

Design Completion and Reliability of Schedule and Cost Estimations to Support Construction Decisions

Implementation Guidance 01 for NEI 20-08, “Strategic Project Management Lessons Learned & Best Practices for New Nuclear Power Construction”

Executive Summary

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Executive Summary

Problem statement: New Nuclear Power (NNP) projects, including small modular reactor (SMR)/Advanced Reactor (AR) projects will have a long lifecycle with multiple steps prior to authorization and construction; these steps include the early conceptual design through final design, licensing, procurement, fabrication, estimating, scheduling, and detailed construction planning. Timelines for First of a Kind (FOAK) NNP projects are lengthy and uncertain, and FOAK elements add to the overall risk and uncertainty. These can be daunting problems that impact each stakeholder's assessment of its return on investment and could tamp down enthusiasm at an early stage of the process. A well-structured Phase Gate process is advocated for planning a project as design maturity progresses (i.e., clarity on the details of the scope and project definition) increasing basis and confidence in the reliability of project estimates and schedules.

Relevant Best Practices and Lessons Learned from NEI 20-08, "Strategic Project Management Lessons Learned and Best Practices for New Nuclear Power Construction," are addressed in Section 2 and Appendix D with recommendations for implementation. In this guide, these practices are laid out with a focus on the linkage between design maturity as an essential determinant of schedule and cost accuracy, and uncertainty as a project is developed and executed.

NEI provides this guidance and recommends its use for sanctioning NNP projects. Phase Gates allow for coordinating design maturity with cost and schedule development accuracy during the pre-execution project planning stage. This guidance is based on successful methods used in large capital project development as adapted to the nuclear industry. Embracing the Phase Gate process for estimating the cost, schedule, and risks is a measured approach that increases confidence in the NNP project development process from concept through project close-out. Appendix C summarizes the elements of a NNP project Phase Gate process across the project lifecycle.

Phase Gates provide investors, executives, stakeholders, and the project team with a road map of objective measures for understanding, controlling, and overseeing a complex, lengthy process, including:

- Achievable and well-timed thresholds for the NNP project to meet in order to secure funding and advance project cost and schedule development
- An established methodology for understanding and addressing uncertainty
- Clear, objective criteria for measuring performance and supporting prudent decision-making

A Phase Gate process anticipates the progressive elaboration of the project's maturity over time as more scope is known, design thresholds are met, planning advances, and uncertainties are reduced. Performance is tracked in early stages per a Preliminary Baseline, which is the estimate of schedule and cost for the project before certain construction and procurement work is sanctioned. Assuming the requirements are met, ultimately a Control Baseline Budget and Control Baseline Schedule is issued at final notice to proceed (FNTP) that becomes the basis for all cost and schedule reporting.