


| | | |
|-------------------------|-----------------------------|---|
| کد سند: RO-S-F-28-02 | معاونت پژوهشی |  |
| تاریخ صدور: ۱۳۹۹/۴/۲۲ | | |
| تاریخ ویرایش: ۱۳۹۹/۵/۱۵ | فرم خلاصه انگلیسی طرح/پروژه | |

Project Title: Product review and identification of standards related to the protection of turbines, boilers, generators and power plant transformers

| | | | |
|---------------------------------|--|------------------------------|--------------------------|
| Department: | Upgrading and standardization of monitoring, protection and control systems of power plants plan | Employer: | Niroo Research Institute |
| Project/Program Manager: | Abbas Yousefpour | Executor: | Ali Bakhshi |
| Project Financial Code: | 152106 | Project Quality Code: | PCSPN02-04 |
| Type of Project/Program: | Applied Developing | Assistant: | Technology |

Project Staff: Ali Asghar Akbari

Keywords:

Protection, turbines, boilers, generators, transformers, products, standards

Project Necessity:

The variety of relays used has expanded to enable defective equipment to be taken out of circuit quickly. Control and protection system is an integral and very important component in all industrial units, including power plants, which with the advancement of technology, control and protection systems have evolved. In recent years, in addition to control and protection systems, equipment status monitoring has also witnessed rapid changes and developments, and although the philosophy of equipment protection and monitoring is different, but with the advancement of sensors and processors, protection and monitoring boundaries have been somewhat overlapped.

The efficiency and reliability of the equipment has been improved by using advanced protection methods as well as online and offline monitoring methods, and many research institutes and companies manufacturing control, protection and monitoring systems are active in the development and design of these systems. In our country, due to industrial growth and increasing the number of specialists in this field, efforts have been made or are being made in the field of designing and manufacturing control and protection systems and even monitoring the situation. Development of the country's power plant industry in recent years and the growth of the number of installed or being installed power plants, as well as the need to maintain old power plants by upgrading control and protection systems on the one hand and the restrictions that developed countries have on political issues.

We allow, on the other hand, the necessity of localization and providing facilities for the construction of these systems in the country or the supply of part of it from second-rate industrialized countries has become inevitable. Therefore, it is necessary to create the ability to design, build and update the control and protection system of power plants, as well as to prepare the necessary standards and instructions for quality assessment and monitoring the implementation and operation of these systems.

Project Goals: (Font: Times New Roman 12)

In this project, according to the mentioned cases, the standards related to the protection of power plant equipment mentioned in the title were examined in detail, and while recognizing and introducing the products of reputable companies in this field, the standards related to the protection of this equipment were identified, reviewed and Were introduced.

Abstract:

In this project, first, the necessary research has been done in parallel with the latest methods of protection of all four equipments, including boilers, turbines, generators and transformers. Then, the reputable manufacturers of protection systems of this equipment have been identified and, if possible, the capabilities and estimates made in cyberspace in relation to the quality of these devices and their manufacturers have been investigated by researchers and customers.

The standards on which the above-mentioned protection systems and devices are based have been searched and reviewed, and finally the latest revised versions of these standards have been reviewed and introduced.

Steps and Methodologies:

In the report of the first phase of this series, the latest methods of protection of power plant equipment, turbines, boilers, transformers and generators have been reviewed. For this purpose, various available references on the methods of protection of this equipment, according to the existing standards have been reviewed and how to protect this equipment has been described.

In the second phase, a comprehensive study was conducted on the manufacturers and various companies related to protection products, and the manufacturers in this field were introduced to each of the four-axis equipment of this project. The different types of protection systems required for this equipment have been identified and their characteristics have been investigated. By examining the characteristics of different products, a comparison has been made between the protection systems of the manufacturers in order to facilitate the use of this equipment.

In the third phase of the project, in the first chapter, the existing standards in the field of gas turbines are discussed. Therefore, after introducing the existing standards, a detailed review of the standard sections regarding the protection of its various sections is given.

In the second chapter, first the standards related to steam turbines are reviewed, then based on the parameters required for protection in the turbine, standard sections and sections are collected and described.

In the third chapter, the standards in the field of protection systems in boilers are examined and its different parts are described.

In the fourth chapter, after searching and selecting the relevant standards, the transformer protection standard is given. The standard is examined on a case-by-case basis and its various parts are described.

Chapter 5 examines the protection standards of generators. After a comprehensive search in this field, the relevant standards have been selected and reviewed. The methods and equipment of protection are fully described by this standard.

Chapter 6 provides an explanation of the final report, and Chapter 7 (Appendices) provides basic standards related to transformer and generator protection that provide general protection information and help to better understand the core standards.

Main Results (technical outputs, patents, papers, books, reports, etc.):

According to its initial definition, this project has reviewed products and identified standards related to the protection of turbines, boilers, generators and power plant transformers, which are presented in the following documents.

Project Documentation:

Introduction report of boiler protection equipment and standards

Report on the introduction of equipment and standards for gas and steam turbine protection

Report on the introduction of generator protection equipment and standards

Report introducing transformer protection equipment and standards.