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General Comment

Obsolescence of systems and components, and market conditions, is incentivizing nuclear power plant (NPP) owners to upgrade outdated analog Instrumentation and Control (I&C) systems with digital technology. Most U.S. operating plants have extended their license to 60 years (potential extension to 80 years), so replacing outdated 1960s-70s technology is unavoidable. Digital components (e.g., I/O modules, software) may introduce new errors into the measurement due to digital technology. The regulatory analysis of the draft regulatory guide states that the revision would incorporate the latest information in setpoint determination. However, the draft regulatory guide does not address Quantization Error which may be introduced due to digital upgrade changes in NPPs.

The process by which an analog signal (sampled and held at a constant value), is approximated to a set of values meant to represent the signal and dependent on number of bits used to represent the signal. The difference between an analog signal and its digital representation after quantization is the Quantization Error (Rounding/Round off and Truncation/Truncating errors).