

## SUPPLEMENTAL DIRECTIVE

NNSA SD 413.3-3

Approved: 06-23-21

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# ANALYSIS OF ALTERNATIVES



## NATIONAL NUCLEAR SECURITY ADMINISTRATION Cost Estimating and Program Evaluation

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Cost Estimating and Program Evaluation

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## ANALYSIS OF ALTERNATIVES

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1. PURPOSE. This NNSA Supplemental Directive (SD) supports the requirements of the authorities listed below to reflect the requirements, roles and responsibilities, and expectations relating to analysis of alternatives (AOA) on programs and projects being executed by the National Nuclear Security Administration (NNSA).
2. AUTHORITY.
  - a. Department of Energy (DOE) Order (O) 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, or successor directive, established requirements and provided direction for AoAs within the DOE Acquisition Management System.
  - b. 50 United States Code (U.S.C.) 2411, *Director for Cost Estimating and Program Evaluation*, established NNSA's Office of Cost Estimating and Program Evaluation (CEPE). This law gives the office Director authority to advise the Administrator on policies and procedures for AoAs for Major Atomic Energy Defense Acquisition (MAEDA) programs.
  - c. 50 U.S.C. 2773, *Independent Acquisition Project Reviews of Capital Assets Acquisition Projects*, requires that an independent entity must review each capital assets acquisition project as the project moves toward the approval of critical decision (CD)-0, CD-1, and CD-2 in the acquisition process. The pre-CD-1 review must include a review using AoA best practices for the project. The identification of any deficiencies in this AoA must be presented to the Administrator.
3. CANCELLATIONS.
  - a. Advance Change Directive (ACD) 413.2, *Centralizing Analyses of Alternatives Studies in the National Nuclear Security Administration*, dated 12-09-19.
  - b. Business Operating Procedure (BOP) 413.6, *Analysis of Alternatives*, dated 3-14-16.
4. APPLICABILITY.
  - a. Federal. Applies to all NNSA federal elements.
  - b. Contractors. Does not apply to contractors.
  - c. Equivalencies/Exemptions.
    - (1) Equivalency. In accordance with the responsibilities and authorities assigned by Executive Order 12344, codified at 50 U.S.C. sections 2406 and 2511, and to ensure consistency throughout the joint Navy/DOE Naval

Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) will implement and oversee requirements and practices pertaining to this Directive for activities under the Director's cognizance, as deemed appropriate.

(2) Exemption. See Appendix B.

5. SUMMARY OF CHANGES.

- a. Converted BOP 413.6 into SD 413.3-3.
- b. Added Section 2, Authority.
- c. Incorporated BOP 413.6, Appendix 1: AoA Process and Deliverables into this SD as Appendix A: AoA Deliverables.
- d. Incorporated BOP 413.6, Appendix 2: AoA Steps into this SD as Appendix B: AoA Guidelines and Procedures.
- e. Incorporated BOP 413.6, Appendix 3: GAO 22 Best Practices for AoA into this SD as Appendix C: AoA Actions, Timing and Lead Responsibilities.
- f. Incorporated BOP 413.6, Section 9, Definitions in this SD as Appendix D: Definitions.
- g. Added Appendix E: Acronyms/Abbreviations.
- h. Incorporated BOP 413.6, Section 8, References into this SD as Appendix F: References.
- i. Incorporated ACD 413.2, Requirements into this SD Section 8, Responsibilities.

6. BACKGROUND. An AoA is an analytical comparison of the operational effectiveness, suitability, and lifecycle cost of alternatives that satisfy validated/established capability needs. It is a step in the acquisition process to identify and assess potential solutions to a gap, or anticipated gap, in mission need. The AoA assesses potential material and non-material solutions that could satisfy validated capability requirement(s) documented in the mission need statement and supports a decision on the most cost-effective solution to meeting the validated requirements. The Government Accountability Office (GAO) has established that a high-quality, reliable AoA is well documented, comprehensive, unbiased, and credible (GAO-20-195G, Appendix XI: *Best Practices for the Analysis of Alternatives Process*).

DOE O 413.3B requires NNSA to conduct an AoA for projects with an estimated Total Project Cost (TPC) greater than \$50 million (M) prior to the approval of CD-1. The order also specifies that an additional AoA may be done after CD-1 if a performance baseline deviation occurs, or if new technologies or solutions become available.

AoAs are also frequently required for programs that meet the definition of a MAEDA under 50 U.S.C. 2411 that are governed by processes other than DOE O 413.3B; non-

MAEDA programs to inform acquisition or programmatic decisions; or in response to congressional direction. Trade space analyses at the component/technology or subsystem level are governed by policies and processes within the respective program office.

7. REQUIREMENTS.

- a. The program office must notify CEPE of the need to initiate an AoA, either through an approved CD-0 (for DOE O 413.3B projects) or by transmitting a validated mission need and set of requirements for MAEDA and non-MAEDA programs.
- b. CEPE must issue the AoA Study Guidance to initiate the AoA.
- c. The AoA team must be provided with sufficient time and resources to ensure a complete analysis. The expected AoA duration, from the approval of the study plan to the briefing of final results, should be no more than 9 months; however, this may change due to the complexity and scope of the proposed analysis and must be discussed with the program office, Management and Budget (NA-MB), and CEPE prior to beginning the AoA process.
- d. The deliverables as defined in Appendix A must be produced.
- e. The requirements and process for conducting an AoA, as defined in Appendix B, must be followed. When best practices (GAO-20-195G) cannot be followed, any deviations must be justified and documented in the Final Report and, if possible, the Study Plan (see Appendix A).

8. RESPONSIBILITIES.

- a. Administrator.
  - (1) Serves as, or delegates the role of, the Project Management Executive.
  - (2) Approves equivalencies and exemptions that are not resolved by the Steering Committee.
- b. Project Management Executive (PME).
  - (1) Approves CD-0 and Mission Need for DOE O 413.3B projects, or serves as the principal official validating requirements for MAEDA and non-MAEDA programs.
  - (2) Accepts recommendations of a preferred alternative from the Steering Committee Chair, if applicable.
  - (3) Approves requests for equivalencies to, and exemptions from, specific requirements in this SD that have been resolved by the Steering Committee.

- c. Principal Deputy Administrator. Renders decisions on impasse issues related to the AoA that cannot be resolved by the Steering Committee Chair or the Director for CEPE.
- d. Deputy Administrators/Associate Administrators (DAs/AAs).
  - (1) Notifies CEPE of the need to start the AoA process.
  - (2) Serves as, or delegates the role of, the Steering Committee Chair.
- e. Director for Cost Estimating and Program Evaluation (CEPE).
  - (1) Develops and maintains AoA processes and policies.
  - (2) Develops and issues the Study Guidance for AoAs.
  - (3) Approves the AoA Study Plan.
  - (4) Serves as, or delegates, a Steering Committee Member.
  - (5) Submits the Sufficiency Memo to the Administrator, the Project Management Executive (PME), and the Steering Committee Chair prior to the preferred alternative recommendation.
- f. Associate Administrator for Management and Budget (NA-MB).
  - (1) Develops the AoA Study Plan in accordance with the AoA Study Guidance.
  - (2) Leads the AoA Team and conducts the AoA in accordance with the AoA Study Plan and Steering Committee direction, including managing all AoA sub-teams and ensuring the quality of AoA deliverables.
  - (3) Leads the AoA cost, risk, schedule, effectiveness, and other analyses.
  - (4) Documents and presents all findings in a Final Report.
  - (5) Provides subject matter expertise to the AoA Team.
  - (6) Serves as, or delegates, a Steering Committee Member.
- g. Associate Administrator for Acquisition and Project Management (NA-APM).
  - (1) Provides subject matter and project-specific expertise to the AoA Team.
  - (2) Serves as, or delegates, a Steering Committee Member.

- h. Office of General Counsel (NA-GC).
  - (1) Provides subject matter expertise (e.g., NEPA) to the AoA Team as appropriate.
  - (2) Provides a Steering Committee Member.
- i. Associate Administrator for Safety, Infrastructure and Operations (NA-50).
  - (1) Provides subject matter expertise to the AoA Team.
  - (2) Serves as, or delegates, a Steering Committee Member, as needed.
- j. Associate Administrator for External Affairs (NA-EA).
  - (1) Provides external communication strategy during the AoA in coordination with program office, as needed.
  - (2) Attends, or sends a delegate to, Steering Committee Meetings as an observer, when appropriate.
- k. Program Office.
  - (1) Establishes and owns mission needs and program requirements for projects under DOE O 413.3B and BOP 413.2, *Program Requirements Document for Construction Projects*.
  - (2) Ensures compliance with requirements validation process for MAEDA or non-MAEDA programs not covered under DOE O 413.3B.
  - (3) Funds the AoA effort.
  - (4) Ensures the appropriate and qualified subject matter experts are included on the AoA team.
  - (5) Participates in Steering Committee meetings.
  - (6) Requests approval of equivalencies to, and exemptions from, specific requirements in this SD, when appropriate.
- l. Steering Committee Chair.
  - (1) Is the Deputy Administrator/Associate Administrator or delegate.
  - (2) Recommends members to serve on the AoA Team or Steering Committee.
  - (3) Approves the AoA Team composition.
  - (4) Provides guidance and oversight to the AoA Team throughout the AoA

process.

- (5) Approves the Final Report for the AoA.
- (6) Receives the Sufficiency Memo.
- (7) Recommends alternative(s) to the PME.

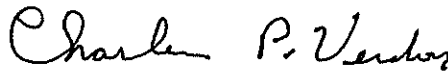
m. Steering Committee.

- (1) Advises the Steering Committee Chair throughout the AoA.
- (2) Recommends approval or disapproval of requests for equivalencies to, and exemptions from, specific requirements in this SD to the PME.
- (3) Recommends members to serve on the AoA Team or Steering Committee, when appropriate.
- (4) Must have representatives from the following:
  - (a) Program Office.
  - (b) CEPE.
  - (c) NA-MB.
  - (d) NA-APM for potential capital asset projects as defined in DOE O 413.3B, or successor order.
  - (e) NA-GC.
- (5) May have representatives from:
  - (a) NA-50.
  - (b) NA-EA.
  - (c) Other NNSA program and field offices.
  - (d) Other DOE program offices (e.g., Science, Environmental Management, Nuclear Energy, Project Management).
  - (e) Other U.S. Government departments or agencies (e.g., Department of Defense).
  - (f) DOE Project Management, Oversight, and Assessments (PMOA)

for potential capital asset projects greater than \$100 M (at the upper end of the cost range).

9. ACRONYMS/ABBREVIATIONS. See Appendix E.
10. REFERENCES. See Appendix F.
11. CONTACT. Director, Cost Estimating and Program Evaluation, 202-586- 6910.

BY ORDER OF THE ADMINISTRATOR:



Charles P. Verdon  
Acting Administrator

1. Appendix A: Analysis of Alternatives Deliverables
2. Appendix B: Analysis of Alternatives Process Guidelines and Procedures
3. Appendix C: Analysis of Alternatives (AoA) Actions, Timing and Lead Responsibilities
4. Appendix D: Definitions
5. Appendix E: Acronyms/Abbreviations
6. Appendix F: References



## **APPENDIX A: ANALYSIS OF ALTERNATIVES DELIVERABLES**

1. **BACKGROUND.** Documentation is essential for a high-quality, reliable Analyses of Alternatives (AoAs). The following deliverables must be produced to ensure decision makers and reviewers have access to the assumptions, constraints, and rationale for the methodology and analysis.
2. **REQUIREMENTS.**
  - a. **Study Guidance.** The Study Guidance is issued within 40 days of the program office notifying the Office of Cost Estimating and Program Evaluation (CEPE) of the need to start the AoA process, based on an approved critical decision (CD)-0 or approval of a validated mission need and requirements and must:
    - (1) be issued by the Director of CEPE, in collaboration with the program office.
    - (2) provide an overview of the mission need, mission gaps, key assumptions, and constraints for the AoA.
    - (3) transmit the Mission Need Statement (MNS), the Program Requirements Document (PRD), other validated requirements, prior studies, and gap analyses, as appropriate.
    - (4) detail one alternative that represents the status quo and a minimum set of additional alternatives to enable a robust exploration of the trade-space.
    - (5) describe the desired trade-space analyses of cost, schedule, risk, and performance, including the framework and expectations for an acceptable set of screening and evaluation criteria, weighting criteria, lifecycle cost requirements, and performance metrics. The performance analysis must include both the capability of the options examined and the effect each option has on mission accomplishment.
    - (6) include the expectation on sensitivity and affordability analyses.
    - (7) detail the expected schedule, interim Steering Committee reviews (including virtual, if appropriate), and deliverables for the AoA.
    - (8) provide a recommendation on composition of AoA Team.
    - (9) describe the expected interaction and data exchanges between the AoA Team and CEPE.
    - (10) document the justification for known AoA process adaptations or deviations, if appropriate.

- b. Study Plan. The Study Plan is issued within 50 days of the AoA Team receiving the Study Guidance, and must:
- (1) be developed in accordance with the Study Guidance by the AoA Team within 40 days of receiving the Study Guidance then submitted to CEPE.
  - (2) be approved by the Director for CEPE within 10 days of receiving the draft Study Plan.
  - (3) reference or describe the mission need, program requirements, and mission.
  - (4) identify key assumptions and constraints for the AoA analysis.
  - (5) include the names, affiliations, roles, and responsibilities of the AoA Team members, independent reviewers, and the Steering Committee.
  - (6) detail the oversight and independent review structure for the AoA.
  - (7) describe the data and resources the AoA team may need.
  - (8) detail the expected schedule, including when data, access to models, analyses, and deliverables will be available to CEPE.
  - (9) include a schedule of interim and final Steering Committee reviews and recommend if any such reviews should be virtual.
  - (10) describe the methodology for conducting each phase of the analysis.
  - (11) describe, with sufficient detail, an initial list of possible alternatives.
  - (12) include all selection (screening and evaluation) criteria that are traceable to the mission need and program requirements. These criteria should be based on the unique characteristics of the assessed program and weighted, if appropriate, to each criterion based on its relative importance to the capability gap and requirements.
  - (13) indicate how a trade-space analysis within alternatives may be included, as appropriate. Specifically, if an aspect of one alternative is found to have a substantive impact on mission accomplishment, that feature, if possible, will be incorporated in the other alternatives in an analytical excursion to better understand the trade-space.
  - (14) indicate whether a Technology Readiness Assessment (TRA) in accordance with National Nuclear Security Administration (NNSA) Policy (NAP) 413.4, *Technology Readiness Assessments*, is required and, if so, include a description of its impact on the analysis.
  - (15) describe how to incorporate impacts from the National Environmental Policy Act (NEPA), if applicable.
  - (16) document justifications for all known AoA process adaptations or deviations from best practices (GAO-20-195G, Appendix XI: [Best

Practices for the Analysis of Alternatives Process]) and this Supplemental Directive (SD).

c. Final Report. The Final Report must:

- (1) be submitted by the AoA Team for review by the Steering Committee within 30 days after briefing the final AoA results to the Steering Committee.
- (2) be approved by the Steering Committee Chair.
- (3) document all steps taken to identify, analyze, and compare alternatives in a single document (excluding a classified appendix, which may be a separate document).
- (4) demonstrate how the Study Guidance was followed.
- (5) include the names of all AoA team members with corresponding affiliations and roles.
- (6) include the mission needs, mission gaps, key assumptions, and constraints.
- (7) document the justification for all assumptions and constraints used in the AoA.
- (8) describe, in sufficient detail, all alternatives considered.
- (9) include all selection (screening and evaluation) criteria traceable to mission needs and program requirements.
- (10) document the screening process, justification for screened alternatives, and the list of viable alternatives evaluated.
- (11) document how effectiveness criteria were quantified and weighted.
- (12) include the total project costs (TPCs) and other remaining lifecycle cost estimates (LCCs) of each viable alternative, including the basis of estimates, assumptions, and calculations used.
- (13) include the affordability analyses.
- (14) include how risk criteria were developed, weighted, and scored for each viable alternative.
- (15) include a detailed description of the risks and identified mitigation strategies for each viable alternative.
- (16) document the tradeoffs among cost, schedule, risk, and effectiveness for each viable alternative.
- (17) include the projected level of the NEPA review for each alternative considered, and a projected NEPA strategy for each viable alternative.

- (18) include an analysis that tests the sensitivity of the cost and benefit estimates and the evaluation criteria to changes in key assumptions.
- (19) document justifications for all deviations from best practices (GAO-20-195G) and this SD, if applicable.
- (20) include a full discussion of the caveats and deviations from the original plans to the final implementation of the analysis.
- d. Sufficiency Memorandum. The Sufficiency Memorandum is issued within 30 days of approval of the Final Report and must:
  - (1) be issued by the Director for CEPE.
  - (2) indicate whether the AoA is well-documented, comprehensive, unbiased, and credible.
  - (3) indicate whether the AoA adhered to the Study Guidance.
  - (4) include an evaluation of whether the AoA was consistent with best practices (GAO-20-195G), this SD, the Study Guidance, and the Study Plan.
  - (5) indicate the extent to which the AoA uses sound analytic methodology, and include recommendations based on the results of the analysis.
  - (6) identify any deficiencies in the AoA.
  - (7) document the data, analysis, and methodology used to develop the Sufficiency Memo.
- e. Alternative Recommendation Document. The Alternative Recommendation Document identifies the recommendation of an alternative after the Final Report is approved, the Sufficiency Memo is issued, and the justification if it is not the preferred alternative from the AoA.

## **APPENDIX B: ANALYSIS OF ALTERNATIVES GUIDELINES AND PROCEDURES**

1. BACKGROUND. An Analysis of Alternatives (AoA) process includes at least five deliverables as described in Appendix A: Study Guidance, Study Plan, Final Report, Sufficiency Memo, and Alternative Recommendation Document. The process and the associated documentation ensure that analyses to support decisions about capital acquisitions or program development are transparent and subject to any subsequent review.

An important requirement of the National Nuclear Security Administration's (NNSA) AoA process is an independent review of the AoA by the Director for Cost Estimating and Program Evaluation (CEPE). The goal of an independent review is to ensure that a high-quality, reliable, and unbiased AoA is developed, presented, and defended to management.

2. REQUIREMENTS.
  - a. The AoA must be impartial, meaning the AoA team conducts the analysis without a predetermined solution or conflict of interest.
  - b. Independent reviews must occur throughout the AoA.
  - c. Documentation must occur throughout the process to ensure all the necessary information can be developed in compliance with the requirements in Appendix A.
  - d. The team must use methods and techniques from industry standards and best practices (i.e., GAO-20-195G, Appendix XI: [Best Practices for the Analysis of Alternatives Process]).
  - e. All cost estimates must be comprehensive, accurate, well-documented, and credible in accordance with best practices published in GAO-20-195G, *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Program Costs*.
  - f. The AoA must consider potential National Environmental Policy Act (NEPA) documentation requirements for each alternative and propose a NEPA strategy for each viable alternative.
  - g. Exemptions from, and equivalencies to, specific requirements in this Supplemental Directive (SD) must be requested using the process steps described in Section 3.h. below.

3. PROCESS.

a. Before the AoA.

- (1) The program office schedules a consultation meeting with CEPE and the Associate Administrator for Management and Budget (NA-MB) to discuss the AoA prior to approval of critical decision (CD)-0 or approval of a validated mission need and program requirement. This meeting should discuss:
  - (a) AoA bounds and key assumptions.
  - (b) Appropriate AoA process adaptations or deviations commensurate with scope and complexity.
  - (c) An initial list of alternatives.
  - (d) Study schedule duration.
- (2) The program office should:
  - (a) Ensure that the requirement documents used to help initiate the AoA have prioritized and quantified the capabilities.
  - (b) Ensure sufficient program funding is available to conduct the AoA.
  - (c) Establish affordability goals before the AoA.

b. Initialization of the AoA.

- (1) The Deputy Administrators/Associate Administrators (DAs/AAs) request CEPE start the AoA process. Initiation must be based on approval of CD-0 or approval of a validated mission need and program requirements. In collaboration with the program office, the Director for CEPE develops and issues Study Guidance within 40 days of the DA/AA request.
- (2) NA-MB identifies a federal lead for the AoA team and initial team members.
- (3) The Steering Committee Chair may appoint additional member to the Steering Committee.
- (4) CEPE hosts a meeting with the AoA team and the Steering Committee to clarify the Study Guidance.
- (5) Upon receipt of the Study Guidance, the AoA Team drafts a Study Plan in alignment with the Study Guidance and, within 40 days, provides it to the Director for CEPE. The AoA Team also briefs the Study Plan to the Steering Committee.
- (6) The Steering Committee may provide further guidance on the Study Plan.

- (7) The Study Plan is approved by the Director for CEPE within 10 days of receipt.
- (8) If the Study Plan is not approved by the Director for CEPE:
  - (a) The Steering Committee Chair and Director for CEPE meet to resolve the issue. If the issue is resolved, the AoA Team revises the Study Plan.
  - (b) If the Steering Committee Chair and the Director for CEPE cannot resolve the issue, they can decide whether to consult the Steering Committee or to elevate the issue to the Principal Deputy Administrator.
  - (c) The Steering Committee or the Principal Deputy Administrator renders a decision, and the AoA Team revises the Study Plan.
  - (d) The Director for CEPE approves the revised Study Plan.
- (9) The approval date of the Study Plan is the official start date of the AoA. However, the AoA Team or program office can begin data collection, but no analysis before approval of the Study Plan to meet schedules. This activity and data should be shared with the Steering Committee at the start of the AoA.
- c. Identify Alternatives. This phase identifies alternatives to be analyzed. The set of alternatives should be sufficient, diverse, and viable.
  - (1) The AoA Team:
    - (a) Develops a diverse range of preliminary alternatives that could meet the mission need to include the status quo alternative.
    - (b) Screens the list of preliminary alternatives against the set of screening criteria.
    - (c) Does not screen the alternative representing the status quo (the baseline alternative).
    - (d) Documents the screening process and results.
  - (2) The AoA Team provides read-ahead material and officially presents the screening process results to the Steering Committee.
  - (3) The Steering Committee provides further guidance on the identified alternatives and the screening process, when appropriate.

- d. Analyze the Alternatives. This phase of the analysis includes using a standard, quantitative process to assess the alternatives by evaluating the effectiveness, risk, cost, and schedule for each viable alternative. The AoA Team must conduct the analysis in a balanced manner, balancing precision, simplicity, and economy, and adding complexity only when it provides needed explanatory power. The AoA Team's products should properly articulate the limitations and uncertainty of its findings.
- (1) The AoA Team:
- (a) Determines each viable alternative's effectiveness to support mission need using a standardized process, and documents the rationale behind the assessment.
  - (b) Quantifies, weighs, and scores effectiveness criteria for each viable alternative.
  - (c) Identifies a list of significant risks and possible mitigations (programmatic, technical, and operational) and weighs and scores risk criteria for each viable alternative. The AoA should address risks and mitigation strategies in a manner commensurate with the size of the effort.
  - (d) Develops documentation, including lessons learned, to distribute throughout the process and after the AoA is finalized.
  - (e) Develops a lifecycle cost estimate (LCCE) for each viable alternative.
    - 1 LCCEs include all costs from inception of the project through design, development, deployment, operation, maintenance, and disposition.
    - 2 LCCEs include a Total Project Cost (TPC), which includes the Engineering and Design cost, Construction costs, and Other Project costs from critical decision (CD)-0 to CD-4 for DOE 413.3B projects. For Major Atomic Energy Defense Acquisition (MAEDA) or non-MAEDA programs, LCCEs include the discrete acquisition (i.e., design, development, and production) costs.
    - 3 LCCEs are shown in both as-then year costs and present value over the entire project life cycle.
    - 4 All cost estimates must be expressed as a range with a confidence interval and not solely as a point estimate.
  - (f) Conducts a sensitivity analysis that tests the sensitivity of the results to changes in key assumptions and evaluation criteria weighting.



- (g) Allows the AoA Team and CEPE to engage in open analyst interactions throughout the study and CEPE timely access to all collected data, other relevant information, and modeling methodologies.
  - (2) The AoA Lead provides read-ahead information on the initial findings to the Steering Committee, stakeholders, and Independent Reviewers.
  - (3) The AoA Study Team officially presents its initial findings to the Steering Committee as a Preliminary Results Review.
  - (4) The Steering Committee provides further guidance, as necessary
- e. Final Report.
  - (1) The AoA Team documents the results of the analysis with accompanying justifications, calculations, and supporting documentation in the AoA Final Report.
  - (2) The AoA Team provides the draft Final Report to the Steering Committee and briefs the AoA final results to the Steering Committee. The briefing date of the final AoA results represents the AoA completion date.
  - (3) The Steering Committee Chair approves the Final Report.
- f. Sufficiency Memorandum.
  - (1) CEPE drafts the Sufficiency Memorandum after receiving the Final Report and submits it to the AoA Team for a factual review. The Sufficiency Memorandum demonstrates whether the AoA was consistent with best practices (GAO-20-195G), the Study Guidance, and the Study Plan, and identifies any deficiencies in the AoA.
  - (2) The Director for CEPE issues the Sufficiency Memo to the Steering Committee Chair, the Project Management Executive (PME), and the Administrator within 30 days of the approval of the AoA final report.
- g. Recommend Preferred Alternative(s).

The Steering Committee Chair considers the results of the Final Report and the Sufficiency Memo to recommend a preferred alternative(s) and records the recommendation in the Alternative Recommendation Document.
- h. Exemptions and Equivalencies.
  - (1) Exemption of requirements or tailoring of requirements, if approved, should be described in the Study Plan.

- (2) Program offices may present cases to the Steering Committee for a specific project to have exemptions from, or equivalencies to, specific requirements in this SD.
- (3) If the consensus of the Steering Committee is to endorse the exemption or equivalency request, final approval of the request is made by the PME.
- (4) When consensus cannot be attained, at the discretion of the program, the exemption or equivalency request is forwarded to the Administrator along with a formal review statement by the Steering Committee outlining the advantages and disadvantages of the proposed request.
- (5) Exemption and equivalency requests are entered into, and processed through, NNSA's concurrence process (eDOCS).

**APPENDIX C: Analysis of Alternatives (AoA) Actions, Timing and Lead Responsibilities**

Action	Timing	Party Responsible
Inform Office of Cost Estimating and Program Evaluation (CEPE) and Management and Budget (NA-MB) of impending AoA. Provide Mission Need Statement (MNS), Program Requirements Document (PRD), prior studies, gap analyses, and description of key assumptions and constraints.	By 90 days before the AoA kickoff.	Program Office
Issue Study Guidance.	By 40 days before the AoA kickoff.	Director for CEPE
Hosts Study Guidance Meeting.	By 30 days before the AoA kickoff.	CEPE
Appoint Federal AoA Lead.	Before submitting Study Plan to Director for CEPE.	NA-MB
Establish AoA Team.	Before submitting Study Plan to Director for CEPE.	NA-MB
Identify any contract study support required.	Before submitting Study Plan to Director for CEPE.	NA-MB
Identify key data sets and data holders needed to support AoA analysis.	Before submitting Study Plan to Director for CEPE.	Program Office
Identify initial analytical methodologies for AoA development.	Before submitting Study Plan to Director for CEPE.	AoA Team
Establish metrics that measure and quantify the capability gaps for the capabilities sought.	Before submitting Study Plan to Director for CEPE.	AoA Team
Identify and complete any preparatory analysis that might inform AoA (avoids replicating existing analysis within the AoA).	Before submitting Study Plan to Director for CEPE.	AoA Team
Provide Study Plan to the Director for CEPE and briefs the Steering Committee, certifying that the team is ready to start AoA.	By 10 days before the AoA kickoff.	AoA Team
Approve Study Plan. AoA starts when plan is approved.	At the AoA kickoff (subject to sufficiency of plan).	Director for CEPE
Begin AoA analyses.	Upon approval of Study Plan.	AoA Team

Action	Timing	Party Responsible
Brief screening process results, initial findings, and final results to Steering Committee.  AoA is complete once Steering Committee is briefed on final results.	As determined by Study Plan.	AoA Team
Submit a written AoA Final Report to the Steering Committee.	By 30 days after briefing the final AoA results to the Steering Committee.	AoA Team
Issue memorandum assessing adequacy of the AoA and compliance with the Study Guidance	By 30 days after the receipt of the approved AoA Final Report.	Director of CEPE
Recommend preferred alternative to the PME.		Steering Committee Chair

## APPENDIX D: DEFINITIONS

- a. Alternative Recommendation Document. A document recording the Steering Committee Chair's recommendation of an alternative after the Final Report is approved and the Sufficiency Memo is issued.
- b. Analysis of Alternatives (AoA). An analytical tool used by decision makers to make technical investment decisions based on many factors such as mission gaps, risks, costs, effectiveness, and technology maturity.
- c. Effectiveness Criteria. One type of evaluation criteria that quantifies how well each alternative, once complete, effectively meets the mission needs. These criteria can include measures of operational effectiveness. Effectiveness criteria must be traceable to mission needs or program requirements and must be quantified and weighted by the AoA team in coordination with the program office.
- d. Evaluation Criteria. One type of selection criteria that is a scale upon which different alternatives can be compared. Generally, the evaluation criteria include cost, lifecycle cost, schedule, risk, and effectiveness criteria. Evaluation criteria should be weighted.
- e. Gap Analysis. A systematic study of assessing current or near-term expected capabilities compared to those capabilities required to achieve a new mission or objective.
- f. Life Cycle Cost Estimate. The overall estimated cost for a particular alternative over the time period corresponding to the life of the alternative, including direct and indirect initial costs plus any periodic or continuing costs for operation and maintenance.
- g. Net Present Value. The net present value is the difference between the discounted present value of benefits and the discounted present value of costs.
- h. Present Value. The present value of an estimate reflects the time value of money, the concept that a dollar in the future is worth less than a dollar today, because the dollar today can be invested and earn interest.
- i. Project Management Executive. The individual designated to integrate and unify the management system for a program portfolio of projects and implement prescribed policies and practices. Formerly known as the Acquisition Executive. See Table 1.

- j. Program Office. The mission stakeholder responsible for identifying the requirements and requesting the necessary budget to fulfill the mission need. See Table 1.
- k. Screening Criteria. One type of selection criteria that each alternative must meet or it is considered a nonviable alternative and dropped from further consideration. Screening criteria must be traceable to mission needs or program requirements.
- l. Steering Committee. The Steering Committee is an advisory board chaired by a Deputy Administrator or Associate Administrator, or designee, and consists of the heads of relevant support organizations, the program office, and others recommended by its members and appointed by the Chair. The Steering Committee provides feedback and advice to the Steering Committee Chair and guidance to the AoA Team at key stages of the AoA.
- m. Viable Alternative. An alternative that is not screened out by failing to meet any of the screening criteria and is fully evaluated for cost, lifecycle cost, schedule, risk, and effectiveness during the AoA.

## **APPENDIX E: ACRONYMS/ABBREVIATIONS**

a.	<u>AoA</u>	Analysis of Alternatives
b.	<u>CD</u>	Critical Decision
c.	<u>CEPE</u>	Cost Estimating and Program Evaluation
d.	<u>GAO</u>	Government Accountability Office
e.	<u>MAEDA</u>	Major Atomic Energy Defense Acquisition
f.	<u>MNS</u>	Mission Need Statement
g.	<u>NEPA</u>	National Environmental Policy Act
h.	<u>PME</u>	Project Management Executive
i.	<u>PRD</u>	Program Requirements Document
j.	<u>TPC</u>	Total Project Cost
k.	<u>TRA</u>	Technology Readiness Assessment

## APPENDIX F: REFERENCES

- a. 50 U.S.C. 2411 et seq., *Director for Cost Estimating and Program Evaluation*.
- b. GAO-20-195G, *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Program Costs*, February 2020.
- c. GAO-15-37, *DOE and NNSA Project Management: Analysis of Alternatives Could Be Improved by Incorporating Best Practices*, December 11, 2014.
- d. DOE Order 413.3B Chg. 5 (MinChg), *Program and Project Management for the Acquisition of Capital Assets*, dated 04-12-18.
- e. DOE Guide 413.3-17 Chg. 1 (Admin Chg.), *Mission Need Statement Guide*, dated 10-22-15.
- f. DOE Guide 413.3-7A Chg. 1 (Admin Chg.) *Risk Management Guide* dated 8-22-15.
- g. DOE Guide 413.3-22, *Analysis of Alternatives Guide*, dated 06-06-18.
- h. Business Operating Procedure 413.2 Admin Change 1, *Program Requirements Document for Construction Projects*, dated 3-20-14.
- i. NNSA Policy (NAP) 413.4, *Technology Readiness Assessments*, dated 12-22-16.