

110kV 变电站电气主接线设计

摘 要

我国电力工业虽然起步比较晚，但是随着社会经济的高速发展，电力工业也得到了迅猛的发展需要建设大量 110kV 变电站满足电力供应建设坚强电网。变电站接线方案趋于简单化为提高经济效益，我国主要变电站的设计已逐渐采用比较简单的接线方案。同时高科技电力电气设备涌现以及迅猛发展的变电站综合自动化技术，同时必须减少变电站占地面积。目前对于变电站电气控制方案设计当中主要涉及内容是主接线设计，短路电流相关分析设计，电气设备确定，电气设备校准（包含母线设计，保险丝设计，电流互感器设计，隔离开关设计，断路器设计等），分配电压设备设计。总的变电站电气控制方案设计当中按照“35 至 110kV 变电站规范要求”，“35 至 110kV 高压配电装置规范设计要求”等等进行参照。且总体变电站电气控制方案设计的设计根据我国专业技术政策以及经济政策相关。本次设计所选设备均为国家推荐的新产品，先进的技术，安全的运行，合理的经济利用是确保设计合理的重要核心。

本文首先对 110kV 变电站变电站电气主接线进行方案选择，确定该变电站高中压三侧分别采用单母线分段接线方式，其完全满足供电可靠性、灵活性及经济性要求。然后对变电站的所带负荷进行分析计算，进行变压器选型，并对无功补偿装置进行选型计算。此外对各种电气设备选择与校验。变电站继电保护整定计算的重点是对变压器保护的确定及整定计算。最后设计了变电站防雷保护方案。本设计方案符合实际情况，满足电力供应需求，切实可行。

关键词：电力供应；变电站设计；变压器；电气主接线

ABSTRACT

Although China's power industry started late, with the rapid development of social economy, the electric power industry has also been rapidly developed, and a large number of 110kV substations need to be built to meet the power supply and build a strong power grid. Substation wiring scheme tends to be simple to improve economic benefits, the main substation design has gradually adopted relatively simple wiring scheme. At the same time, the high-tech electric equipment and the rapid development of substation integrated automation technology, and must reduce the substation floor space. At present, the electrical control scheme design of the substation mainly involves the main wiring design, short-circuit current correlation analysis design, electrical equipment determination, electrical equipment calibration (including bus design, fuse design, current transformer design, isolation switch design, circuit breaker design, etc.), distribution voltage equipment design. In the overall electrical control scheme design of substations, reference is made to "35-110kV substation specification requirements", "35-110kV high-voltage distribution device specification design requirements" and so on. And the electrical control scheme design of the overall substation is related to China's professional and technical policy and economic policy. The equipment selected in this design are all new products recommended by the country. Advanced technology, safe operation and reasonable economic utilization are the important core to ensure the design is reasonable.

In this paper, the main electrical wiring scheme of 110kV substation is firstly selected, and the three sides of the high and middle voltage substation are determined to adopt single bus section wiring mode, which fully meets the requirements of power supply reliability, flexibility and economy. Then the analysis and calculation of the load of the substation, transformer selection, and reactive power compensation device selection calculation. In addition to a variety of electrical equipment selection and calibration. The key point of relay protection setting calculation in substation is the determination and setting calculation of transformer protection. Finally, the lightning protection scheme of substation is

designed. The design scheme conforms to the actual situation, meets the power supply demand, and is feasible.

Keywords: Power supply; substation design; transformer; electrical main wiring

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