

**SC Analysis of Alternatives (AOA)
Background, Principles, and Considerations
(Program Discussion Draft)**

Background

- GAO: Multiple approaches for CMRR, MOX, and UPF caused Congress to ask GAO to review NNSA AOA Process (Result is GAO-15-37 identifying AOA best practices, December 2014)
- DOE: Moniz Improving Project Management Memoranda, December 2014
 - "...the responsible program office shall conduct an alternatives analysis that is independent of the contractor organization responsible for the proposed project."
 - SC response to recommendation: SC does not support the specific recommendation, but recognizes improvements in the Analysis of Alternatives (AOA) process are needed. SC is unique in its reliance on various stakeholder science communities and advisory organizations to assess early project concepts and recommend priorities. Often alternate concepts are developed, rigorously evaluated/debated in high competitive and transparent forums within these communities. SC can improve its documentation of the community process and its relevance for support subsequent AOAs. Typically, the SC program and executing institution appropriately collaborate on AOA (e.g., an SC laboratory may have the technical and costing expertise to best characterize alternatives).
- GAO/DOE Correspondence on High Risk List progress/commitments:
 - July 2016 GAO letter to Moniz reinforcing need for AOA guidance
 - February 2017 High Risk List report highlighted AOA guidance
- DOE AOA Guide: On hold pending regulatory reform approach
- PM assesses AOA against GAO best practices as part of CD-1 ICR
- SC experience over past year: ECP, PIP II, SLI, etc.

SC Principles (Kin Chao brief February 2016)

Regardless of approach, the Analysis of Alternatives must be:

- Well Documented
- Comprehensive
- Unbiased
- Credible

Considerations

- Programs define functional requirements or preliminary KPPs for the project that meets the mission need.
- The PME, with buy-in from IPT and program manager, formally agree on the range of alternatives to be analyzed.
- OMB states that the alternative analysis should identify and consider at least three viable options, in addition to the status quo.
- For projects where the site or the options are limited or already selected (i.e., upgrades, instruments, etc.) the project needs to document the history of this selection process (advisory committees, upgrades were part of initial project plan, etc.). In this scenario, the Analysis of Alternative (AoA) might focus on technical alternatives.
- The selection criteria (i.e., capital cost, life cycle cost (LCC), schedule, location, aesthetics, performance, security, risk, other benefits, etc.) including its weight/priority should be determined first, then do the Alternative Analysis. Document the rationale for applying each weighting factor or prioritization, prior to completing the AoA.
- When performing an alternative analysis, the following should be considered:
 - Analysis period for the LCC should be the same for all options. The least common denominator should be used for options of different useful lives. If the least common denominator is too large and thus unrealistic, use a period that is realistic based on the nature of the project or the mission need.
 - The cost of alternative-related actions/activities that will occur during the analysis period should be included in the LCC; those alternative-related actions/activities that occur outside the analysis period should not be. For example, if the analysis period for buildings is 15 years, assuming a 40-year design life, the demolition cost should not be part of the LCC because it is out of the analysis period; however, salvage value should be.
 - Any sunk cost is not part of LCC.
 - Alternative analyses should be performed assuming a realistic funding scenario provided by or agreed to by the program.
 - One-for-one replacement cost should be included if a building needs to be demolished for the project. The assumed cost of the demolition should be similar to the facility or type of building being constructed.
 - The cost of maintaining a building is covered in the LCC as part of overhead/G&A cost if the building is not demolished or reused.
 - If there is a space bank or disposition is already paid by another project—it is considered a sunk cost and should not be included in the LCC.
 - If productivity factors are a criteria for the various options, they should have a basis and the justification should be clearly shown and documented.

- If energy efficiency costs are a criteria, the savings should have a basis and the justification clearly shown and documented.
 - If operations and maintenance costs are a factor, then justification should be clearly shown and documented.
 - A benefit analysis needs to be performed (most likely part of the selection criteria and ranking process). See 4th bullet above.
 - CD-4 dates for different options should be provided if schedule is a key factor in alternative selection.
 - Square footage or costs used for comparisons should be based on site data or comparable data.
 - The analysis should be based on parameters or performance initially established (not necessarily the size of facility but capability).
 - A sensitivity analysis, using the same factors for all options, is not useful because it likely will not change the ranking. Vary the factors for different alternatives.
- The program office should strongly consider an independent review of the AoA in addition to the OPA IPR.
 - The AOA team provides the results of the analysis to the program for decision.
 - The conceptual design should be performed after the program selects the alternative.