National Science Foundation • Office of Inspector General

4201 Wilson Boulevard, Suite I-1135, Arlington, Virginia 22230

MEMORANDUM

DATE: July 8, 2016

TO: Ms. Suzanne H. Plimpton, Reports Clearance Officer

Marie A. Maguire

FROM: Ms. Marie A. Maguire, Assistant Inspector General for Audit (Acting)

SUBJECT: Office of Inspector General Comments on the Draft *Large Facility Manual*

On behalf of the National Science Foundation Office of Inspector General (NSF OIG), I am submitting the attached comments on the draft *Large Facility Manual* (LFM) dated May 2016. Overall, we appreciate the increased oversight incorporated into the LFM. However, we note that the LFM is unclear as to which of the new requirements relate to large facilities in operations and suggest NSF clarify this prior to the LFM issuance. We also suggest ensuring that LFM guidance for NSF staff and recipients aligns with NSF internal Standard Operating Guidance (SOGs). As an example, see our comment on section 4.2.4.1, NSF Policy Positions. We hope you find our comments and suggestions useful.

Attachment

Section/Page Number	Language in Manual/Observations	Comments and Suggestions
Summary Timeline for MREFC Projects, 2.1.4-2	N/A	We suggest updating figure 2.1.4-1 to incorporate new requirements, such as the independent cost estimate, incurred cost audits, incurred cost submissions, etc.
4.2.1 Cost Estimating and Analysis Overview, 4.2.1-2	When submitting packages for cost analysis, Recipients must submit the following as a minimum: • Cost Estimating Plan per Section 4.2.2.1. • "Cost Model Data Set" per Section 4.2.2.1. • Reports and Proposals per Sections 4.2.2.2 and either 4.2.3.2 or 4.2.4.2. • The Work Breakdown Structure (WBS) and WBS Dictionary per either Sections 4.2.3.3 or 4.2.4.3. • Supporting information forming the Basis of Estimate (BOE) per Sections 4.2.2.4, 4.2.2.5,4.2.2.6, and either 4.2.3.4 or 4.2.4.4	Please clarify whether the steps apply to facilities in construction, operations, or both. For example, it was unclear in the operations section whether WBS is required for operations awards or not.
4.2.2 Cost Estimating and Analysis Process, 4.2.2-10	As a term and condition of the award, the recipient will be required to provide information (typically annually) on the actual use(s) of the management fee.	We suggest NSF more definitively outline the frequency of submitting management fee data. We suggest annually instead of "typically annually".
	The LFM does not require the auditee to submit a written assertion of need that details all sources of revenue, and examine all federal and non-federal sources of revenue for each awardee in determining whether a management fee is necessary and warranted.	We suggest NSF require the auditee's proposal involve a full disclosure of all financial resources and other sources of income available to cover unallowable expenses.

	The LFM lists appropriate uses of management fee stating, "Examples of potential appropriate needs include….and financial incentives to obtain and retain high caliber staff."	Our review of management fee uses at large facility awardees highlighted examples of "incentives," including significant signing bonuses and payment for private school tuition of employees' children. The use of management fees for these types of expenses may be questionable to taxpayers. We suggest NSF consider giving examples of "appropriate" financial incentives.
	The LFM does not address whether management fee should be captured under a separate line item in proposals.	We suggest NSF require management fees to be submitted as a separate line item in its future NSF proposals, rather than including them under a category of allowable cost.
4.2.2.-7 Cost Estimating and Analysis Process, G.6-Other	Budget contingency should also be presented as part of the total amount of Other Direct Costs and included in section G.6 on the standard NSF budget form.	The contingency estimates include indirect costs as well as direct costs, so it is not correct to categorize contingency as only "Other Direct Costs." Contingencies are required budget information for construction awards specifically listed on Form SF 424C (line 13) which NSF has agreed to use. We suggest that budget contingency have its own separate line item on proposed budgets to NSF.
4.2.2.1 Cost Estimating Plan, 4.2.2-1 and 4.2..3-2	• For *construction* awards, the CEP must explain how the Recipient will follow "The Twelve Steps of a High-Quality Cost Estimating Process" from the GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs (GAO-09-3SP March 2009, or subsequent revision). • Recipients are required to follow the best practices within the GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program	Please clarify whether the GAO Cost Estimating and Assessment Guide is a *requirement* for facilities in construction, operations, or both. On pg. 3.5.1-1 in the operations plan section it states "Note that cost estimating should follow the Government Accountability Office (GAO) Cost Estimating Guidelines, per Section 4.2." However, 4.2 is unclear what applies to construction and what applies to operations. In addition, while the construction section requires a statement from the awardee that they followed the GAO Cost

	Costs (GAO-09-3SP March 2009, or subsequent revision) and GAO Schedule Assessment Guide: Best Practices for Project Schedules (GAO-16-89G December 2015, or subsequent revision), taking into consideration NSF policy and practice as provided in this manual. • In the cost estimate section on construction it states, "The additional high level information should typically be provided ….A statement positively affirming recipient compliance with applicable federal regulations and NSF policy, including the LFM and GAO Cost Estimating and Assessment and GAO Schedule Assessment Guides." This is not required in the operation's estimates section of the LFM.	Estimating and Assessment Guide the same requirement is not made for operations.
4.2.2.2 Relevant Guidance and Reporting Formats	Budget contingency should also be presented as a part of the total amount of Other Direct Costs and included in section G.6 on the standard NSF budget form. Budget contingency budget estimates should be developed in accordance with Sections 4.2.5 and 5.2 of this manual. Budget contingency and allocations of contingency will be called out in the Cooperative Support Agreement by the G/AO under the "Contingency" section, based on information provided in the negotiated budget justification.	Comment: The new Large Facility Manual outlines how NSF awardees should develop contingency in Sections 4.2.5 and 5.2 including development of a risk management plan, tying contingency to WBS elements, use of Monte Carlo simulations etc. We suggest 4.2.2.2 be clear that the proposal budget should include adequate documentation to support that the contingency amounts were developed in accordance with 4.2.5 and 5.2 and are supportable.
Cost Estimating and Analysis for Operations Awards, 4.2.4-1 through 4.2.4-4.	The language in the construction estimate section includes: • "The results of an independent cost estimate review will be factored into the NSF cost analysis. To ensure maximum usefulness of	The cost estimating and analysis for operations awards section is silent on whether independent cost estimate reviews will be done on operations awards. We suggest NSF require that significant operation awards go through an independent cost estimate review.

	the review, it will generally be done as part of the Preliminary Design Phase." • "There may be one or more years between the PDR and the start of construction, which is predicated on successful completion of the FDR."	We suggest NSF should make it clear when the independent cost estimate will be done so awardees can plan accordingly. Currently, the LFM says "will generally be done as part of the Preliminary Design Phase."
		If there are significant changes between the PDR and FDR how will NSF assess the new quotes and data? We suggest NSF conduct an independent review of all updated quotes.
		If the independent cost estimate review indicates significant issues, or significant time has elapsed between the PDR and FDR, how will NSF handle this? We suggest NSF request the recipient to update its estimates with current, accurate and complete cost data and also perform a follow-up review.
		We suggest that the large facility proposals go through the most stringent of the eight types of GAO independent cost reviews, an independent cost estimate.
4.2.4.1 NSF Policy Positions, Point 4	In support of NSF's "No Cost Overrun" policy, projects shall use a confidence level for contingency estimates between 70 and 90 percent (under a probabilistic approach).	We suggest NSF also state its expectation not only in terms of a confidence level, but also the precision of the estimate (so that NSF can say, for example, that it is 80% confident that the point estimate is accurate within a range of plus or minus 20%).
4.2.4.1 NSF Policy Positions, Point 5	NSF will hold budget contingency through project completion, in an amount up to 100% of the total NSF-approved contingency budget, until it can be justified for obligation. However, the LFM does not outline the procedures related to this new policy; for	We suggest describing the process and procedures related to this new policy of holding budget contingency, including explaining how the amount of contingency to be held by NSF will be determined. Also, indicate that the allocations would be included in the award notice and the CSA

	example, that the allocations would be included in the award notice and the CSA amended. As another example, the new SOG states the project would monitor budget contingency against both the NSF-approved contingency budget and the total allocation to date. This expectation should be made clear in the LFM.	amended. Additionally, the new Contingency SOG (under Monitoring and Reporting of Budget Contingency) requires that the Project monitor budget contingency use against both the NSF-approved contingency budget and the total allocation to date. This expectation should be made clear in the LFM. We suggest the LFM be updated to align with the SOG, i.e., incorporate requirements from the new SOG as it relates to the recipient.
4.2.5.4 Contingency Planning and Assessment during Preliminary Design	Use of rigorous probabilistic cost estimating methods that estimate confidence levels for the TPC (such as Monte Carlo methods based on probability distributions for risk) are preferred and NSF highly encourages application of these methods where practical.	We suggest NSF make it clear whether probabilistic cost estimating methods are, or are not, a requirement. If probabilistic cost estimating is not used, what are other acceptable methods?
4.2.5.5 Development of the Contingency Use Process	The CCB change request document, whether forwarded to NSF for approval or not, must have the minimum content requirements necessary to comply with relevant cost principles, as well as to maintain an audit trail. SEE SAMPLE CHANGE CONTROL REQUEST FORM. This form states "Cost control accounts may be included for traceability in the accounting system."	When use of budget contingency is requested, we suggest that NSF require the recipient to document in the Change Control Request (in Additional Documentation for example) which of its accounts the related charges will be recorded under to provide better traceability in its accounting system.
4.2.5.6 Contingency Planning and Assessment during Final Design	At the Final Design Review (FDR) the budget estimate should be substantially based on externally obtained cost estimates (vendor quotes, bids, historical data, etc.). This added definition is expected to result in an increase in the project's estimated Budget at Completion (BAC) and a reduction in its budget contingency,	It would be useful if the contingency section explained whether the independent cost estimate at PDR would cover a review of contingency. Also, if contingency amounts are further refined between PDR and FDR, we suggest stating that NSF will review the revised amounts and specifying what type of review will be performed.

	while TPC remains constant. Also as part of the FDR, NSF assesses the methodology employed by the project to further refine its cost and contingency estimates including schedule and scope adjustments.	
4.2.5.7 Contingency Use and NSF Oversight during Construction	Unexpended contingency funds may not be used to support operations or other out-of-scope activities.	We suggest that NSF clearly define scope and out-of-scope activities to avoid the possibility of subsequent disagreement between NSF and the recipients as to the meaning of these terms.
4.2.5.8 Reporting Requirements	At a minimum, the monthly report will include: …(4) an updated change log indicating all contingency allocations ("puts and takes") and a "liens" list of projected amounts of possible future calls on contingency.	We suggest that NSF also request its recipients to provide a comparison of approved budget to actual use of contingency. This comparison could be the recipients' affirmation that they are using contingency funds as approved by NSF.
4.4 DOCUMENTATION REQUIREMENTS	In addition, access to any pertinent books, documents, papers and records should be made available to the NSF Director and the Comptroller General of the United States or any of their duly authorized representatives to make audits, examinations, excerpts and transcripts in accordance with either the Uniform Guidance or FAR requirements.	We suggest adding NSF OIG to the list of organizations for which the awardee must provide access to documentation.
4.5.3 Recipient Performance Reviews and Audits, 4.5.3.4	NSF conducts a cost incurred audit for large facility awards above $100M at the end of the award and potentially during execution of the award based on an annual large facility risk assessment conducted by the Large Facilities Office and the Cooperative Support Branch at NSF.	Please clarify whether the cost submission and cost incurred audits apply to facilities in construction, operations, or both. We suggest both.
4.5.3 Recipient Performance Reviews and Audits, 4.5.3.5	EVM section stated "This section reserved for future content.	As we have recommended in the past, we suggest the certification of EVM systems and the validation of EVM data.

4.5.3.2 NSF External Reviews.	Additional ad hoc reviews may be requested by the PO under certain circumstances, such as significant re-planning of construction projects, changes in key personnel, and major changes in research technical design, direction and scope.	We suggest review of updated vendor quotes/bids be added to the circumstances. As also referred to in Section 4.2.5.7, we suggest the NSF clearly define scope, change in scope and major change in scope, to avoid the possibility of subsequent disagreement between NSF and its recipients as to the meaning of these terms.
4.5.5 Re-Baselining	The re-baselining section does not explain what type of reviews NSF will complete in the event of a re-baseline. For example, whether re-baselined proposals will be required to go through an independent cost review.	We suggest clarifying what types of reviews re-baselined proposals will go through.
5.2.3.2 Contingency Definitions	For MREFC construction projects, the amount of budget contingency is determined by performing a probabilistic risk analysis on the baseline cost and schedule and selecting a Total Project Cost with an acceptable confidence level (typically between 70-90%).	As also mentioned in 4.2.5.1, we suggest NSF also state its expectation not only in terms of a confidence level, but also the precision of the estimate (so that NSF can say, for example, that it is 80% confident that the point estimate is accurate within a range of plus or minus 20%).
5.2.6.3 Risk Description	However, note that NSF does not allow the use of contingency for risks that are commonly referred to as "unknown unknowns" such as exceptional events or major changes in scope.	Suggest that NSF provide some examples of exceptional events for which contingency is not allowed to be used. Also, as mentioned in 4.2.5.7 and in 4.5.3.2, we suggest the NSF clearly define scope, change in scope and major change in scope, to avoid the possibility of subsequent disagreement between NSF and its recipients as to the meaning of these terms.
5.2.8.8 Handling Inflation	Inflation is part of the NSF budgeting and project planning.	We suggest that NSF require its recipients to affirm (and also verify in NSF reviews of proposal budgets) that inflation is not double-counted in other estimates, such as in contingency.
5.2.11.1 Contingency Budget Timeline	At the Final Design Review (FDR) the PEP budget estimate should be substantially based on	Consistent with our comments in 4.2.4, we suggest that NSF instruct its recipients that estimates based

	externally obtained cost estimates (vendor quotes, bids, historical data, etc.)	on vendor quotes/bids should be kept current (i.e., preferably less than a year old but no more than 18 months) throughout the project life cycle at least until award.