。

1.2.5 Equipment mainly used for living and logistics, such as air conditioner, refrigerator, washing machine, fridge, motorbike, automobile, copying machine, computer and walkie talkie, shall not be included in the scope of statistics.

主要用于生活后勤的设备，如空调、冷冻机、洗衣机、冰箱、摩托车、汽车、复印机、计算机、对讲机等不列入统计范围。

1.2.6 Instruments & apparatus and tools used for analysis, test and check, and such equipment as is used for measurement and photographing shall not be included in the scope of statistics.

用于分析、试验、校对的仪器仪表、工具，以及测量、拍照用的设备不列入统计范围。

1.2.7 Various mobile equipment (such as lubricating oil filter and mobile air compressor), mixers in various storage tanks, and air preheater on heating furnace shall not be included in the scope of statistics.

各类移动设备（如润滑油过滤机、移动式空气压缩机）；各类贮罐中的搅拌机；加热炉上的空气预热器等设备不列入统计范围。

1.2.8 Equipment that has no independent function in accessory equipment of large-scale units or small equipment (except for that falling within the scope of pressure vessel) shall not be included in the scope of statistics.

大型机组等设备的附属设备中不具备独立作用的设备或小型设备（属压力容器范畴的除外）不列入统计范围。

2 Equipment quantity calculation

设备台数计算

2.1 Equipment quantity shall be counted as per the equipment classification catalog, as detailed in Appendix 4.

设备台数按设备分类目录进行统计，详见附件 4。

2.2 Process equipment shall be calculated by set; overlapped equipment shall be all calculated by set no matter whether their process item numbers are separated; overlapped quantity cannot be calculated as one set through merging.

工艺设备按台计算，重叠设备不论工艺位号是否分开，一律按台数计算，不能把重叠台数合并按一台计算。

2.3 Equipment that has independent function in accessory equipment of large-scale units, such as rotating equipment and coolers (above $\Phi 500$) in lubricating oil, sealing oil and cooling systems, and all accessory equipment that falls within the scope of pressure vessel shall be counted separately.

大型机组等设备的附属设备中具有独立作用的设备，如润滑油系统、封油系统和冷却系统中的转

动设备及 $\Phi 500$ 以上的冷却器等设备，属于压力容器的所有附属设备，均应单独统计。

2.4 Transmission equipment shall be calculated as per unit. An auxiliary unit matching a main unit and having a power smaller than 100KW shall not be calculated separately and shall be calculated together with the main unit as one set. An auxiliary unit matching a main unit and having a power greater than or equal to 100KW shall be calculated separately with the main unit.

传动设备按机组计算，与主机配套的附机且功率小于 100 千瓦的，不单独统计，与主机一起按一台计算；凡与主机配套的附机且功率大于或等于 100 千瓦的，与主机分别计算。

2.5 Power equipment, such as transformer, switch cabinet, UPS, and such motor, turbine and electric generator as have power greater than or equal to 100kW, shall be calculated separately.

动力设备，如变压器、开关柜、UPS、功率大于或等于 100 千瓦的电动机、汽轮机、发电机等，单独统计。

2.6 Instruments shall be calculated by set. All independent elements that can form detection and control loops shall be calculated by sets respectively, including regulating element, measuring transmission element, display element, computing element, assistant element, special element and various actuators.

仪表设备按台计算，凡是能组成检测、控制回路的独立单位分别按台数统计，包括调节单元、测量变送单元、显示单元、计算单元、辅助单元、特殊单元及各种类型的执行器等。

Appendix 3

附件 3

Statistical Method of Static Sealing Points 静密封点统计方法

1 Scope of statistics for static sealing points

静密封点统计范围

1.1 Flanges, valves, unions, plugs, threaded elbows, tees and other fittings on all equipment and pipelines; oil leveler of pump equipment, and fittings on accessory pipelines; pressure gauges, thermometer joints and glass plate level gauges on equipment and pipelines; air-cooled tube bundle plugs; exposed expansion joint of heating furnace tube; joints of other equipment.

所有设备、管道上的法兰、阀门、活接头、丝堵、丝扣弯头、三通等管件；机泵设备的油标，附属管线上的管件；设备及管道上的压力表、温度计接头，玻璃板液位计；空冷管束堵头；加热炉炉管的外露涨口；其它设备的接合部位。

1.2 Oil switch of electrical equipment, transformers and other oil-filled electrical equipment; orifice plate and regulating valve of instrumental equipment, and fittings and joints on accessory pipelines.

电气设备的油开关、变压器及其它充油电气设备；仪表设备的孔板、调节阀，附属管线上的管件与接头。

2 The joint positions of the following equipment, pipelines and pipe fittings shall not be included in the scope of statistics for static sealing points.

下列设备、管道及管件的接合部位不列入静密封点统计范围。

2.1 Removed, transferred and scrapped equipment; mothballed and idle equipment; equipment kept in stock and uninstalled; buried pipes and pipe fittings; sealed transmission part of equipment.

拆迁、外调、报废设备；封存、闲置设备；未安装的库存设备；埋地管道及管件；设备传动密封部位。

2.2 Equipment and pipelines mainly used for living and logistics, and water, steam, air and other pipelines and fittings used for analytical experiment, test and check.

主要用于生活后勤的设备及管道，以及用于分析化验，试验、校对的水、汽、风等管道及管件。

3 Static Sealing Area Division and Responsibilities

静密封区域划分和职责

3.1 Production units may be divided into several areas by equipment arrangement or technological process; auxiliary systems may be zoned by technological process and equipment layout; the operation departments may conduct the division for convenience of collection of statistics and management.

生产装置可按设备布置或工艺流程将本装置划分为若干区域；辅助系统可按工艺流程结合设备布局进行划分区域；运行部可以从便于统计和管理方便出发来进行区域划分。

3.2 The supply department is responsible for the part from power pipeline network to user's first valve (including valve); Instrument Control Dept. is responsible for the instrument process pipelines, air ducts and heat tracing pipes; the transmission department is responsible for the part from petroleum process pipeline or heat tracing pipe to the first flange of user's first valve (excluding valve); equipment and pipelines of units are in the charge of the corresponding departments.

动力管网至用户第一阀门（包括第一个阀门）为界，由输送供应部门负责；仪表的工艺管路、风管、加热伴管由仪表控制部负责；石油工艺管路、保温伴管至用户第一个阀门的第一道法兰为界（不包括阀门）由送出部门负责；各装置所属设备、管路由所属部门负责。

4 Statistics for Static Sealing Points

静密封点统计

4.1 Statistics for static sealing points and labor division

静密封点统计与分工

4.1.1 Each operation department is responsible for counting static sealing points of process equipment, process pipeline and pump equipment in this department; Electrical Operation Dept. is responsible for counting static sealing points of non-utility equipment and such electrical equipment as is in the charge thereof; Instrument Control Dept. is responsible for counting static sealing points of non-utility equipment and such instruments as are in the charge thereof. 运行部负责本部门工艺设备、工艺管道及机泵设备的静密封点统计；电气运行部负责自用设备及由本部负责管理的电气设备静密封点统计；仪表控制部负责自用设备及由本部负责管理的装置仪表设备静密封点统计。

4.2 Demarcation points for collecting statistics for static sealing points of equipment and pipelines: Equipment inlets and outlets are taken as demarcation points, static sealing points inside inlet and outlet flanges (including flange) are counted in equipment body and those outside flanges are counted in pipelines; condensate drain pipes of equipment are drained locally, static sealing points of those pipes not drained into system are counted in equipment body, and for those pipes drained into system, static sealing points outside the first flanges are counted in pipelines; for venting from the top of equipment (including safety valve), static sealing points of pipes not discharging into system are counted in equipment, and static sealing points outside the first flanges of pipes with joint seals are counted in pipelines.

设备与管道静密封点统计分界点：以设备出入口为分界点，出入口法兰（包括法兰）以内算设备本体上的静密封点，法兰以外的统计到管道上；设备排凝管就地排放，不排入系统的统计在设备本体上；排入系统的，以第一道法兰为准，法兰以外的统计到管道内；设备顶部放空（包括安全阀），未排入系统的统计到设备上，有管道连接密封排放者，以第一道法兰为准，法兰以外的统计到管道内。

4.3 Static sealing points in static sealing area: They are counted one by one respectively by

process equipment, process pipeline, pump equipment, electrical equipment, instrumental equipment and other equipment.

静密封区域内的静密封点：分别按工艺设备、工艺管道、机泵设备、电气设备、仪表设备和其它设备逐台设备、逐条管线进行统计。

4.4 Static sealing is measured in points: one static sealing joint is counted as one sealing point. Details are as follows:

静密封按点计算：一个静密封接合处算一个密封点。具体规定如下：

4.4.1 A pair of flanges, regardless of their specifications and size, is counted as one sealing point; for a valve, either end of it connected by flange is counted as one point respectively, valve cover is counted as one point, and gland cover is counted as one point. In general, for a valve, regardless of its specification and size and connection of either end of it by flange, screw thread or welding, four sealing points are calculated. Under any special circumstance, such as where a valve body is provided with screwed plug or venting is closely downstream of it, five sealing points shall be calculated for such valve. If a valve body is provided with screwed plug and has venting closely downstream of it, six sealing points shall be calculated for this valve.

一对法兰，不论其规格大小，均算一个密封点；一个阀门，阀门两端与法兰连接处各算一个点，大盖算一个点，填料盖算一个点。一般情况下，一个阀门不论其规格大小及两端的连接形式为法兰、丝扣、焊接等，均按四个密封点计算。特殊情况，如阀体有丝堵或阀后紧接放空，则一个阀门按五个密封点计算。若既有阀体丝堵，阀后又紧接放空，则按六个密封点计算。

4.4.2 For a union, three sealing points are calculated; for a threaded elbow, two sealing points are calculated; for a threaded tee, three sealing points are calculated; a pressure gauge connector is counted as one sealing point; a sheathed thermometer joint is counted as one sealing point; a screwed plug or an exposed expansion joint is counted as one sealing point.

一个活接头按三个密封点计算；一个丝扣弯头按两个密封点计算；一个丝扣三通按三个密封点计算；一个压力表接头按一个密封点计算；一个套管温度计接头按一个密封点计算；丝扣堵头或外露涨口，一个堵头（一个涨口）按一个密封点计算。

4.4.3 For a single-sided glass plate level gauge, one plate is counted as one sealing point and the number of sealing points for a set of level gauge is counted by multiplying the number of plates by 1; for a double-sided glass plate level gauge, one plate is counted as one sealing point and the number of sealing points for a set of level gauge is counted by multiplying the number of plates by 2. For others, the number of sealing points shall be calculated in the light of the aforementioned requirements.

玻璃板液位计，单面的，一块板算一个密封点，一组液位计按板块数乘 1 统计密封点；双面的，一块板算两个密封点，一组液位计按板块数乘 2 统计密封点。其它比照上述规定统计计算密封点。

4.4.4 If a valve is connected to a flange, the connection is only counted as one sealing point, instead of counting sealing points based on both flange and valve, and in general, the sealing point is counted in valve rather than flange. Only when a flange separately forms a static sealing joint can the static sealing point of flange be counted. Static sealing points are counted

in the same manner when other pipe fittings are connected to each other.

若阀门与法兰连接，则连接处只算一个密封点，不能既按法兰统计密封点，又按阀门统计密封点，一般统计在阀门上而不统计到法兰上。只有法兰单独成为一个静密封接合处时才统计法兰静密封点。其它管件相互连接时以此类推统计静密封点。

5 Criteria for Inspection of Static Sealing for Leakage

静密封泄漏检验标准

5.1 Equipment and pipeline joints are visually inspected for coking, smoking and material leakage.

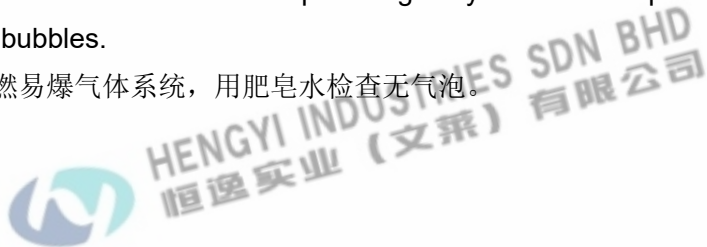
设备及管路的结合部位用肉眼观察，不结焦、不冒汽、无物料渗漏。

5.2 Welding or joint positions or the joints of instrument process pipes and air pipes are tested with soapy water for leakage and bubbles (at vacuum positions, inspection is conducted by thin paper strip suction method).

焊接或联接部位或仪表工艺管、空气管的联接处，用肥皂水试漏，无气泡（真空部位，用薄纸条吸的办法）。

5.3 Gas and other flammable and explosive gas systems are inspected with soapy water for emergence of bubbles.

在瓦斯气等易燃易爆气体系统，用肥皂水检查无气泡。



Appendix 4

附件 4

Equipment Classification Catalog

设备分类目录

No. 编号	Classification 大类名称	No. 编号	Classification 大类名称
1	Furnace 炉类	15	Manufacturing, processing and maintenance 制造加工检维修类
2	Tower 塔类	16	Test and inspection equipment 试验与检测设备类
3	Reaction equipment 反应设备类	17	Information and communication equipment 信息与通讯设备类
4	Tank 罐类	18	Special equipment for safety and environmental protection 安全环境保护专用设备类
5	Heat exchange equipment 换热设备类	19	Office and ancillary facilities 办公及辅助设施类
6	Pipe and valve 管道与阀门类	20	Building and structure 建构筑物类
7	General machinery 通用机械类	21	Drilling equipment 钻井设备类
8	Oil/gas loading, unloading and injection facilities 油/气装卸加注设施类	22	Special vehicle for drilling and production 钻采特车类
9	Power equipment 动力设备类	23	Logging equipment 测井及录井设备类
10	Electrical equipment 电气设备类	24	Geophysical equipment 物探设备类
11	Automatic control and instrumentation 自动控制与仪器仪表类	25	Injection and production equipment 注采设备类
12	Lifting and transportation 起重运输类	26	Seismic and geological data processing and interpretation equipment 地震地质资料处理解释设备类
13	Ship 船舶类	27	Special machinery for refining and chemical engineering 炼油化工专用机械类
14	Engineering machinery 工程机械类	28	Other equipment 其它设备类

Appendix 5

附件 5

Interface Division between Equipment Management Disciplines 设备管理专业界面划分

1 Division of Business Interface between Instrument Control Dept. and Production Operation Dept.

仪表控制部与生产运行部业务界面的划分

1.1 Non-remote, non-controlled, direct-reading local instruments, such as local pressure gauge, mercurial thermometer, bulb thermometer, bimetallic thermometer, glass plate (pipe) level gauge, magnetic flap level gauge and flowmeter, is in the charge of Production Operation Dept.

不远传、不带控制的直读式就地仪表，如就地压力表、水银温度计、温包式温度计、双金属温度计、玻璃板（管）液位计、磁翻板液位计、流量计等由生产运行部门负责。

1.2 Installation, daily maintenance and leaking stoppage of measuring element protection sleeve welded to equipment, primary instrument valve and pipeline upstream of it, and orifice flange (orifice plate is supplied by Instrument Control Dept.) are in the charge of Production Operation Dept.

与设备焊接成一体的测量元件保护套管、仪表一次阀及前管线、孔板法兰的安装(孔板由仪表控制部提供)及日常维护和堵漏等由生产运行部门负责。

1.3 The instrument control department is responsible for the pneumatic control valves controlled by DCS, SIS, PLC and other systems, as well as the control loops of self-operated control valves, hydraulic valves, cylinders and control loops of flue baffles (including solenoid valves, transponders, air supply pipelines and accessories, etc.); The production and operation department is responsible for hydraulic valves and flue baffles.

由 DCS、SIS、PLC 等系统控制的气动调节阀，以及自力式调节阀、液动阀的控制回路、烟道挡板的气缸及控制回路（包括电磁阀、回信器、气源管线及附件等）由仪表控制部负责；液动阀、烟道挡板等由生产运行部负责。

1.4 The sealing surface at the terminal connection of instruments, equipment and pipelines serves as the professional management interface, and the instrument control department is responsible for the daily management of this sealing point, with the cooperation of the production and operation department.

仪表与设备、管道的终端连接处的密封面作为专业管理分界面，该密封点由仪表控制部负责日常管理，生产运行部配合。

1.5 The maintenance such as replacement, if necessary, of the connecting pipes and flanges of instruments and measuring elements, the pipe nozzles, the regulating valves and the connecting flanges and orifice flanges of pipes etc. shall be proposed by the Instrument Control

Dept. The maintenance shall be commissioned by the Production Operation Dept. with the cooperation from the Instrument Control Dept. The Instrument Control Dept. provides the drawings and purchase orders of pipe nozzles and flanges. Upon completion of such maintenance, joint acceptance shall be conducted. Instrument Control Dept. is responsible for the management, maintenance, gasket replacement and leaking stoppage of regulating valve, impulse lines downstream from all primary valves, and heat tracing lines used exclusively for instruments. Thermal insulation of regulating valve body, orifice flange and pipe-mounted instruments themselves caused by process renovation or overhaul shall be commissioned uniformly by the Production Operation Dept.; piecemeal thermal insulation shall be in the charge of Instrument Control Dept.

仪表测量元件的接管及法兰、管咀、调节阀与管道的连接法兰、孔板法兰等，如需更换等检修，由仪表控制部提出，生产运行部负责委托实施，仪表控制部配合，其中管咀及法兰，由仪表控制部提供图纸和订货清单，检修完毕共同验收。调节阀、所有一次阀后的引压管及专供仪表使用的仪表伴热线管理、维护、换垫、堵漏等，均由仪表控制部负责。因工艺改造或检修引起调节阀阀体、孔板法兰及管道式仪表本体的保温，统一由生产运行部负责委托，零星保温由仪表控制部负责。

1.6 Instrument Control Dept. is responsible for managing the heat tracing valves and pipelines shared with process from the first welding joint at the branch or from the first sealing surface downstream from the branch valve.

与工艺共用的伴热阀门和管线，从分支处的第一道焊口或分支阀门后的第一道密封面开始归仪表控制部管理。

1.7 For the condition monitoring system of large units and pump groups, the instrument control department is responsible for the on-site probes and leads, acquisition stations, cabinets and other parts of the condition monitoring system, while the mechanical power department is responsible for the network server, client and condition monitoring analysis and processing part of the condition monitoring system, and the declaration of related accessories is based on the principle that whoever manages it shall declare it.

对于大机组及泵群状态监测系统，仪表控制部负责状态监测系统的现场探头及引线、采集站、机柜等部份，机械动力部负责状态监测系统的网络服务器、客户端、状态监测分析处理部份，相关配件的申报按谁管理谁申报的原则执行。

2 Interface Division between Instrument Control Dept. and Electrical Operation Dept.

仪表控制部与电气运行部的界面划分

2.1 The Electrical Operation Dept. is responsible for installation and management of power supply lines from the distribution room of units to the general distribution box of instruments, while the Instrument Control Dept. is responsible for switches and power supply lines in the general distribution box of instruments (the maintenance and replacement of main switch may be entrusted to the Electrical Operation Dept. and the capacity of main switch need be selected through consultation with the Electrical Operation Dept.).

装置配电间到仪表总配电箱之间的供电线路安装和管理由电气运行部负责，仪表总配电箱内的开关及供电线路由仪表控制部负责（总开关的检修、更换可委托电气运行部，总开关的容量选择需同电气运行部协商）。

2.2 The instrument control department is responsible for all accessories (including solenoid valves) and leads in the instrument loop system, and the electrical operation department is responsible for all accessories (including solenoid valves) and leads in the electrical loop system. When the non-professional equipment fails in this loop and the specialty is unable to handle it, you can fill in the entrustment form and entrust the corresponding specialty to repair it. When both parties are overhauling each other's loop system, the other specialty must send someone to cooperate.

凡属仪表回路系统内的所有附件（包括电磁阀）及引线由仪表控制部负责，凡属电气回路系统的所有附件（包括电磁阀）及引线由电气运行部负责，在此回路中非本专业设备出现故障且本专业又无能力处理时，可填写委托单，委托相应专业检修处理。双方在对方回路系统中检修作业时，对方专业必须派人配合。

2.3 In principle, the interface between the electric operation department and the instrument control department is divided according to the design specialty of the cable in the engineering stage. If the cable is designed by the electric specialty, the operation department of the electric department is responsible for management and operation. If the cable is designed by automatic control specialty, the instrument control department is responsible for management and operation. For the cable operation that the electrical operation department of the instrument DCS cabinet is responsible for, the instrument control department is responsible for opening the cabinet door and monitoring, and the electrical operation department is responsible for the operation; For the cable operation that the instrument control of the control cabinet (junction box) managed by the electric operation department is responsible for opening the door of the control cabinet (junction box) and monitoring, and the instrument control department is responsible for the operation.

电气运行部与仪表控制部的电缆及端子排的分管界面原则上按工程阶段电缆的设计专业划分，若该电缆由电气专业设计，则电气部运行部负责管理及作业；若该电缆由自控专业设计，则仪表控制部负责管理及作业。对于进仪表 DCS 机柜的电气运行部负责的电缆作业，由仪控部负责打开柜门及监护，电气运行部负责作业；对于进电气运行部管理的控制柜（接线盒）的仪表控制负责的电缆作业，由电气运行部负责打开控制柜（接线盒）门及监护，仪控部负责作业。

2.4 In principle, the instrument control department is responsible for the equipment management in the instrument loop and the electrical operation department for the equipment in the electrical loop, but the instrument control department is responsible for the measuring instruments and solenoid valves, and the electrical equipment in the instrument control cabinet is responsible for the electrical operation department. The management of the control cabinet body shall be based on the principle of who is the main and who is responsible, and special circumstances shall be divided according to the actual use on site.

涉及仪、电一体化的就地控制柜，原则上属于仪表回路中的设备管理由仪表控制部负责，属于电气回路中的设备由电气运行部负责，但涉及测量仪表及电磁阀时由仪控部负责，属于仪表控制柜内的电气设备由电气运行部负责。控制柜本体的管理，按照谁为主，谁负责原则，特殊情况根据现场使用实际协商划分。

2.4 Sootblower control box and equipment in it shall be managed by Electrical Operation Dept. (If there is any problem of pressure gauge, solenoid valve of pneumatic valve and other equipment in the box, the Instrument Control Dept. may be entrusted with its solving.) When the sootblower has both electrical control box and instrument control box in it, the electrical and instrument control boxes shall be managed by the electrical and instrument control departments respectively. Motor, electrically operated valve, limit switch, igniter and electrical cable ducts (including incoming power lines) of sootblower shall be managed by Electrical Operation Dept.; pneumatic valve, flame detector (or flame probe) and solenoid valve of sootblower shall be managed by Instrument Control Dept. The output terminal block in sootblower control box on site is regarded as the demarcation point between electrical and instrumental equipment.

吹灰器设备的控制箱及箱内设备由电气运行部管理（箱内的压力表、气动阀电磁阀等设备存在问题时，可委托仪表控制部处理）；当吹灰器设备中既有电气控制箱又有仪表控制箱时，则电气、仪表控制部各自管理其中的电、仪控制箱。吹灰器设备的电动机、电动阀、限位开关、点火器及电气电缆管线（包括电源进线）由电气运行部管理；吹灰器设备的气动阀、火焰检测器（或火焰探头）、电磁阀等由仪表控制部管理。电、仪设备的分界点以现场吹灰器控制箱内配出端子排为界。

2.5 When it comes to troubleshooting of electroEquipment Management integration equipment or equipment at electrical and instrumental interface, the discipline that is the first to receive the notice shall timely inform its counterpart, and the counterpart shall promptly send personnel to jointly find the cause of trouble.

2.9 The instrument control department shall be responsible for the accessories of the control circuit equipped with the main valve, high-pitched valve and extraction valve of the power station steam turbine, and the interface is bounded by the first terminal on site.

电站汽轮机本体主汽门、高调门、抽汽门所配带的控制回路的附件，由仪控部负责，分界面以现场第一道端子为界。

当涉及机电一体化或电气、仪表交接面的设备故障处理时，先接到通知的专业应及时通知对方专业，对方专业应及时派员共同查找故障原因。

2.6 When there is any objection to the division of management interface of newly-added mechatronics equipment, the Equipment Management Department shall organize the coordination division of mechanical, electrical, instrument and other related majors.

新增机电一体化设备的管理界面分工存在异议时，由机械动力部组织机、电、仪等相关专业协调划分。

3 Work division between Instrument Control Department and Equipment Maintenance

Department

仪控部与设备检修部的分工

3.1 As for the instrument control valve, the instrument control department, as the asset department, is responsible for its life-cycle management and operation and maintenance, and is responsible for the spare parts, technical support, quality acceptance, process supervision and confirmation of maintenance results required for the control valve maintenance. If necessary, it can be entrusted to the maintenance department for implementation during the maintenance process.

对于仪表调节阀, 仪控部作为资产所属部门负责其全生命管理与运维, 负责调节阀维修所需备件、技术支持、质量验收, 过程监督以及检修结果的确认, 维修过程中如有需要可委托检修部进行实施。

3.2 The equipment maintenance department is responsible for the repair of fans and pumps brought by the instrument control department.

仪表所带的风机、泵的检修由设备检修部负责。

4 Division of Business Interface between Electrical Operation Dept. and Production Operation Dept.

电气运行部与生产运行部业务界面的划分

4.1 Interface division of motor bearing. The production and operation department shall be responsible for the oiling of motor bearing bush lubricating oil and the daily maintenance of oil goggles, and the electric operation department and the production and operation department shall jointly undertake the daily inspection tour. When the electric operation department finds the oil level and oil quality of bearing bush, it shall contact the production and operation department in time for handling. The operation department is responsible for the spare parts of motor bearing bush. If the bearing bush is overhauled, the electric operation department will inform the production operation department, which will entrust the equipment maintenance department to overhaul it.

电机轴瓦界面划分。电动机轴瓦润滑油的加油及油视镜的日常维护工作应由生产运行部门负责, 电气运行部和生产运行部共同承担日常的巡回检查工作, 电气运行部发现轴瓦油位、油质问题时应及时联系生产运行部处理。电动机轴瓦备件由运行部负责, 如轴瓦检修, 由电气运行部告知生产运行部, 由其负责委托设备检修部检修。

4.2 Production Operation Dept. is responsible for coupler connecting pump (unit) to motor; Electrical Operation Dept. is responsible for fabrication of motor-side coupler if it is necessary due to electrical reasons. The operation department need participate in the rotation confirmation after motor maintenance.

泵(机组)与电机相联的联轴器由生产运行部负责, 当电气原因引起电动机侧联轴器需要制作时, 由电气运行部负责。电动机检修后转向确认需运行部参加。

4.3 Division of labor in motor foundation. If the motor foundation is integrated with the foundation of rotating equipment body, the foundation shall be managed by the operation

department. If the motor-side foundation need be renovated separately due to electrical reasons, the Electrical Operation Dept. shall be responsible for the renovation.

电动机基础的分工。电动机与转动设备本体基础为一体化的由运行部负责管理。当电气原因需要对电机侧基础单独进行改造时，由电气运行部负责实施。

4.4 Division of electric valves (including electric regulating valves) in production devices. The production operation department is responsible for the valve body part, and the electric operation department is responsible for the electronic actuator part.

生产装置的电动阀（包括电动调节阀）分工。阀体部份由生产运行部负责，电动头部份由电气运行部负责。

5 Work division between Electrical Operation Department and Equipment Maintenance Department

电气运行部与设备检修部的分工

5.1 The electrical operation department shall be responsible for the inspection, disconnection and on/off of power supply for the temporary power supply needed for the maintenance of production equipment, and the equipment maintenance department shall provide power supply facilities.

生产装置设备检修中需要的临时用电，由电气运行部负责用电设备的检查、拆接线、停送电，设备检修部提供用电设施。

5.2 During motor maintenance, the electrical operation department shall be responsible for dismantling and inspecting the rotor or lifting the motor. The equipment maintenance department is responsible for the special position of the motor and the cooperation of the crane.

电动机检修需拆检转子或起吊电动机时，由电气运行部负责，遇到起吊有困难时设备检修部须派人进行现场指导；当重量超过 5 吨或需吊机（包括带驾驶室的行车）配合时，由设备检修部负责；

5.3 During motor repair, the electrical operation department shall be responsible for dismantling the coupling bolts and couplings, and properly keep the dismantled coupling bolts, diaphragms, couplings, anchor bolts, gaskets and other parts. After the motor repair is completed, be responsible for restoring and bringing the bolts to the full buckle, restore the motor gasket to the original position, and do not need to tighten the anchor bolts for restoration. The equipment maintenance department is responsible for alignment, and the electrical operation department is responsible for disassembly damage or loss.

电动机检修中（或电机轴承置换润滑脂后），联轴器螺栓及联轴器由电气运行部负责拆卸，将拆下的联轴器螺栓、膜片、联轴器、地脚螺栓、垫片等零部件妥善保管。电机检修完成后，负责恢复并将螺栓带至满扣，电机垫片恢复至原位，地脚螺栓恢复不需要拧紧，设备检修部负责进行找正及对轮连接，因拆卸损坏或丢失，由电气运行部负责。

5.4 When the alignment of electric equipment requires machining, the the equipment maintenance department can be directly entrusted to repair it. When the motor rotor needs to be balanced, the electric operation department shall install half coupling and cooling fan blades, and the equipment maintenance department shall carry out dynamic balance test.

电动设备找正需要进行机加工时，可直接委托设备检修部；电动机转子需要做平衡时，由电气运行部安装半联轴器及冷却风叶，设备检修部进行动平衡试验。

5.5 When the coupling needs to be replaced as a whole, the pair of wheels on both sides of the coupling shall be removed and replaced by the equipment maintenance department, and the installation position of the motor pair of wheels shall be confirmed by the electrical operation department.

联轴器需要整体更换时，联轴器两侧对轮由设备检修部拆除及更换，电机对轮安装位置由电气运行部确认。

5.6 If the shaft head of the motor is connected with gears, the motor and the casing shall be removed by the equipment maintenance department during the motor repair, and then the electrical operation department shall carry out the motor repair, and the equipment maintenance department shall reset the motor after the motor repair.

对于电机轴头带齿轮联接的，在进行电机检修时，电机与机壳联结处由设备检修部进行拆除，然后由电气运行部进行电机维修，电机检修后再由设备检修部进行复位。

5.7 The disassembly and assembly of electrical and equipment connection parts such as electric valve and pipeline pump shall be divided according to the principle of "whoever needs it shall disassemble and assemble".

电动阀及管道泵等电气与设备联接部件的拆装，根据“谁需要谁拆装”原则分工。

5.8 The electric operation department is responsible for the cooler installed on the motor body, and the equipment maintenance department is responsible for the split type (cooler not installed on the motor body).

安装于电机本体上冷却器由电气运行部负责，分体式（未安装在电机本体上的冷却器）由设备检修部负责，生产运行部做好相关牵头协调工作。

5.9 The equipment maintenance department shall be responsible for dismantling and removing the motor when repairing the direct-connected pipeline pump, direct-connected reducer and direct-connected axial flow fan. The electrical operation department shall be responsible for repairing and installing the damaged skeleton seal, labyrinth seal and felt seal on the gland side of the motor (the equipment maintenance department shall be responsible for special seals); When this part of the seal is a mechanical seal, if the motor shaft is worn out, the repair and processing dimensions of the shaft seal part shall be given by the equipment maintenance department, and the electrical operation department shall be responsible for processing. After the repair is completed, the equipment maintenance department shall replace the mechanical seal and the motor in place, and the mechanical and electrical discipline shall jointly conduct trial operation.

直连式管道泵、直连减速机及直连式轴流风机等检修时由设备检修部负责解体并拆下电动机，电动机压盖侧损坏的骨架密封及迷宫式密封、毛毡密封由电气运行部负责修理并安装（特殊密封由设备检修部负责）；当该部分密封为机械密封时，如电动机轴发生磨损后，轴密封部位修复加工尺寸由设备检修部给出标准图纸，电气运行负责加工（可委托设备检修部），修复完成后由设备

检修部回装机械密封并回装电动机就位，机、电两专业共同试运转。

5.10 When directly connected high-speed pump motor and shielded pump motor are repaired, the equipment maintenance department is responsible for dismantling, the electrical operation department is responsible for repairing the motor, machining and repairing the main shaft of the motor, the equipment maintenance department is responsible for installing the mechanical seal (the electrical operation department is responsible for the side frame seal of the motor gland) and positioning the motor, and the mechanical and electrical specialties jointly test run.

直连式高速泵电动机、屏蔽泵电动机检修时，由设备检修部负责拆卸，电气运行部负责电动机的检修及电动机主轴的加工修复，设备检修部负责机械密封（电动机压盖侧骨架密封由电气运行部负责）安装及电动机就位，机、电两专业共同试运转。

5.11 When the belt-driven axial-flow air-cooled fan motor is repaired, the electrical operation department is responsible for dismantling the motor pulley and other parts. After the motor is repaired, the electrical operation department is responsible for installing in place and the equipment maintenance department is responsible for aligning. The equipment maintenance department shall be responsible for the disassembly and assembly of the fixed blades of the direct-connected air cooling fan.

皮带传动轴流式空冷风机电动机检修时，电气运行部负责拆卸电动机皮带轮等零部件，电动机检修完成后由电气运行部安装就位，设备检修部负责找正；直连空冷风机固定叶片谁需要检修谁拆装，可调叶片由设备检修部负责拆装。

5.12 When the motor with sliding bearing is repaired, the equipment maintenance department is responsible for repairing the sliding bearing and the bearing seal, the auxiliary facilities such as fan blades are dismantled by the electrical operation department, and the electrical operation department is responsible for measuring and adjusting the gap between the rotor and stator of the motor, the rotor and stator of the exciter and the gap between the partition plates of the motor.

带有滑动轴承的电动机检修时，由设备检修部负责滑动轴承及轴承密封的修配，风叶等附属设施由电气运行部拆装，电动机转子和定子、励磁机转子和定子间隙测量、调整以及电动机隔板间隙的调整由电气运行部负责。

5.13 The electrical operation department is responsible for providing the core-pulling technical requirements and precautions for synchronous machines and generators, and the equipment maintenance department is responsible for lifting.

同步机、发电机抽芯工作由电气运行部负责提供抽芯技术要求及注意事项，设备检修部负责起重。

5.14 When the motor of the unit is repaired, the equipment maintenance department shall be responsible for the disassembly of the coupling. After the motor repair is completed, the equipment maintenance department shall install and align the coupling.

机组的电动机检修时，由设备检修部负责联轴器的拆卸，电动机检修完成后由设备检修部进行联轴器安装及找正。

6 Interface Division for Purified Instrument Air Pipelines

仪表净化风管线界面划分

6.1 Purified instrument air pipelines with diameter \geq DN25 (including valves of the same diameter) are in the charge of Production Operation Dept., while those with diameter $<$ DN25 (including valves of the same diameter) are in the charge of Instrument Control Dept. (including the first weld joint or valve at diameter change position); besides, the purified air pipelines (including the first weld joint or valve at diameter change position) with diameter $<$ DN25 independently used by Production Operation Dept. are in the charge of Production Operation Dept.

仪表净化风管线大于和等于 DN25 的管线（包括同口径阀门）由生产运行部负责，小于 DN25 的净化风管线（包括同口径阀门）由仪表控制部负责（包括变径处第一道焊缝或阀门），其中生产运行部独立使用的小于 DN25 的净化风管线（包括变径处第一道焊缝或阀门）由生产运行部负责。

6.3 The emergency air supply tank installed for instrument regulating valve or shut-off valve and the filter installed on the main purified air pipeline shall be in the charge of Production Operation Dept. if they fall within the scope of pressure vessel.

仪表调节阀或切断阀配有事故气源储罐以及净化风主管线上的过滤器，如属于压力容器的由生产运行部负责。

6.4 Maintenance and dehydration of an air storage tank for a purified air inlet unit shall be in the charge of the operation department of this unit; filter on pipeline downstream of the purified air storage tank, and daily dehydration of emergency air supply tank shall be in the charge of Instrument Control Dept.

净化风进装置的储气罐由所在装置运行部负责设备维护和脱水管理；净化风储气罐后管线上的过滤器、事故气源罐的日常脱水工作由仪表控制部负责。

7 Division of Telecommunication System in Process Plant Area

装置区电信系统划分

7.1 Industrial video monitoring system in production areas of plants and units is in the charge of Instrument Control Dept.; industrial video monitoring system of distribution room is in the charge of Electrical Operation Dept.; all video monitoring systems related to security are in the charge of Information Management Dept.

装置及单元等生产区域的工业视频监控系统由仪表控制部负责；配电间的工业视频监控系统由电气运行部负责；所有安防相关的视频监控系统由信息管理部负责。

7.2 Wireless communication facilities, terminals, telecommunication lines, telephone system, access control system, patrol system and generic cabling system are in the charge of Information Management Dept.

无线通讯设施、终端、电信线路、电话系统、门禁系统、巡更系统、综合布线系统由信息管理部负责。

7.3 The electrical operation department is responsible for the fire alarm system, including the complete set of fire linkage control system of power station and the fire control system of wharf. 火灾报警系统由电气运行部负责，包括电站成套消防联动控制系统、码头消防控制系统等。。

7.4 The instrument control department is responsible for the control system of fire water pressurized pumping station, fire foam station and tank farm fire spraying, as well as the grating fire detection system and combustible toxic gas alarm system in the tank farm.

厂区消防水加压泵站、消防泡沫站、罐区消防喷淋的控制系统，以及罐区光栅火灾检测系统、可燃有毒气体报警系统等，由仪表控制部负责。



Appendix 6

附录 6

Detailed Rules for Operation and Management of Water Cooling Equipment

水冷设备运行管理细则

1 When the temperature of heat medium is higher than 150°C, heat should be recovered first, and then cooled with indirect circulating water; Mechanical equipment conveying heat medium with temperature greater than 135°C shall not be cooled by circulating water.

热介质温度高于 150°C 时应先进行热量回收，再用间接循环水冷却；输送热介质温度大于 135°C 的机械设备不得采用循环水冷却。

2 The cooling water flow rate of the water cooler should be above 0.5m/s, the water temperature at the outlet of the cooling water should not be higher than 50°C, the temperature difference between the inlet and outlet of the cooling water should be 8 ~ 10°C, and it should not be lower than 6°C on the premise of ensuring the cooling water flow rate. If there is special need for the process, such as the water cooler with the water temperature at the outlet of the cooling water exceeding 50°C, the flow rate should be increased and reported to the Mechanical Power Department for the record.

水冷器冷却水流速应在 0.5 米/秒以上，冷却水出口水温不应大于 50°C，冷却器的冷却水进出口温差应在 8~10°C，在保证冷却水流速的前提下不应低于 6°C，对工艺有特殊需要的，如在冷却水出口水温需要超过 50°C 以上水冷器，应提高流速，并报机械动力部备案。

3 It is necessary to establish a list of water-cooling equipment of the plant, including process parameters, medium name and properties, materials, specifications, models, installation and update years, etc. The list of water-cooling equipment of each device shall be filled in by each device, and the mechanical power department shall summarize it and send it to the relevant operation department. The list of water-cooling equipment of the plant is updated once every operation cycle, and each operation department shall report it to the Mechanical Power Department within two months after the overhaul.

要建立装置水冷设备一览表，内容包括水冷设备的工艺参数、介质名称和性质、材质、规格、型号、安装和更新年份等。各装置水冷设备一览表由各装置填报，机械动力部汇总后发相关运行部。装置水冷设备一览表每个运行周期更新一次，由各运行部在大修后二个月内报机械动力部。

4 Thermometers, pressure gauges, flowmeters and sampling valves shall be set at the circulating water side of the key water coolers of major devices.

凡主要装置的关键水冷器，循环水侧均应设置温度计、压力表、流量计和取样阀。

5 For water coolers with medium side pressure greater than circulating water pressure, especially oil coolers, the inlet and outlet pipelines of circulating water shall be provided with sampling ports.

对于介质侧压力大于循环水压力的水冷器，尤其是油冷器，循环水进出口管线上均应设有取样口。

6 The circulating water return pipe main pipe of each device must be provided with a sampling port; Temperature and pressure gauges shall be set on the inlet and return main pipes of circulating water.

各装置的循环水回水管总管上必须设有取样口；在循环水的进、回水总管上均应设置温度、压力表。

7 Each operation department should strengthen the operation management of water cooler and make a good account of water cooler leakage; The water-cooling equipment that can't meet the process requirements or has too many blocked pipes should be updated or reformed in time.

各运行部应加强水冷器的运行管理，做好水冷器泄漏台账；对已不能满足工艺要求或堵管数过多的水冷换设备要及时进行更新或改造。

8 It is necessary to strengthen the inspection of corrosion and scaling of water coolers. One month before the overhaul of the device, each device shall put forward a list of water coolers to be inspected, which shall be submitted to the Mechanical Power Department and the Planning and Dispatching Department for examination and approval, and then issued to the Public Engineering Department and the Quality Inspection Department. The quality inspection department is responsible for the sampling and analysis of scale samples, and will report the analysis results to the mechanical power department and the planning and adjustment department within one month after the system starts. On-site inspection and photographing: The mechanical power department, the dispatching department and the public engineering department are responsible for forming an inspection team to inspect the on-site water cooler. The public engineering department will complete the inspection summary of the water cooler within two months after the system starts, and report it to the mechanical power department and the dispatching department.

要加强对水冷器进行腐蚀结垢状况检查，装置大检修一个月前由各装置提出需检查的水冷器清单，报机械动力部与计调部审批汇总后下达给公用工程部、质检部。质检部负责垢样的采样与分析，并于系统开工后一个月内将分析结果报机械动力部、计调部。现场检查、拍照由机械动力部、计调部、公用工程部负责组成检查小组对现场水冷器进行检查，公用工程部于系统开工后二个月内完成水冷器检查总结，报机械动力部、计调部。

9 After the water cooler is cleaned and overhauled, the tube side and shell side shall be pressure tested separately, and they can be put into use only after passing the pressure test. By the use of units and mechanical power department is responsible for the supervision and acceptance of maintenance quality.

水冷器清洗、检修后，需对管程、壳程分别试压，试压合格后方可投用。由使用单位和机械动力

部负责监督验收检修质量。

10 All water coolers made of materials should be cleaned and prefilmed before use, if conditions permit.

所有材质的水冷器在使用前，如果具备条件都应进行清洗预膜处理。

11 For cold exchange equipment with anti-corrosion coating, the temperature should be strictly controlled during operation to avoid coating damage. At the same time, steam purging should be avoided. If it is really unavoidable in the process, the purging temperature should be strictly controlled (the steam temperature of the cooling exchange equipment should not be higher than the maximum service temperature of the coating) to avoid damage to the coating.

对于有防腐涂层的冷换设备，在运行操作时应严格控制温度，避免涂层损坏。同时应避免用蒸汽吹扫，工艺上确实避免不了的，应严格控制吹扫温度（进冷换设备蒸汽温度不大于涂层最高使用温度），以免造成涂层损坏。

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