Project Execution Plan (PE) Workshop

Housekeeping and Logistics

- Greetings
- Session will be recorded and posted for access later.
- NSF Participant Introductions
  - Joe Whitmeyer; *Directorate for Social, Behavioral and Economic Science (SBE),* jwhitmey@nsf.gov
    Jill Nelson; *Directorate for Education and Human Resources (EHR), jnelson@nsf.gov*
  - Florence Rabanal; *Office of Budget and Award Management, Large Facilities Office*
- Questions queued in Chat
- Flow (websites and slides)
- Breaks every hour but please take them as needed

Workshop Objectives and Today's Agenda

OBJECTIVES

- Introduce basic project management concepts
- Bring awareness to selected key guidance documents central to preparations of mid-scale research infrastructure (RI) proposals.
- Share tips for navigating information sources

TODAY'S AGENDA

HR1

- Introduction (20 min)
- Broader Context and Inventory of Guidance Documents (30 min)

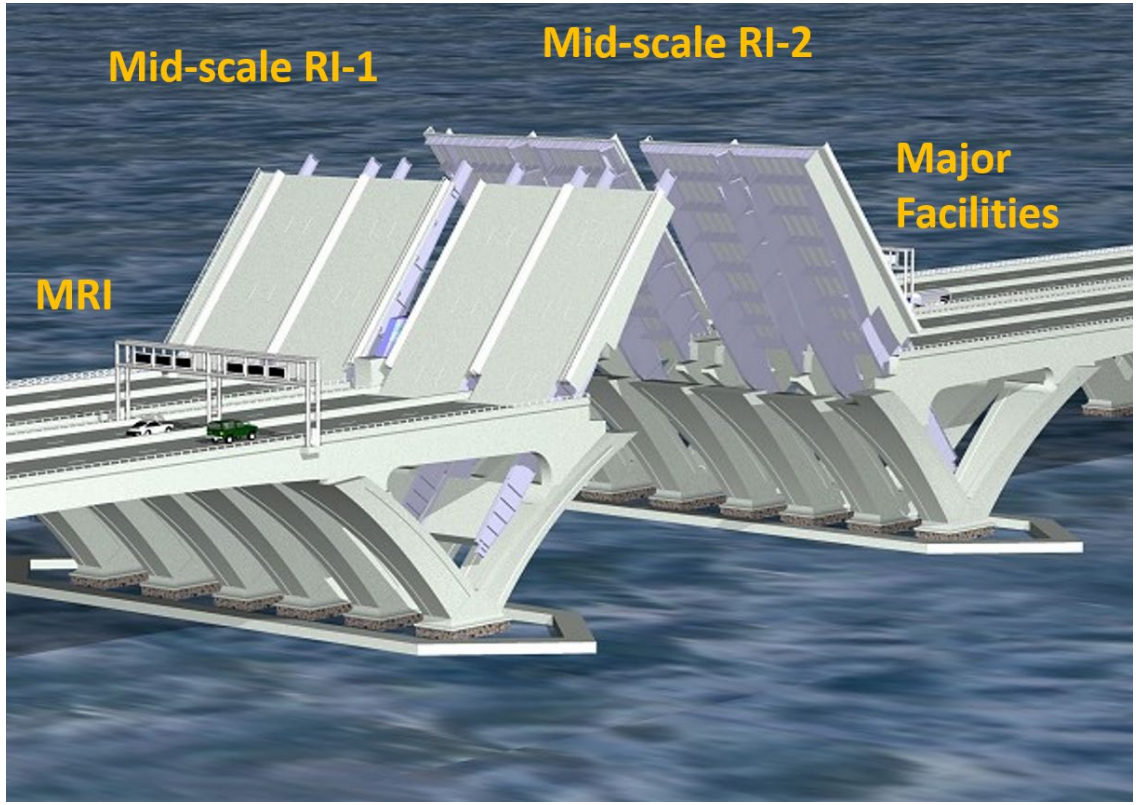
HR2

- Project Management Basics (50 min)

HR3

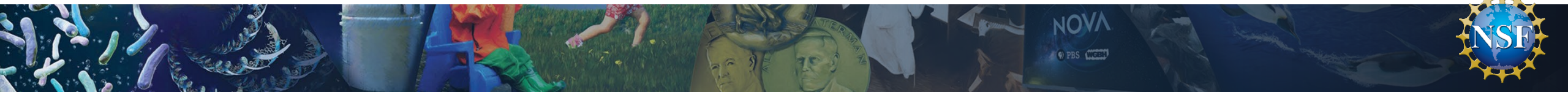
- Project Management Plan Template (50 min)

Mid-scale Research Infrastructure



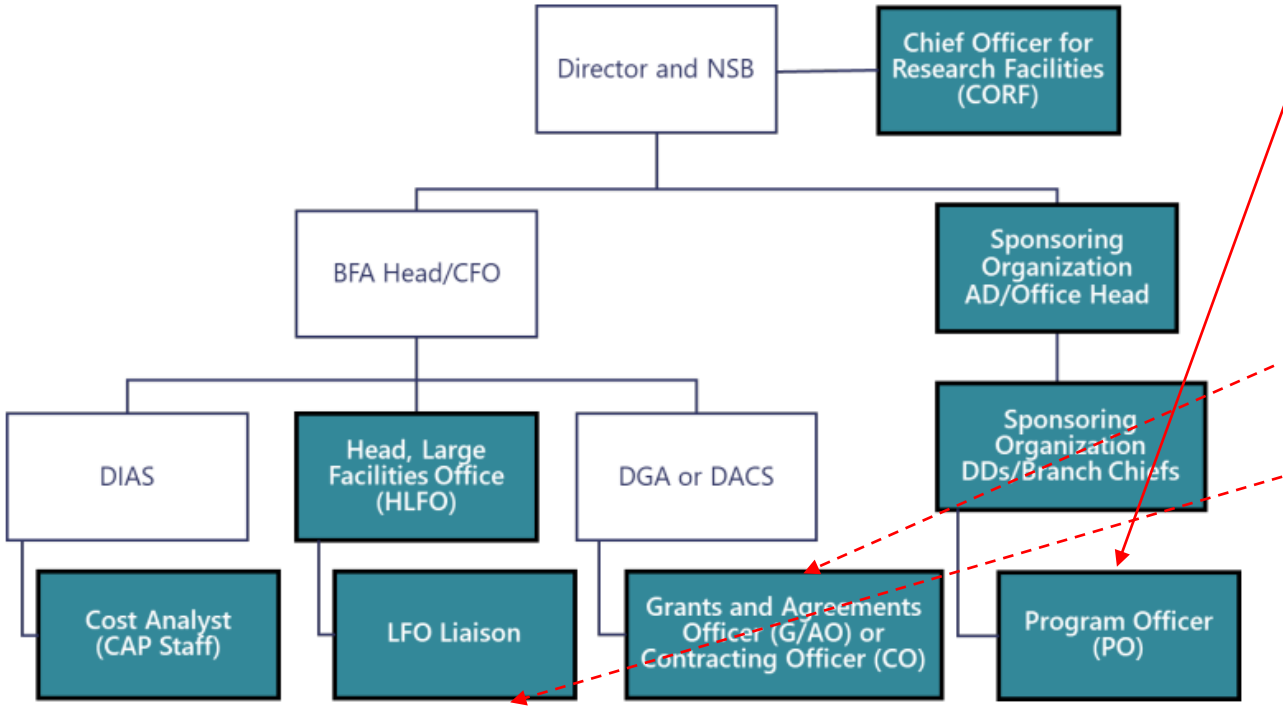
- **Major Research Instrumentation (MRI) program:** $100K < instrumentation < $4M[1]
- This gap results in missed opportunities that may leave essential science undone.
- $100M =< **Major Facilities Projects**
- NSF needed a new agile process for funding experimental research capabilities in the mid-scale range.
  - **Mid-scale RI-1:** $6 - <$20 M
  - **Mid-scale RI-2:** $20 - < $100 M

[1]$5.7 million with the addition of Congressionally mandated cost sharing



NSF Organization, Key Stakeholders and Assistance

Figure 2.1.6-1 **NSF organization chart highlighting staff who have primary oversight and management roles and responsibilities for major facilities and mid-scale research infrastructure.**



The participants with primary oversight and management roles and responsibilities are listed below and highlighted in the NSF organizational chart in Figure 2.1.6-1

- **Program Officer (PO)** – A scientist or engineer having primary oversight responsibility within NSF for all aspects of the project.
- **Grants and Agreements Officer (G/AO)** – NSF Grants and Agreements Officer who has legal responsibility and authority for the business and financial management of grants and cooperative agreements.
- **Large Facilities Office Liaison** – The designated project management advisor from the LFO, who is assigned as project liaison by the HLFO. This individual is the PO's primary resource for assistance with all policy, process, and procedural issues related to the development, implementation, and oversight of major facility projects.

Precedence and Inventory of Relevant Guidance Materials

1. 2 CFR, part 200: Uniform Administrative Requirements, Cost Principles, and Audit Requirement for Federal Awards (Uniform Guidance).

2. The Solicitation and subsequent Award Terms and Conditions

3. **NSF Proposal & Award Policies and Procedures Guide (PAPPG):** The PAPPG is comprised of documents relating to the Foundation's proposal and award process for the assistance programs of NSF. The PAPPG, in conjunction with the applicable award terms and conditions, serves as the Foundation's implementation of the Uniform Guidance.

4. **Research Infrastructure Guide (RIG)**, formerly known as Major Facilities Guide: as referenced in the PAPPG

5. Business Systems Review (BSR) Guide

"The RIG requirements flow from other NSF policies and statutory requirements. The hierarchy of documentation, in order of precedence, presented here."

The Research Infrastructure Guide (RIG) contains NSF policy on the planning and management of major facilities and mid-scale projects through their full life cycle.1 The purpose of the Guide is to:

Provide guidance to NSF staff on conducting oversight of major facilities and mid-scale projects and to Recipients in carrying out effective project planning and management, and

Clearly state the required policies and procedures as well as pertinent guidance and practices at each stage of a facility's life cycle.

Triple Constraint Concepts in Project Management

"…the Triple Constraint states that the success of the project is impacted by its costs, time, and scope. As a project manager, you can keep control of the triple constraint by balancing these three constraints through trade-offs…"

Merit Review Criteria and Context of Research Infrastructure (RI) Proposal

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:

a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and

b. Benefit society or advance desired societal outcomes (Broader Impacts)?

2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

4. How well qualified is the individual, team, or organization to conduct the proposed activities?

5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

<u>Triple Constraint</u>

- Budget
- Schedule
- Scope

<u>Project Execution Plan</u>

RIG Section 9 Lexicon: 9.1 LEXICON PREFACE

This Lexicon contains definitions of project and program management terms used in this Guide, as applied to NSF major facilities. It is a combination of specialized terms defined by NSF and used in the management of its major facilities, and terms and definitions commonly used in professional project and program management. A subset of common project management terms compatible with NSF usage were selected from a standard source, the PMI Lexicon, [1] for inclusion in this lexicon.

The Lexicon provides a common set of standard terms and definitions that should facilitate communication and understanding between stakeholders when used in documents and correspondence related to major facility management. The terms and definitions included in this lexicon are in development and are subject to modifications in future versions

1 Entries in italics in this lexicon have been reproduced with permission from Project Management Institute, Inc., [PMI Lexicon], (2012) Copyright and all rights reserved.

- **Project Execution Plan (PEP).** Project Execution Plan. The document that describes how the project will be executed, monitored, and controlled.
- **Major Facility.** A science and engineering facility project that exceeds $100,000,000 in construction, acquisition, or upgrade costs to the NSF Foundation.
- **Research Infrastructure (RI).** Any combination of facilities, equipment, instrumentation, computational hardware and software, and the necessary supporting human capital.
- **Mid-scale RI.** Per Section 109 of AICA, a mid-scale project means research instrumentation, equipment, and upgrades to major research facilities or other research infrastructure investments that exceeds the maximum funded by the Major Research Instrumentation program (MRI) and are below that of a major multi-user research facility project (Major Facility).
- **Construction Stage.** The period of time in which funds are obligated for acquisition and/or construction of a facility that fulfills the terms and conditions set forth in an award instrument between NSF and the Recipient(s). This Stage ends with the start of the Operations Stage.
- **Construction = implementation, acquisition**

American Innovation and Competitiveness Act (AICA)

Terms and Definitions, July 15 ver1.1

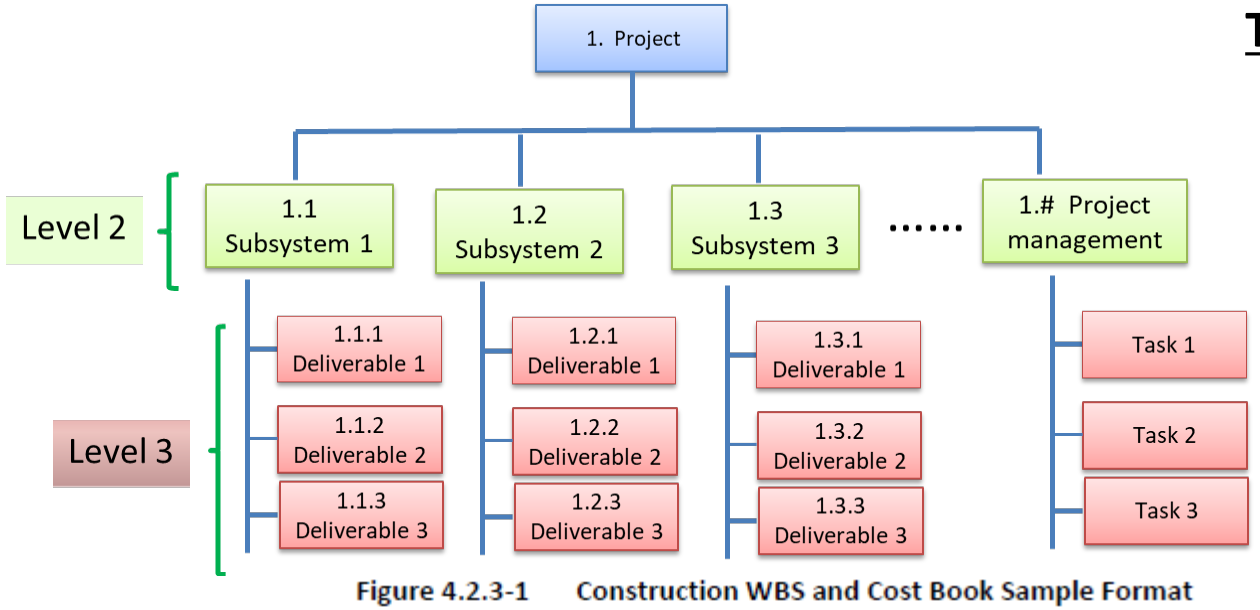


Figure 4.2.3-1 Construction WBS and Cost Book Sample Format

1.0 Project Administration and Management Office
- 1.1 Project Management Office
- 1.2 Site Office
- 1.3 Science Office
- 1.4 Education and Public Outreach
- 1.5 Safety and Environmental Assurance

2.0 Facility Infrastructure and Civil Construction
- 2.1 Sub-element X
- 2.2 Sub-element Y
- 2.3 Sub-element Z

- **Work Breakdown Structure (WBS).** A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables
- **WBS Dictionary.** WBS Dictionary. A document that provides detailed deliverable, activity, and scheduling information about each component in the work breakdown structure

Scope Baseline. The approved version of a scope statement, work breakdown structure (WBS) and its associated WBS dictionary, which can be changed only through formal change control procedures and is used as a basis for comparison.

Notes:
*Work Packages to Level 3
*Product oriented
*Potential components of construction WBS

Terms and Definitions, July 15 ver1.1

Construction = Implementation

WBS Element	WBS Description	Total Cost (FY$k)	Cost Account Manager (CAM)
1	Project		
1.1	Example: Project Management		
1.2	Work Package		
1.3	Work Package		
1.4	Work Package		
	Sub total		
	Budget Contingency (as applicable)		
	Total Project Cost (TPC)		

- **Total Project Cost (TPC).** The sum of the baseline budget (including indirect costs), the budget contingency, fee/profit (as applicable), and management reserve (if authorized) for the Construction Stage.
- **Performance Measurement Baseline. Performance Measurement Baseline. (PMB)** The approved cost and schedule baseline for accomplishing project work scope used as a basis of comparison for Earned Value Management. The PMB is typically approved and established at the time of the construction award, in the terms and conditions of the award instrument, and is under formal change control for the life of the project. (For NSF projects, contingency amounts are not included in the PMB due to the NSF requirement that contingency is held and managed separately from the baseline.)
- **Baseline Definition.** The description of the approved scope of work and resources for a construction project, including a hierarchical, product-oriented Work Breakdown Structure (WBS) and associated WBS dictionary; the cost and schedule Performance Measurement Baselines (PMB). Any contingency amounts, cost and time, are added to the baseline to establish the Recipient managed TPC.

eCFR :: 2 CFR Part 200 Subpart E -- Cost Principles

- **§ 200.404 Reasonable costs.**
- A cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a prudent person under the circumstances prevailing at the time the decision was made to incur the cost. The question of reasonableness is particularly important when the non-Federal entity is predominantly federally-funded. In determining reasonableness of a given cost, consideration must be given to:
- **(a)** Whether the cost is of a type generally recognized as ordinary and necessary for the operation of the non-Federal entity or the proper and efficient performance of the Federal award.
- **(b)** The restraints or requirements imposed by such factors as: sound business practices; arm's-length bargaining; Federal, state, local, tribal, and other laws and regulations; and terms and conditions of the Federal award.
- **(c)** Market prices for comparable goods or services for the geographic area.
- **(d)** Whether the individuals concerned acted with prudence in the circumstances considering their responsibilities to the non-Federal entity, its employees, where applicable its students or membership, the public at large, and the Federal Government.
- **(e)** Whether the non-Federal entity significantly deviates from its established practices and policies regarding the incurrence of costs, which may unjustifiably increase the Federal award's cost.
- [78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75885, Dec. 19, 2014]

Terms and Definitions, July 15 ver1.1

eCFR :: 2 CFR Part 200 Subpart E -- Cost Principles

- **§ 200.403 Factors affecting allowability of costs.**
- Except where otherwise authorized by statute, costs must meet the following general criteria in order to be allowable under Federal awards:
- **(a)** Be necessary and reasonable for the performance of the Federal award and be allocable thereto under these principles.
- **(b)** Conform to any limitations or exclusions set forth in these principles or in the Federal award as to types or amount of cost items.
- **(c)** Be consistent with policies and procedures that apply uniformly to both federally-financed and other activities of the non-Federal entity.
- **(d)** Be accorded consistent treatment. A cost may not be assigned to a Federal award as a direct cost if any other cost incurred for the same purpose in like circumstances has been allocated to the Federal award as an indirect cost.
- **(e)** Be determined in accordance with generally accepted accounting principles (GAAP), except, for state and local governments and Indian tribes only, as otherwise provided for in this part.
- **(f)** Not be included as a cost or used to meet cost sharing or matching requirements of any other federally-financed program in either the current or a prior period. See also § 200.306(b).
- **(g)** Be adequately documented. See also §§ 200.300 through 200.309 of this part.
- **(h)** Cost must be incurred during the approved budget period. The Federal awarding agency is authorized, at its discretion, to waive prior written approvals to carry forward unobligated balances to subsequent budget periods pursuant to § 200.308(e)(3).
- [78 FR 78608, Dec. 26, 2013, as amended at 85 FR 49562, Aug. 13, 2020]

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- **Budget and Budget Justification.** The proposal budget sets forth how much money the proposer is requesting, by category, to complete the project. The budget justification provides a more detailed breakdown of proposed spending in each category as well as a justification supporting the numbers provided in each budget category. This information is relied upon by NSF in formulating the total award amount and final award budget that is incorporated into any resultant award. (See PAPPG Chapter VI.B.1.)
- **Basis of Estimate (BOE).** Supporting documentation outlining the details used in establishing project estimates such as assumptions, constraints, level of detail, ranges, and confidence levels.
- **Cost Book**. A compilation of Cost Book Sheets, typically used to present baseline or total project cost, but may be used to present rolled-up costs for smaller elements or sub-elements.
- **Cost Book Sheet**. A compilation of related information from the Cost Model Data Set, used to define and present the cost estimate for a particular element or sub-element of a deliverable-based work breakdown structure for construction or a functional, activity, and/or deliverable based work breakdown structure for operations.

Terms and Definitions, July 15 ver1.1

- **Allowance.** Resources included in the basis of estimate for baseline cost estimates to cover the cost of known but as-of-yet undefined details or requirements for an individual WBS element. May be used when the level of project definition may not enable certain costs to be estimated definitively or times when it is simply not cost effective to quantify and cost every small item included with the WBS element, but reliable correlations are available.
- **Contingency.** A planned amount of budget and time added to the baseline estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs. These events are often referred to as "known-unknowns" and are considered manageable by the Recipient. Budget and schedule contingency are typically estimated using statistical analysis and professional judgment based on experience**.** Budget and schedule contingency are called out separately as part of the Total Project Cost and Total Project Duration, respectively, and obligated to the project for the Recipient to manage based on need per NSF policy.
- **Risk.** An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.
- **Risk Register.** A document in which the results of risk analysis and risk response planning are recorded

Wrap-Up

- Session 2: August 19, 2022, Advanced Topics
- Optional Homework for Session 2
  - Send to jwhitmey@nsf.gov
  - Prefix and email subject line: **PEPSession1: Questions**
- (Potential) Future Mid-scale RI1 Program Webcast