U.S. Nuclear Regulatory Commission Plans for Commercial Power Plant Licensing and Assessment of Environmental Effects on Fatigue Lives of Critical Reactor Components

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Abstract: The first part of this two-part paper describes 1) the current status of the U.S. Nuclear Regulatory Commission's (NRC) license renewal program for existing commercial light-water reactors (LWRs), and 2) the status of NRC's licensing efforts for new LWRs that may be constructed in the future. Additionally, the NRC's plans for addressing issues associated with operating existing LWRs beyond the expiration of the renewed license period (i.e., after 60 years of operation) are discussed. This part of the paper also delineates the NRC's plans associated with future licensing of non light-water reactors (i.e., advanced reactors) and discusses some of the more recent activities in this area. The second part of this paper addresses the assessment of environmental effects on the fatigue lives of critical reactor components. The regulatory treatment and requirements associated with demonstrating acceptable fatigue lives are described for 1) existing plants that have not entered into the license renewal period, 2) existing plants that have been approved for license renewal, and 3) new LWR applications. The paper identifies remaining unresolved issues associated with the treatment of environmental effects. NRC and industry-sponsored research activities are described that are underway or planned to resolve these remaining issues. Related activities to modify the existing American Society of Mechanical Engineering (ASME) Boiler and Pressure Vessel Code (i.e., the Code) requirements to address environmental effects are also discussed.