

General Electric Systems Technology Manual

Chapter 9.0

Electrical Systems

TABLE OF CONTENTS

9.0 ELECTRICAL SYSTEMS 1
 9.0.1 Normal AC Power System 2
 9.0.2 Emergency AC Power System 2
 9.0.3 120 VAC Power System 2
 9.0.4 DC Power System 2

9.0 ELECTRICAL SYSTEMS

Introduction:

The plant electrical systems provide redundant, diverse, and dependable power sources for plant startup, operation, and shutdown. In the event of a total loss of offsite power (referred to as loss of preferred power), three diesel generators, a gas turbine and batteries are provided onsite to supply electric power to equipment necessary for the safe shutdown of the plant. The general format of this chapter is:

- Normal AC Power (NP) System (Section 9.1)
- Emergency AC Power (EP) System (Section 9.2)
- 120 VAC Power Systems (Section 9.3)
- DC Power Systems (Section 9.4)

Design Criteria:

The offsite power distribution network is the preferred source for station power to the normal and emergency buses. The offsite power distribution system includes two or more power sources capable of operating independently of the onsite or emergency power sources. It encompasses the grid, transmission lines, transmission line control systems, switchyard battery systems, and other distribution equipment. The general design criteria requires that electric power from the transmission network to the onsite electric distribution system be supplied from two physically independent circuits designed and located to minimize the likelihood of simultaneous failure under operating, postulated accident and environmental conditions.

The onsite site power distribution network distributes power to normal and emergency buses. The emergency buses, components and loads are required to be designed, built, and operated in accordance with IEEE class 1E standards. IEEE class 1E is the safety classification given to electrical equipment and systems that are essential to emergency reactor shutdown, containment isolation, reactor core cooling and containment and reactor heat removal, or are otherwise essential in preventing significant release of radioactive material to the environment.

The emergency power system is designed to provide the functioning of structures, system, and components important to safety. The safety function for the emergency power system is to provide sufficient capacity and capability to assure that the specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operation occurrences and that the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

9.0.1 Normal AC Power System

System Purposes:

1. To provide adequate power to unit auxiliary loads needed for normal operation of the plant.
2. To deliver two physically independent offsite power supplies to the emergency buses, each capable of supplying the total station normal and emergency in-house loads. The two physically independent power supplies are the 138KV and the 69KV offsite transmission systems.

9.0.2 Emergency AC Power System

System Purpose:

To provide a reliable source of AC power to all loads which are required for safe shutdown of the plant.

9.0.3 120 VAC Power System

System Purposes:

1. To provide 120 VAC power to safety related loads and non safety related loads.
2. To provide uninterruptible 120 VAC power to systems that are not safety related.

9.0.4 DC Power System

System Purposes:

1. To provide highly reliable 125 VDC and 24 VDC power to emergency buses and to equipment required for safe shutdown of the plant
2. To provide 125V DC power to balance of plant loads.