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# Regulatory Perspectives on Analytical Codes and Methods for Advanced Reactors

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Analytical codes and methods are used extensively in the design and safety analysis of nuclear reactors. These are commonly used to analyse the response of a complex engineering system to postulated events with potentially severe health, financial, and environmental implications. Regulatory agencies establish requirements and/or expectations on the nuclear power plant designer or licensee for the development and use of analytical codes and methods in order to ensure the quality, credibility, and confidence in the analyses produced by the analytical codes and methods. In addition, regulatory agencies have used analytical codes and methods to perform confirmatory analyses as part of due diligence during a regulatory review. The Task Group on Analytical Codes and Methods (TGACM) of the OECD-NEA Working Group on the Safety of Advanced Reactors (WGSAR) has performed a review to (1) identify and clarify the requirements and best practices applicable to nuclear power plant designers for the development and use of analytical codes and methods used in the design and safety analysis of nuclear power plants, and (2) identify best practices for the use of confirmatory analyses by regulatory agencies.

In this paper first results of this on-going work will be presented, based on the responses to a survey from Canada, France, Germany, Italy, Russia, UK and USA. The partly different procedures and expectations on regulatory approval of codes and methods, quality assurance program and handling of possible bugs and errors will be discussed. For example, some countries require the code developer to undergo a certification process. In addition, in some countries qualification of code users and / or organisations is required.

The second part of the survey is related to confirmatory analysis. Because the objective of these confirmatory analysis is mainly linked to support the regulator, the required capabilities and expectations are partly different to codes used for the design and optimization of advanced reactors. Independent from the claimed inherent safety capabilities of reactor concept, a simulation of severe accident phenomena is expected by regulatory authority.

In the review an overview on existing codes used for advanced reactors will be provided. The capabilities of these will be discussed and compared with safety relevant phenomena of these advanced reactor concepts.

In conclusion, the regulatory expectations related to codes used for advanced reactors should be considered in the development of these codes. Comparing code capabilities with safety relevant phenomena, the review provides information on further code development needs.

## Country/Int. organization

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