

3.4 DESIGN STAGE PLANNING

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Prepared by the Research Infrastructure Office and the Office of the Chief Officer for Research Facilities.

3.4.1 Design Execution Plan

The Design Execution Plan (DEP) describes the work to be conducted by the Awardee as part of a design effort. For Major Facilities, the DEP would first be submitted and reviewed to support an award at the planned point of entry to the Design Stage, normally the Conceptual Design Phase. A revised DEP would then be submitted and reviewed at the Conceptual Design Review (CDR) and Preliminary Design Review (PDR) to support award of the Preliminary Design Phase and Final Design Phase, respectively. For a Mid-scale RI project, the DEP would be submitted for NSF review in accordance with the funding announcement. Like the Project Execution Plan (PEP), a DEP is considered a living document. If the Design Phase is extended or the proposed activities change, a revision to the DEP may be appropriate.

Regardless of the scale of project, the primary deliverable to NSF from the design activities is a refined PEP for the proposed construction, acquisition, or implementation that would take place in the future, if awarded. Other deliverables the Awardee could provide to NSF to document progress during design may include test reports, prototype assessments, and documentation of actual or planned contributions from other partners. The DEP helps set expectations for all of deliverable to NSF for inclusion in the terms and conditions of the award.

The DEP should leverage the 10-section format of the Project Execution Plan (PEP) described in Section 3.5 Construction Stage and Implementation Planning, tailored and scaled specifically to the proposed design activities. Not all ten sections are required, nor are all the subsections. However, it is recommended that the proposing organization include a brief discussion on why any main section is omitted to facilitate NSF review. The content of the DEP is at the discretion of the proposing organization and will vary dramatically based on the size, complexity and technical nature of the proposed project. The scope of the DEP should reflect the activities necessary to advance the proposed project to the next level of technical readiness, which may be another phase of design or the start of construction or implementation. The structure and content of the DEP is generally as follows:

1. **Design Execution Overview:** Overview of the proposed design effort to advance the proposed project.
2. **Organization:** Description of the organization supporting design, including all partner organizations and key personnel, and where they fit into the organizational structure.
3. **Design Baseline:** Use of a WBS format is required, even for Level-of-Effort (LOE) activities, to help illustrate the primary deliverables as well as how the proposed budget was developed. At a minimum, the schedule should be logical and credible

and list key design, review, and deliverable milestones. A fully developed Integrated Master Schedule (IMS) may be appropriate for large, complex design activities. As noted above, one deliverable from design is always a refined PEP to support eventual construction/implementation, if awarded.

4. **Scope Acquisition and Delivery:** Description of significant procurement activities supporting design and how quality of any deliverables will be assured.
5. **Safety, Health & Environmental Protection:** This section would generally be applicable to design activities that involve laboratory testing, prototyping or field work. Institutional Health and Safety policies can generally be referenced, but anything specific to the award activities should be considered.
6. **Controls:** At a minimum, this section should describe how progress against the proposed plan for design will be monitored and controlled by the Awardee. For larger, more complex projects, Configuration Control for the design itself should also be articulated along with how any internal design reviews will be utilized to advance the design.
7. **Information Management:** At a minimum, this section should describe how any information developed during design (specifications, drawing, test results, etc.) will be managed and controlled.
8. **Risk Management:** This section should include a Risk Register for the design activities and describe planned risk mitigations being conducted during design, including testing and prototyping to reduce risk during construction/ implementation, if awarded. If contingencies are requested for the design award (budget, scope or schedule), or allowances are included in the estimate of the design effort, they should be described here, along with how each was developed or estimated. Statistical analysis (like Monte Carlo) is not required for estimating budget contingency on design activities.
9. **Award Close-out:** This section should describe the proposed method on how the current award will eventually be closed out. This will depend on the structure of the award and the overall schedule for design. For example, if associated with a Major Facility, the design award may be extended several times through supplemental funding requests and award close-out may not happen until well into the Construction Stage. Consultation with NSF on the award structure expected for Major Facility Design Stage awards. For Mid-scale RI, award close-out may happen before a decision is made to advance to implementation depending on the funding program.
10. **Post-Award Plans and Expectations:** Post-award in this case means following the end of the current design award. For Major Facilities, post-award plans may include submittal of the revised DEP for review and award of a subsequent Design Phase following successful completion of a stage-gate review (see Section 2.5 Major Facility Design Stage). For Mid-scale RI projects, it may be planned submittal of the mature PEP to support a future implementation proposal.