
Regulation

Regulation for the Application of Probabilistic Risk Assessment (PRA) at Nuclear Facilities (FANR-REG-05)

Version 0

Federal Authority for Nuclear Regulation (FANR), 2010
P O Box 112021, Abu Dhabi, United Arab Emirates
regulation@fanr.gov.ae

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Definitions

Article (1)

For purposes of this regulation, the following terms shall have the meanings set forth below.

Containment	Methods or physical structures designed to prevent or control the release and the dispersion of radioactive substances.
PRA Peer Review	A process used to demonstrate conformance with this regulation. The process uses a documented procedure to direct the peer review team when evaluating the adequacy of a PRA
PRA Peer Review Team	A group of individuals assembled by the applicant or licensee to provide a review of the scope and quality of the PRA against a defined standard. The peer review team members shall be independent of the personnel who developed the PRA, familiar with the areas of the plant design modelled in the PRA and have expertise in the technical areas and methods used in developing the PRA.
Probabilistic Risk Assessment (PRA)	<p>A comprehensive, structured approach to identifying failure scenarios constituting a conceptual and mathematical tool for deriving numerical estimates of risk.</p> <p>Level 1 comprises the assessment of failures leading to the determination of the frequency of core damage.</p> <p>Level 2 constitutes the assessment of containment response and leads to the determination of frequency of containment failure resulting in release to the environment of a given percentage of the reactor core's inventory of radionuclides.</p>
Structures, Systems and Components (SSCs)	A general term encompassing all the elements of a Facility or Activity which contributes to protection and safety, except human factors. Structures are the passive elements such as building vessels and shielding. A System comprises several components assembled in such a way as to perform a specific active function and a Component is a discrete element of a system.

Objective

Article (2)

The objective of this regulation is to require the Applicant or Licensee constructing or operating a Nuclear Facility to conduct a PRA to support the Construction and Operating Licensing.

Scope

Article (3)

1. The scope of this regulation addresses the:
 - a) elements to be modelled in the PRA
 - b) completeness of the analysis
 - c) standards by which this analysis is to be carried out
 - d) manner in which the PRA results are to be used and updated over the life of the facility
 - e) information submittal and retention requirements
2. The PRA shall include an Assessment that takes into consideration internal and external events and all modes of plant operation. Measures should be implemented consistent with the applicant's/licensee's management system to ensure the quality of the PRA, including data and information used in the analyses. The PRA shall be based on realistic analysis using state-of-the-art tools, methods and data to calculate the radiological release and consequences of spectrum of events ranging from those of high anticipated frequency through those of rare anticipated frequency, e.g., severe reactor accidents. This requires addressing uncertainties and conforming to internationally recognised PRA standards and best practice.

Quality

Article (4)

1. A high quality PRA shall be performed and used to complement the Nuclear Facility Design, Construction, Operation and Safety analysis. The PRA shall be based upon the design of the nuclear power plant and site-specific information. The PRA shall assess accident sequences leading up to and including reactor core damage and loss of containment integrity, and the corresponding quantity and composition of Radioactive Material available for release to the environment (i.e. Level 2 PRA).

Specific Requirements

Article (5)

The PRA shall be used to assess the safety of the Nuclear Facility, establish performance goals for safety significant SSCs, and compare the nuclear power plant risk with the Authority probabilistic targets. The PRA results shall include identification of the most safety significant: event sequences, human actions, plant configurations, new information, issues and changes to the approved referenced plant design. The results of the PRA shall be used to complement design, construction and operation of the facility and shall be updated and applied over the life of the nuclear power plant.

Article (6)

The Licensee shall update the PRA over the life of the Nuclear Facility at appropriate intervals to reflect the operating experience, design modifications, and other changes reflecting the as-built and as-operated plant that could affect the PRA. Results from the updated PRA shall be used to ensure that the nuclear power plant design and operational programmes incorporate current PRA insight.

Article (7)

1. The Licensee shall conduct a PRA Peer Review of the PRA when it is initially developed and at each major update. The Licensee shall present a summary of the results of the PRA Peer Review to the Authority.
2. A PRA Peer Review shall be performed by qualified personnel and each member of the peer review team must have technical expertise in the specific methods used to perform the PRA elements. The PRA Peer Review outcome compares the PRA against the characteristics and attributes, documents the results, and identifies both strengths and weaknesses of the PRA.

Article (8)

The PRA and related documentation shall be updated and made available at the licensee's site, for the Authority's inspection and audit upon request. The Licensee shall provide a summary of the PRA results to the Authority in connection with the applications for construction and operating licences. The summary shall include an overview of the PRA results, conclusions and an explanation of how these have been utilised to complement Design, Construction and Operation. The summary shall also describe the results of the Peer Review process described in Article 7. At the time of a major PRA update, the Licensee shall provide to the Authority a summary report describing the update, the reasons for the update and how it is using the results.