Backfitting list

Safety-related requirements / measures for further risk prevention

Foreword

Under the provisions of the Atomic Energy Act, the use of nuclear energy for the commercial generation of electricity is to be phased out in a structured manner and regulated operation ensured until final decommissioning.

Since the beginning of 2010, a joint Federation-Länder Working Group has been compiling this non-exhaustive backfitting list of safety-related requirements.
In particular consideration of the provisions of the 13th amendment to the Atomic Energy Act and the lessons learned from Fukushima, this list has now been updated.

The following list of requirements and measures is based on an overall safety assessment derived from completed safety reviews.

The requirements / measures described were developed from the results of the safety reviews, the supervision procedures, global operational experience and national and international developments in regulations, as well as from the findings of various safety-related studies and research activities.

Each nuclear power plant must be subject to a review of the extent to which it already meets these requirements / measures and which specific measures must be implemented to achieve the targeted improvements in safety.

In accordance with Section 7d of the Atomic Energy Act, the licensing and supervisory authorities under nuclear energy legislation apply this list of requirements and measures to each German nuclear power plant authorised for power operation. Some requirements and measures may also be applied to installations in post operation.

I a Extended safety review

(1) The license holder shall present, in complete form (verification manual), the analyses which are the basis for the licensing and supervisory procedures for events to be considered as level of defence 3. Where requirements are updated in line with revised regulations, the contents shall be reviewed to ensure they are still up to date. (PWR, BWR)

(2) Implementation of the results of the analysis of events classed as level of defence 3 under latest available knowledge, including those occurring in low-power and shutdown operation modes, with the aim of complying with the 30-minute concept. (PWR BWR)

I b Personnel/organisational requirements

(1) Development, introduction and continual improvement of a process-oriented management system which integrates the requirements of safety management, ageing management and quality management. (PWR, BWR)

(2) Supplementary measures for maintaining training and competence of shift personnel and shift supervisors. For example, emergency control room simulation exercises, training in prevention and mitigation as well as training for personnel in other specialist areas and for technical support staff in the plants and headquarters, securing "know-why" competences. (PWR, BWR)

I c Measures/requirements at levels of defence1-4

Optimising operational management

(1) Existence of an operational pool cooling system (1 x 100%) which is separate from the emergency core cooling and residual heat removal system (TH / JN). (PWR, BWR)

(2) Reducing the collective dose of the plant personnel in line with best practice of the respective reactor series, and taking the plant-specific particularities (PWR, BWR) into account; to this end, where necessary decontamination of the primary circuit to reduce the collective dose of the personnel. (PWR, 3rd series)

(3) Optimising the operational control and limitation systems to reduce the

frequency of demands on the safety system, with the aim of demonstrating that the safety concept implemented in the plant is designed for prevention in line with technological developments. (BWR)

Increasing safety in low power and shutdown modes of operations

(4) Further increasing safety in low power and shutdown modes of operation by expanding measuring systems and review of whether automatic measures derived from this are useful in terms of safety. (PWR, BWR)

(5) Depending on the results of the review referred to in I c (4), provide for automatic measures to avoid manual actions in mid-loop operation. (PWR)

Improving effectiveness and reliability of safety functions and increase of existing safety margins

(6) Replacing pipes in the pressure retaining boundary to improve leak-before-break behaviour (in relation to material properties, construction, longitudinal welds in piping manifolds, operating conditions) in locations where this measure can achieve a significant safety gain. (PWR, BWR)

(7) Enlarging the flooding tank inventory and increasing reserves of feedwater and demineralised water, provided this is useful from a safety point of view. (PWR)

Improving prevention and mitigation measures within the framework of accident management

(8) Establishing possibility of recovery from the sump for the high pressure path. (PWR)

(9) Supply to emergency power bus bars from an external feed (e.g. third external grid connection or from an adjacent unit). (PWR, BWR)

(10) Development of Severe Accident Management Guidelines (SAMGs) and their implementation in the plant regulations. (PWR, BWR)

(11) Presence of a sampling system in the containment vessel suited to the conditions anticipated in the case of serious core damage. (PWR, BWR)

(12) Replacement of RPV water level probes with a view to introducing feed and bleed procedures. (PWR)

(14) Provision of a mobile electricity supply to maintain continuous current in case of a station blackout. (PWR, BWR)

(15) Extensive independence of the third external grid connection, e.g. through the connection to faraway or decoupled power grid distributions, in case of failure of the main and back-up grid connections. (PWR, BWR)

(16) Development and provision of computer-assisted diagnosis and prognosis aids for determining the radiological situation in order to support on-site emergency response staff in the event of an accident. (PWR, BWR)

(17) Increasing reserves of feedwater, provided this is useful from a safety point of view. (BWR)

(18) Diversified heat removal from the safety-related residual heat removal chain (including heat sink of a cold subcritical reactor) (PWR, BWR)

II Security measures

The following is a list of general security measures. No details are given as these measures are classified.

(1) Optimising measures with regard to protection against insider threats (further details contained in classified information). (PWR, BWR)

(2) Optimising detection equipment (further details contained in classified information). (PWR, BWR)

(3) For vital safety related areas of the plant, construction of physical barriers against intrusion by third parties, with a protective effect complying with current requirements (further details contained in classified information). (PWR, BWR)

(4) Implementation of specific administrative and technical measures to improve effectiveness and reliability of plant security (further details contained in classified information). (PWR, BWR)