TASNEEF
هيئة الإمـــــارات للتصـــنـيـف
EMIRATES CLASSIFICATION SOCIETY

Amendments to the “Guide for Nuclear Installation on Board of Marine Units”

Effective from 1/1/2026

The Guide has been amended to improve some requirements for the electrical installations, introducing a better guidance on how to analyze the behaviour of the electric installation with generators off; and clarifications on the requirements for the main electrical system and the emergency electrical system. (Prop. 284)

Section 6 – ELECTRICAL INSTALLATIONS

1. GENERAL REQUIREMENTS

1.1.
Electrical installation on board of Units is to comply with the requirements of TASNEEF Rules Pt C, Ch 2, as applicable, and to the requirements of this Section.

1.2.
Electric installation is to consist of the main, stand-by and emergency electric systems.

1.3.
The main electric system is to be provided with main and stand-by electric energy sources and main switchboards intended to supply electric energy to both nuclear installation auxiliaries, including the heat transfer systems, and all the other on board consumers.

1.4.
The capacity of the main energy sources is to be such that in the event of any one of them being stopped, it will still be possible to supply those services necessary to provide normal operational conditions of propulsion and safety, minimum comfortable conditions of habitability and all services needed for the operation of nuclear installation, without recourse to the emergency source of electrical power.

1.5.
The capacity of the stand-by energy sources is to be sufficient to supply electric energy to the consumers ensuring safety of nuclear installation and are to be capable to restore sufficient power for safety, minimum propulsion and comfortable conditions of habitability, without recourse to the emergency source of electrical power.

1.6.
~~Electric installation, with generators off, is to be capable of supplying electric energy to the systems required for disabling the reactor and keeping it in safe state for at least 30 days in normal operational conditions, minor fault conditions, major fault conditions including severe accident conditions, and considering a single failure of the electric installation in addition to the initial event which caused the abnormal operation.~~
The behaviour of the electric installation, with generators off, is to be analysed under risk assessment study considering the availability of the necessary electrical energy for disabling the reactor and keeping it in safe state for a period to be defined according to the ship operating profile, in the following cases:

- normal operational conditions,
- minor fault conditions,
- major fault conditions including severe accident conditions, and
- considering a single failure of the electric installation in addition to the initial event which caused the abnormal operation.

1.7.
When starting up the reactor and shutting down the reactor, the safety control systems of the reactor are to be supplied with electric energy from at least two independent sources.

1.8.
The stand-by and emergency generators, in case one of them fails, are to be designed, installed and operated to supply electric energy to the consumers required for starting up the supply of the heat transfer systems from cooled (or hot stand-by) state and for maintaining minimal habitability conditions.

1.9.
The emergency generators may be used for starting up the heat transfer systems, if they produce enough power, and for supplying electric energy to the Unit emergency consumers.

1.10.
The main electric system is to be capable to supply the heat transfer system consumers and all Unit's essential consumers from two power stations in normal operational and transient modes.

1.11.
The provision is to be made for periodic tests of electric installation structure equipment which is critical for safety of the steam supply system and the whole Unit.

1.12.
Electric equipment of machinery and systems essential for safety of the heat transfer system are to be capable of operation under inclinations as per Sec 5, Tab 1.

1.13.
Power supply from uninterruptable power supply sources is to be provided for consumers needed to ensure safety actions on nuclear installation when main, stand-by and emergency power sources are not in operation (black out situation).

1.14.
Power supply from emergency diesel generators is to be provided for consumers which allow to be in power failure from the main and stand-by power sources for a period, determined by safety conditions and requiring power supply availability after immediate emergency protective actions have been taken on nuclear installation.

1.15.
Power supply from stand-by energy sources (stand-by generators) is to be provided for consumers which allow to be in power failure when switching off the main power sources and after emergency protective actions have been taken on nuclear installation, and for consumers providing safety services and minimum propulsion and minimum habitability conditions.

1.16.
Hull return distribution systems are not permitted.

2. MAIN ELECTRICAL SYSTEM

2.1.
Other design solutions, different or alternative to those described in the following paragraphs, will be considered acceptable on the basis of the result of a dedicated risk analysis aimed at demonstrating that they provide the same or higher degree of safety.

2.2.
Failure of a single component within any main generating set (including alternator and its drive engine, associated auxiliaries; etc), or within distribution devices of the main electric system is not to cause malfunctions or shutdown of the nuclear installation and or loss of the Unit minimum propulsion and maneuverability.

2.3.
Upon any single failure, provisions are to be foreseen for fast recovery of electric power needed for maintaining the Unit in normal operational condition and normal habitability conditions.

2.4.
In order to comply with the general principle already stated above, the main electric system is to be provided of at least two main generators, two stand-by generators and two main switchboards.

2.5.
At least two separate and functionally independent power stations are to be foreseen so that in normal operation and minor fault in one station, the other is not affected. Each station is to consist of main generator (generators), stand-by generator (generators) and main switchboard.

2.6.
Power supply to essential consumers for the safe operation of the nuclear installation and of the heat transfer system are to be provided from at least two power stations.

2.7.
Stand-by sources (hot stand-by) are be activated as fast as possible.

2.8.
The total capacity of the main generators of each power station is to be sufficient to supply all the essential services required for maintaining the Unit in normal operational conditions and normal habitability conditions.

2.9.
In case of black out on the main bars of any main switchboard, stand-by generators are to be automatically started and connected to the bars to take up load for a time necessary for safe operation of the heat transfer system.

2.10.
The design is to allow parallel operation of the stand-by generators with the main generators at least for a time necessary for load transfer.

2.11.
The total capacity of the available stand-by and main generators~~, which remain operational,~~ is to be sufficient to supply essential services required for maintaining the Unit in normal operational conditions and normal habitability conditions. Services which are not essential for the safety of the Unit may be disconnected.

2.12.
The total capacity of the stand-by generators, under abnormal conditions, is be sufficient to supply essential services providing safety, ensuring minimum habitability conditions, allowing return into a normal operational condition including start up and cooling of the heat transfer systems.

2.13.
Any single failure in controls and instrumentation systems located in the central control station consoles and panels is not to affect more than one power station.

2.14.
Power supplies for the heat transfer system consumers are to be provided from the main switchboards or from dedicated switchboards and from the emergency switchboard.

2.15.
The automation and monitoring systems supporting operation of the safety systems and radiation monitoring system are to be powered from the main and emergency switchboards. Power supply is to be normally from the main distribution system and automatically switched over to the emergency sources in case of loss of power from the main distribution system.

2.16.
In case the automation and monitoring systems supporting operation of the safety systems and radiation monitoring system or part of the systems needs to be continuously supplied, the systems or their relevant part are to be powered from the transitional source of emergency electrical power or equivalent source.

2.17.
The main switchboards are to be located in separate compartments (i.e. isolated from each other with watertight subdivisions and Class A-0 boundaries, or higher where required).

2.18.
The main generators of the power stations may be located in a common engine room compartment, provided that 2.14 requirement is complied with.

2.19.
Where the main generators are located in one common engine room compartment, the stand-by generators are to be located in a separate compartment.

3. EMERGENCY ELECTRICAL SYSTEM

3.1.
The emergency electrical system and the emergency generators are to be independent from the nuclear installation.

3.2.
The emergency electrical system is to include not less than two emergency generators and two emergency distribution system independent on each other. The design is not to allow synchronization of electric energy sources in emergency.

3.3.
Consumers for the heat transfer systems and essential auxiliaries of the nuclear installation are to be supplied by two separate emergency distribution systems with associated emergency generators. Emergency services required by TASNEEF Rules Pt C, Ch 2, Sec 3, (or relevant parts for specific type of ships such as passenger and ro-ro passenger ships) are to be supplied by one emergency generator with an independent distribution system.

3.4.
Each emergency generator is to be connected to its associated emergency switchboard.

3.5.
The emergency switchboards are to be powered in normal conditions from every main switchboard.

3.6.
Each emergency generator is to be started automatically in case of

- black out of the relevant emergency switchboard
- activation of the reactor emergency protection system
- loss of voltage at the supply system of heat transfer system consumers.

3.7.
The emergency electrical system is to be capable of being loaded in a time as short as required by the maintenance of the reactor safety conditions.

3.8.
The capacity of each emergency generator of the emergency source of electrical power is to be sufficient to supply, in addition to the requirements specified in TASNEEF Rules Pt C, Ch 2, Sec 3 (or relevant parts for specific type of ships such as passenger and ro-ro passenger ships), system and components necessary to ensure the shut-down of the reactor and all the consumers performing the reactor safety functions.

3.9.
Measuring instruments for every emergency generator are to be installed both in the emergency switchboard and in the central control station.

4. UNINTERRUPTABLE POWER SUPPLY SOURCES

4.1.
At least two independent uninterruptable power supply sources are to be foreseen.

4.2.
In case of power failure from the main and emergency sources to the console of the heat transfer system or radiation monitoring systems and other instruments and indicators essential for safety of the Unit, it is to be supplied from an UPS as transient electric energy source. Switch over from main supply to emergency and further to transient source of electric energy is to be performed automatically.

4.3.
Monitoring systems and instrumentation measuring parameters of the heat transfer system, radiation monitoring systems and other instruments and indicators essential for safety of the Unit are to be supplied from both UPS for 30 minutes.

4.4.
UPSs as transient power supply sources may not be required if evidence is provided that the consumers specified in [4.2] have built-in uninterrupted power supply for 30 minutes complying with single failure principle under normal conditions, minor or major fault conditions and severe accidents.

4.5.
The UPSs are to be located and installed so that not more than one UPS fails in case normal operation, minor or major fault conditions and severe accidents.

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