

**Proposed Reponses/Action Plan for BOAC Cost Surveillance Policy and Procedures Subcommittee Report**

5/24/2019

Level of Recommendations	Focus area and Comments	Recommendation by the Subcommittee	Background Information	Proposed response Action	Target Date
Only overarching recommendation	<b>Overall processes:</b> The processes do a good job documenting what is required and are considered sufficient. [Page 16, Sec. V Summary]	Consider consolidating SOGs, manuals, and other policies and procedures, as appropriate, into a single document or series of focused documents addressing cost analysis or at a minimum, the four areas of the review [Page 16, Sec. VI Considerations for Improvement]	Most of the guidance documents were formally developed in the past 3 years, following receipt of the NAPA report as well as GAO and OIG audit reports. NSF is still in the process of formalizing and standardizing internal procedures for various areas of facilities oversight.	<b>CONCUR:</b> LFO, DACS/CSB, and DIAS/CAP, working through the Major Facilities Working Group review process, are still developing the critical set of Standard Operating Guidance (SOGs) documents to cover various areas of facility oversight. DACS/CSB SOG for <i>Standardized Cost Analysis Guidance</i> and SOG for <i>Review and Approval Matrix</i> were updated September 2018 and March 2019. The CAP SOG for <i>Pre-award Reviews</i> was updated September 2018. The LFO SOG for <i>Selection of Independent Cost Estimate Reviews</i> was finalized in May 2019. DACS/CSB is evaluating consolidating their SOGs. NSF will evaluate the benefits of consolidating all into a single internal manual similar to the PAM to enhance the cohesion and clarity when the majority of the guidance documents are further refined.	2021 - 2022
Considerations for further improvement	<b>Cost Estimating (CE):</b> Requirements are clearly documented in LFM and SOG, but they were not followed consistently [Page 16, Sec. V Summary]	<b>CE Recommendation 1:</b> The methodology used for estimating purposes should be listed in this order of preference: 1) Actual/historical data for the system/subsystems being estimated; 2) Analogous data with adjustments to reflect the technical and complexity differences; 3) Parametric data should be used for higher level WBS - modified to reflect the technical, size, weight, quantity and/or schedule of the system being estimated; 4) Expert opinion - used only if a secondary methodology is used to substantiate the expert opinion provided by the recipient or evaluator. [Page 17-18, Cost estimating & Sec. V Summary]	Due to the pioneering nature of many major facility construction projects as well as their initial operations, actual/historical data will likely not exist.	<b>CONCUR:</b> Added a statement to MFG Section 4.2.2.3 on GAO best practice #6 Obtain data that: "The best estimating method should be chosen for each WBS element. The following cost estimating methodologies should be used, in order of preference, if the data exists: (1) Actual/historical data for the systems or operations being estimated; (2) Detailed engineering build-up; (3) Parametric data with adjustments to reflect differences (e.g., technical, size, weight, quantity, location, schedule); (4) Analogous data with adjustments to reflect differences; (5) Expert opinion, only if a secondary methodology is used to substantiate." MFG 4.2.2.3 currently states that an explanation for choosing a particular estimating method should be documented in the CEP and Cost Book.	COMPLETE
		<b>CE Recommendation 2:</b> The use of cost analysts/estimators who are certified by qualified organizations should be encouraged. This applies to those who perform Independent Cost Estimates/Analysis. [Page 18, Sec V Cost Estimating]	Due to their pioneering nature, major facility projects are often highly specialized. While the professional cost estimators could provide valuable assistance on the estimating methodology, the objective evaluation of the cost estimate usually requires truly in-depth technical knowledge that only technical experts could possess. NSF is strengthening the review panel's evaluation with regard to cost estimating, with input from both the technical experts and professional cost estimators to ensure the most reliable assessment. This teamed approach have been clearly reflected in the <i>Major Facilities Oversight Review</i> SOG	<b>CONCUR:</b> 1) As part of PMIAA implementation, NSF will evaluate the cost estimating qualification/certifications of the NSF team; 2) SOG for <i>Minimum Core Competencies for Oversight of Major Facilities</i> requires one (1) LFO SME to have cost estimating certification; 3) The qualifications and requirements for members of the expert panel are included in the <i>Major Facilities Oversight Reviews</i> SOG; 4) Core Competencies for Recipients are being developed for a new section in the MFG ("Key Personnel").	2020

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		<p><b>CE Recommendation 3:</b> Improve cost estimate documentation. Both the Recipients and evaluators should clearly document the estimate approach, quantitative justification and support. [Pages 17 &amp; 18, Sec V Cost estimating]</p>	<p>Section 4.2 of the MFG (formerly the LFM) and the DACS/CSB <i>Standardized Cost Analysis Guidance</i> SOG (which includes the Cost Proposal Review Document) are relatively new and still being socialized with the community and NSF, respectively. Commonality of approach and documentation are still a work in progress.</p>	<p><b>CONCUR:</b> 1) MFG 4.2.2.3 currently states that an explanation for choosing a particular estimating method should be documented in the CEP and Cost Book; 2) Similar language has been included in the <i>Major Facilities Oversight Review</i> SOG to strengthen panel review documentation requirements; 3) CSB's <i>Standardized Cost Analysis Guidance</i> SOG is being revised to clarify documentation requirements.</p>	<p>December 2019</p>
<p align="center"><b>Consideration for further improvement</b></p>	<p><b>Independent Cost Estimates/Analysis (ICE/ICA):</b> The ICAs are useful in the initial phases as an Agency begins to strengthen its oversight and project management processes and learn how to do the programmatic oversight. By design the ICA is focused on process, not content, and the issues at this point in NSF's oversight processes should migrate to content. [Page 18, Sec. V: <i>Independent Cost Estimates/Analysis</i>]</p>	<p><b>ICE/ICA Recommendation 1:</b> Over time, the NSF should migrate to ICE products even if higher-level in nature and early in the project lifecycle... By Design, an ICA is focused on process, not content, and the issues at this point in NSF's oversight processes should migrate to content. An ICE should be conducted as early as possible in the project lifecycle of the project to inform possible trades and descope. The BOAC subcommittee expected to see an ICE product, even if preliminary, for the AIMS project. [Page 19]</p>	<p>In order to conduct an ICE on a construction project design drawings and specifications need to be relatively mature. Some projects are mature enough during the Preliminary Design Stage while others are not fully refined until the Final Design Phase. Under AICA, NSF has the flexibility to scope and time the ICE as long as it is completed prior to award. Although ICES have been historically used by NSF, the requirement is new. An ICE has been performed for the AIMS project as part of the Final Design Review process.</p>	<p><b>CONCUR:</b> An ICE will be conducted at the earliest possible time based on (in part) the maturity of the drawings and specifications as determined by the Core IPT. This expectation has been clarified in the <i>Independent Cost Estimate Review</i> SOG. <u>Note:</u> An ICA will be used for operations award (in conjunction with expert panels) to ensure programs/facilities follow the correct process since operations awards are activity-based rather than deliverables-based.</p>	<p>COMPLETE</p>
		<p><b>ICE/ICA Recommendation 2:</b> The ICE product should also be used to foster discussions about risks between the independent agent and the Project. [Page 19]</p>	<p>The ICE for AIMS included its own risk analysis and the project team used it to reconcile with the Project's risk analysis. NSF also uses expert panels to assess the Project's risk analysis which is also considered "independent".</p>	<p><b>CONCUR:</b> 1) Language has been added to the <i>Independent Cost Estimate Review</i> SOG on this expectation for the ICE scope of work; 2) <i>Major Facilities Oversight Review</i> SOG includes language requiring the review panel to evaluate the Project's risk analysis at each stage-gate review.</p>	<p>COMPLETE</p>
		<p><b>ICE/ICA Recommendation 3:</b> An independent schedule estimate (ISE) should be performed in concert with the ICE for enhanced confidence. The NSF should consider budgeting to an independent probabilistic schedule analysis. [Page 19]</p>	<p>For a civil construction project (like AIMS) an ISE is relatively straight forward. An ISE was conducted for the AIMS project by the ICE contractor. Other projects are often highly specialized and unique in nature, such as LHC High Luminosity Up-grades. While the professional schedule analyst could provide valuable assistance in the methodology used for probabilistic schedule analysis, the objective evaluation of the schedule estimate input usually requires truly in-depth technical knowledge and experience that only technical experts possess. NSF's major facilities stage-gate review process requires the expert panel to independently evaluate the schedule estimate.</p>	<p><b>CONCUR:</b> In the <i>Major Facilities Oversight Review</i> SOG, NSF has clarified requirements on the assessment of cost and schedule estimate by the independent review panel. The Core IPT will assess whether or not the contractor should also perform an ISE and probabilistic cost schedule risk analysis in conjunction with the ICE based on the technical nature of the project.</p>	<p>COMPLETE</p>

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		<b>ICE/ICA Recommendation 4:</b> Threshold or Non-negotiable science and or technical performance requirements should be traceable. There should be more clearly defined criteria around scoping/de-scoping decisions. Threshold or Non-negotiable requirements are the level of requirements below which the project isn't worth doing. [Page 19]	Thresholds on non-negotiable science and technical performance requirements for science projects are dictated by the needs of the scientific research program that the facility/project will support. Due to the "No Cost Overrun" policy, there is strong reliance on scoping/descoping to meet the Total Project Cost authorized by the Board when there is cost increase cannot be covered by contingency. Determining whether or not the project is worth continuing is often a strategic decision by the agency. To ensure that the project will ultimately meet the science mission needs, the impact of descoping on the threshold science performance needs to be carefully evaluated by the scientific & technical experts as well as NSF Leadership.	<b>CONCUR:</b> NSF has reviewed MFG Section 3.4.1 as well as the <i>Major Facilities Oversight Review</i> SOG to ensure clarify of requirements for the following PEP components: PEP sections 1.2 (Scientific Requirements), 4.1 (Project Definition) and 4.4 (Scope Management Plan). Language in the SOG to also requires that scoping/descoping criteria and the impact of descoping decisions on the threshold requirements is evaluated.	COMPLETE
Considerations for further improvement	<b>Internal Management Plans and Earned Value Management (IMP/EV):</b> The Earned Value Management process has been accomplished effectively. Analysis has been completed and data is being used. [Page 20]	<b>IMP/EV Recommendation 1:</b> Continue the appropriate implementation, verification and utilization of EVMS.		<b>CONCUR</b>	COMPLETE
		<b>IMP/EV Recommendation 2:</b> Update the IMP on a regular basis	NSF recognizes that IMP's are often the last document to be completed and are not always reviewed and up-dated after construction begins. A draft IMP SOG is ready for MFWG review and includes the verbiage: <i>"The IMP is updated during the Preliminary Design Phase, the Final Design phase, and at the start of the Construction, Operations, and Divestment stages. The IMP is a living document and should be reviewed annually, at a minimum, and revised as necessary."</i>	<b>CONCUR:</b> The Facilities Readiness Panel standard operating procedure includes a focus on IMP being current and complete. The draft IMP SOG will include a requirement that the Programs review the IMP annually and update as necessary.	September 2019
Considerations for further improvement	<b>Incurred Cost Audits, Indirect Costs and Budget Contingency</b>	NSF initiate a dialogue with the recipient community in preparation for the establishment of a set of core competency recommendations for recipient staff who support the administrative and management aspects of large facilities projects. [Page 20]	This is well underway as a result of the NAPA report, but has been considered a lower priority. The Large Facilities Workshops have been an excellent platform to facilitate various dialogue with the Recipient community for discussing minimum core competencies. Only final implementation and codification is required. NSF intends to take a similar team approach to Recipient Core Competencies as it does for NSF staff.	<b>CONCUR:</b> This will be codified as part of an interim update to the MFG by adding a new section "Key Personnel". A session on this topic was included as part of the Large Facilities Workshop in May 2019 to further the dialog with the community on this emerging requirement.	January 2020
	<b>NSF's "No Cost Overrun policy":</b> This "No Cost Overrun policy" is misleading. This policy requires that the Total Project Cost (TPC) estimate developed at the Preliminary Design Stage has adequate contingency to cover all foreseeable risks, and that any cost increases not	<b>Issue 1:</b> Descoping well into the implementation phases of a project has been studied and typically doesn't yield the cost savings forecasted. [Page 19]	This observation aligns with NSF's experience.	<b>CONCUR:</b> NSF is considering mechanisms to address unforeseen events/risks that are not manageable by the Recipient ("unknown-unknowns") based on the NEON experience, including the authorization and use of management reserve. A SOG on the use of management reserve totaling less than \$10M is nearing completion. Discussion are on-going with the National Science Board regarding the potential cost impacts of "unknown-unknowns" in relation to the No Cost Overrun Policy.	November 2019
		<b>Issue 2:</b> Estimating only known risks will lead to underestimating the costs. This discovery is understood in project management and cost estimating communities and such risks are known as "unknown-unknowns." [Page 19]	This observation aligns with NSF's experience on DKIST and NEON.		

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<p align="center"><b>Special Comments on NSF's "No Cost Overrun policy"</b></p>	<p>any cost increases not covered by contingency be accommodated by reductions in scope. [Page 19]</p>	<p><b>Issue 3:</b> If the overall objective is to have Major Facilities projects which are cost-capped, then a specific process for trading off between science/technical requirements, and programmatic performance should be codified. [Page 19]</p>	<p>NSF's implementation of the NCOP has been clarified in the version of the MFG now out for public comment. NSF believes that it's "No Cost Overrun Policy" is a valuable oversight tool for NSF in instilling diligence in estimates produced by the Recipient and the analysis conducted by NSF. However, it is not a hard "cost-cap" as the project can be re-baselined as described in Section 4.2.5.2 of the MFG. Trade-offs are always considered as part of the Scope Management Plan. Significant de-scoping (beyond the Scope Management Plan) constitutes a re-baselining which must be presented to the Board for consideration.</p>		
		<p><b>Additional references from NASA:</b> Currently, there are no additional Unallocated Future Expenses (UFE) held at the NSF Headquarters level for portfolio management across Major Facilities projects. Managing at portfolio level and maintaining UFE has improved programmatic performance for a large set of complex NASA science missions. [Page 20]</p>	<p>Noted.</p>		