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## Design Criteria of the Electrical Power Supply for Lithium Loop System of DEMO-Oriented NEutron Source (DONES) plant.

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The aim of this paper is to identify the design criteria of the Electrical Power Supply of the Lithium Systems of DEMO-Oriented NEutron Source (DONES) power plant. This facility is planned as a simplified IFMIF-like plant to provide, in a reduced time scale and with a reduced cost, information on materials damage due to neutron irradiation. In particular, a general overview of the current status of the electrical power systems developed for IFMIF-EVEDA has been made and also emphasis has been put on the analysis of the new specific requirements of DONES. This paper describes the Electric Power System (EPS) for Lithium Loop System (LLS). Its scope is to define design criteria, mainly focusing on the design of electric distribution system for electric loads of LLS and its components. A detailed description of design criteria and of key functions are reported, taking into account the specific requirements of the DONES Facility.

The Lithium Power System, has the following main functions:

🛛 receives the AC power from the commercial power grid and transformed to proper voltage levels and feeds LLS electric loads in normal conditions;

⊠ receives the DC/AC power from the uninterruptible power supply systems and emergency generator in case of the AC power grid lost, for SIC LLS electric loads;

Ø provides control and protection to the electric equipment, cables and electric loads against faults.

The Electric Distribution Systems provides the electric power to all electric loads of LLS. These loads are classified based on Safety Important Class (SIC) methodology into three groups based upon the loads served (in according to the IEC Standards):

• SR/Non-SIC loads, Single Power System (Normal Operation) fed by power grid;

• SIC-2 loads, Power System plus Emergency Power Supply System;

• SIC-1a/b loads, Redundancy Power System plus Emergency Power System.

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