

# Exhibit L

## 8820.2F Facility Project Requirements

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**NASA  
Procedural  
Requirements**

**NPR 8820.2F**  
Effective Date: January 28, 2008  
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2013

COMPLIANCE IS MANDATORY

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## **Facility Project Requirements**

**Responsible Office: Facilities Engineering and Real Property  
Division**

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# Preface

## P.1 Purpose

The purpose of this NASA Procedural Requirements (NPR) is to provide the minimum requirements for the planning and acquisition of NASA facility projects.

## P.2 Applicability

This NPR applies to NASA Headquarters, Centers, Component Facilities, and Jet Propulsion Laboratory (JPL) only to the extent specified or referenced in their contract. NASA's program and project policy is found in the NPR 7120 series. The Facility Project Manager (FPM) must comply with these policies; however, the project requirements within this NPR apply to all facility projects on NASA-owned or -controlled real property.

A requirement in this NPR is identified by "shall," a good practice by "should," permission by "may" or "can," expected outcome or action by "will," and descriptive material by "is" or "are" (or other verb form of "to be").

## P.3 Authority

- a. 42 United States Code (U.S.C.). 2473 (c)(1), Section 203 (c)(1) of the National Aeronautics and Space Act of 1958, as amended ([http://www.nasa.gov/offices/ogc/about/space\\_act1.html](http://www.nasa.gov/offices/ogc/about/space_act1.html)).
- b. NASA Policy Directive (NPD) 8820.2, Design and Construction of Facilities (<http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=8820&s=2C>).

## P.4 Applicable Documents

The following references apply to facilities projects:

- a. Executive Order (EO) 12114, Environmental Effects Abroad of Major Federal Actions.
- b. EO 12196, Occupational Safety and Health Programs for Federal Employees, as amended.
- c. EO 12372, Intergovernmental Review of Federal Programs, 3 CFR (1982 Compilation), as amended by Executive Order 12416, 3 CFR (1983 Compilation).
- d. EO 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction.
- e. EO 12941, Seismic Safety of Existing Federally Owned or Leased Buildings.
- f. EO 13327, Federal Real Property Asset Management.

- g. EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management.
- h. Code of Federal Regulations (CFR) Part 434, Title 10, Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings.
- i. 10 CFR Part 436, Federal Energy Management and Planning Programs.
- j. 14 CFR Part 1216, Environmental Quality.
- k. 29 CFR Part 1910, Occupational Safety and Health Standards.
- l. 29 CFR Part 1926, Safety and Health Regulations for Construction.
- m. 29 CFR Part 1960, Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters.
- n. 36 CFR 800, Protection of Historic Properties, of the National Historic Preservation Act (NHPA).
- o. NPD 1000.0, Strategic Management & Governance Handbook.
- p. NPR 1441.1, NASA Records Retention Schedules.
- q. NPR 1600.1, NASA Security Program Procedural Requirements.
- r. NPR 1620.2, Physical Security Vulnerability Risk Assessments.
- s. NPR 1620.3, Physical Security Requirements for NASA Facilities and Property.
- t. NPR 1800.1, NASA Occupational Health Program Procedures.
- u. NPD 1800.2, NASA Occupational Health Program.
- v. NPD 1820.1, NASA Environmental Health Program.
- w. NPR 4200.1, NASA Equipment Management Procedural Requirements.
- x. NPR 7120.5, NASA Space Flight Program and Project Management Requirements.
- y. NPR 7120.7, Institutional Infrastructure and Information Technology Program and Project Management Requirements.
- z. NPR 7120.8, NASA Research and Technology Program and Project Management Requirements.
- aa. NPD 7330.1, Approval Authorities for Facility Projects.
- bb. NPR 8000.4, Risk Management Procedural Requirements.
- cc. NPD 8010.2, Use of the SI (Metric) System of Measurement in NASA Programs.
- dd. NPD 8500.1, NASA Environmental Management.
- ee. NPR 8530.1, Affirmative Procurement Program and Plan for Environmentally Preferable Products.
- ff. NPR 8553.1, NASA Environmental Management System (EMS).
- gg. NPR 8570.1, Energy Efficiency and Water Conservation.
- hh. NPR 8580.1, Implementing The National Environmental Policy Act and Executive Order 12114.
- ii. NPD 8700.1, NASA Policy for Safety and Mission Success.

- jj. NPD 8710.5, NASA Safety Policy for Pressure Vessels and Pressurized Systems.
- kk. NPR 8715.3, NASA General Safety Program Requirements.
- ll. NPD 8800.14, Policy for Real Property Management.
- mm. NPR 8800.15, Real Estate Management Program Implementation Manual.
- nn. NPD 8810.2, Master Planning for Real Property.
- oo. NPR 8810.1, Master Planning Procedural Requirements.
- pp. NPD 8820.2, Design and Construction of Facilities.
- qq. NPR 8831.2, Facilities Maintenance Management.
- rr. NPD 9050.6, NASA Exchange and Morale Support Activities.
- ss. NASA Partnering Desk Reference.
- tt. NASA Reliability Centered Building and Equipment Acceptance Guide.
- uu. NASA Project Definition Rating Index (PDRI) Manual.
- vv. Office of Management and Budget (OMB) Circular A-11, Preparation, Submission and Execution of the Budget.
- ww. OMB A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.
- xx. OMB Circular A-131, Value Engineering.
- yy. Federal Acquisition Regulation (FAR).
- zz. NASA FAR Supplement (NFS).
- aaa. NASA-STD 1740.12, Safety Standard for Explosives, Propellants, and Pyrotechnics.
- bbb. NASA-STD 8719.7, Facility System Safety Guidebook.
- ccc. NASA-STD 8719.9, Standard for Lifting Devices and Equipment.
- ddd. NASA-STD 8719.10, Safety Standard for Underwater Facility and Non-Open Water Operations.
- eee. NASA-STD 8719.11, Safety Standard for Fire Protection.
- fff. NASA-STD 8719.17, NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems.
- ggg. Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding, dated January 2006.

## **P.5 Measurement/Verification**

P.5.1. Do Centers' Construction of Facilities (CoF) programs comply with the requirements of this NPR? To verify compliance, Facility Program Engineers assigned to Headquarters Facilities Engineering and Real Property Division will perform annual CoF program reviews at the Centers.

Reviews entail taking a random selection of CoF projects from each Center and, for those projects, reviewing documentation and interviewing project managers and project stakeholders.

## **P.6 Cancellation**

This revision cancels NPR 8820.2E, dated October 7, 2003.

/S/

Thomas Luedtke

Associate Administrator for Institutions and Management

# Chapter 1. NASA's Facilities Program

## 1.1 Facility Program Content

The annual facility program is part of the Agency's five-year budget described in NPD 1000.0, Strategic Management & Governance Handbook (see <http://nodis3.gsfc.nasa.gov/>). The five-year budget includes the Construction of Facilities (CoF) program under the Institutional Investment account. The CoF program comprises funds for four project types:

**1.1.1 Discrete Projects** -- Discrete Projects are projects with an estimated construction cost of \$5 million or more.

**1.1.2 Minor Revitalization and Construction Projects (MRCs)** -- MRCs are projects with an estimated construction cost of at least \$500,000 and up to \$5 million.

**1.1.3 Demolition Projects** -- Demolition Projects are projects eliminating real property assets no longer required by NASA.

**1.1.4 Facility Planning and Design (FP&D)** -- FP&D are funds used to plan and design facility projects.

## 1.2 Facility Program Best Practices

Centers shall comply with NASA-accepted best practices regardless of fund source (e.g., NASA Program, Institutional Investment Account, or third-party funded). The accepted best practices include the following:

- a. Front-end planning to define project requirements using comprehensive planning tools such as the PDRI, team building, and other techniques.
- b. Site investigation and sufficient preliminary design to fully develop project scope, assess risks, identify construction complexities, and provide a realistic cost estimate prior to inclusion into the NASA budget submission to OMB.
- c. Use of life-cycle cost vs. first cost to select project systems, equipment, materials, and methods.
- d. Designing for maintainability to optimize operation and maintenance costs and effort.
- e. Commissioning installed equipment, systems, building envelope, and other building elements to ensure quality, reliability, and systems integration.

- f. Using environmentally friendly processes, materials, and equipment. When a project includes demolition, maximize reuse vs. disposal.
- g. Applying constructability concepts and principles during each phase of the facility project process to ensure the project execution remains practical.
- h. Using partnering tools and techniques to establish and maintain professional working relationships among project stakeholders (including, but not limited to, users, contractors, and construction managers).
- i. Practicing effective configuration and change order control to minimize project cost and schedule growth.
- j. Using United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) concepts.
- k. "Making Zero Incidents a Reality" -- a safety initiative encouraging proactive safe behavior during the construction phase.

## 1.3 CoF Program Formulation

NASA Centers and Headquarters formulate the CoF program through a collaborative process. The following paragraphs and Figure 1-2, CoF Program Management, describe this process.

**1.3.1 Guidance** -- Each year, NASA's Office of the Chief Financial Officer (OCFO) issues guidance to the Centers for reporting their budget requests. The OCFO coordinates this through the Mission Directorates and Mission Support Offices.

**1.3.2 Establishing Project Scope** -- Each project must have clearly defined goals and objectives (see Appendix A, Definitions, "full disclosure concept"). Federal appropriations require "Full Funding" (see OMB Circular A-11, Section 31.6). "Full Funding" means the project budget includes sufficient funds to complete a useful segment of a capital project (investment) before any funds are obligated for that segment. Budget requests for acquisition of capital assets must propose "Full Funding."

**1.3.3 Fragmentation** -- NASA Centers have no authority to fragment facility projects or circumvent the CoF approval process. In establishing a project scope, a NASA Center must include all of the necessary elements in a single project to avoid fragmentation or the appearance of fragmentation. (See Appendix A, Definitions, "fragmentation," "facility project," and "full disclosure concept" definitions). For multiple projects within one facility, there shall be at least 90 days separation between beneficial occupancy of one project and the award of any subsequent project.

**1.3.4 Incremental Programming for Facility Requirements** -- Incremental programming for facility requirements is a process to plan and execute CoF funding over more than one fiscal year for a specific purpose. Incremental programming differs from fragmentation in that it fully discloses the overall plan. The Director, FERPD must approve incremental programming for facility requirements before inclusion into any Center's five-year plan. Incremental funding requests shall include a reasonable explanation for the action, an overall

schedule including major milestones, total estimated costs, planned scope, and objectives.

1.3.4.1 The Center CoF program manager shall provide incremental planning project documents to FERPD for review. These planning documents must include the following:

- a. The total estimated cost of the completed incremental project (all phases).
- b. The estimated cost of this project phase for the planned budget year.
- c. The costs of previously approved or budgeted project phase(s).
- d. The planned costs of each future project phase by fiscal year.
- e. Whether or not this particular project phase will yield a usable facility or portion thereof.

1.3.5 **Budget Request (Five-Year Plan)** -- Centers shall develop and submit a Budget Request (Five-Year Plan) in accordance with the annual guidance issued through the NASA OCFO (see paragraph 1.3.1 and Figure 1-1). Prior to this guidance, FERPD issues a data call with guidance and reporting requirements to the Centers. FERPD, Centers, and other Headquarters offices prioritize the CoF program Agency wide using the Centers' submitted data.

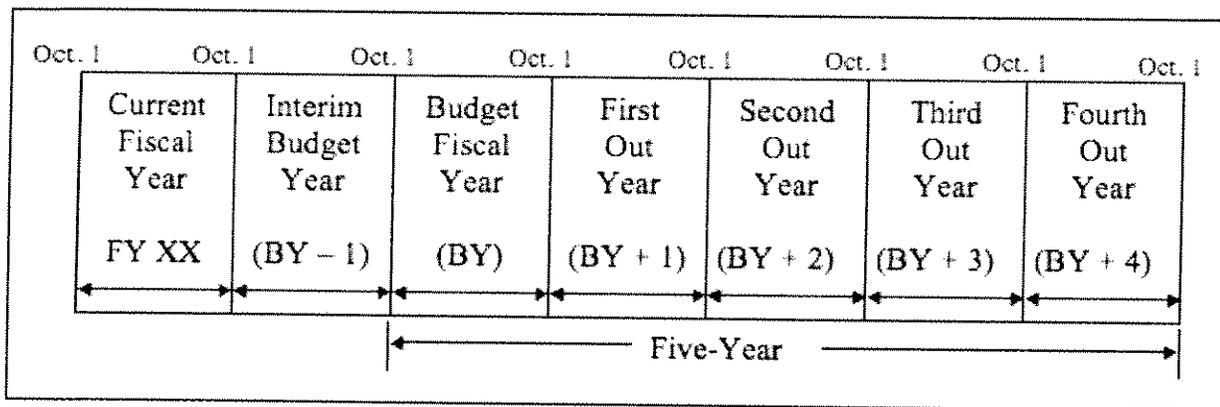


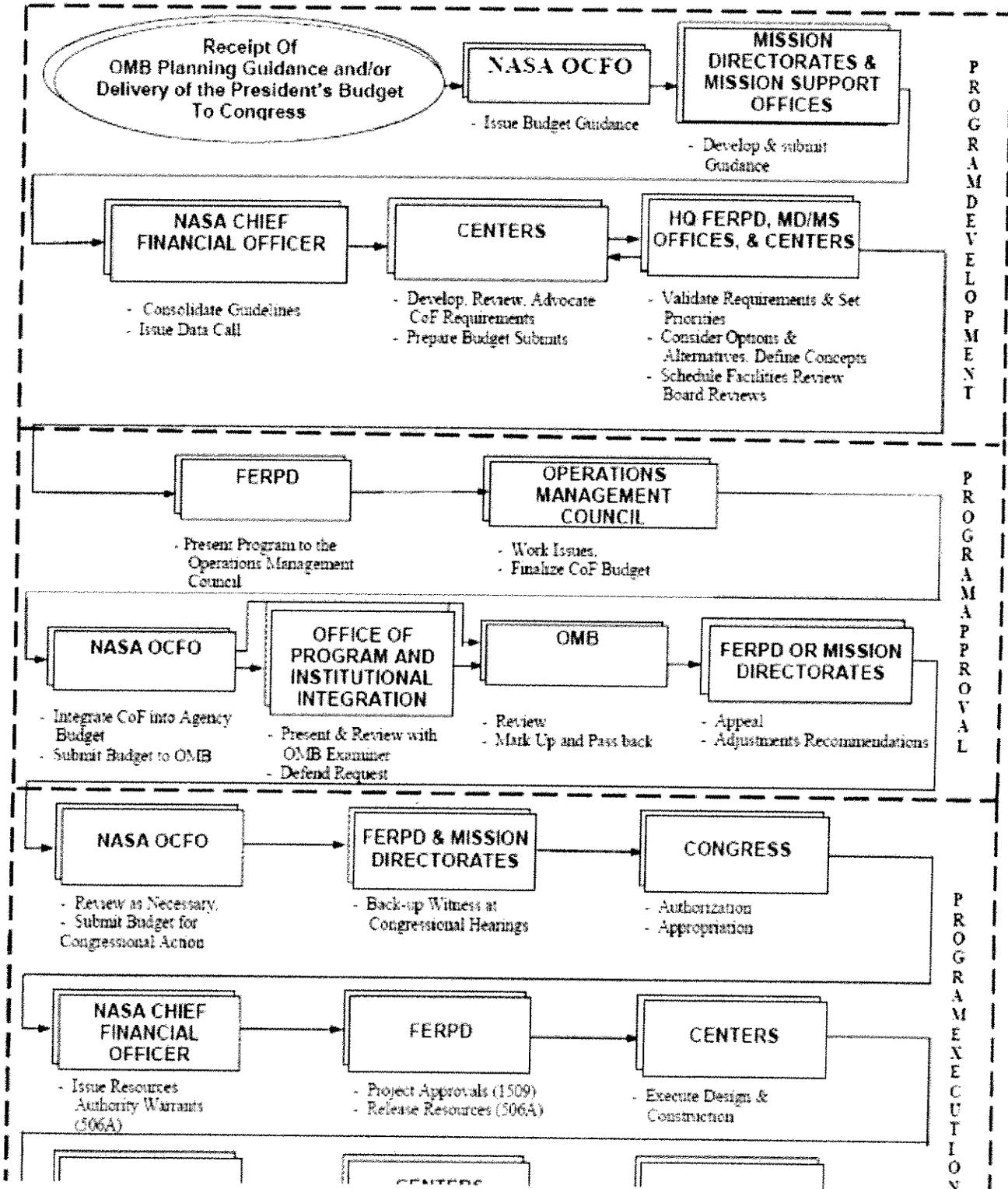
Figure 1-1 CoF Five-Year Plan

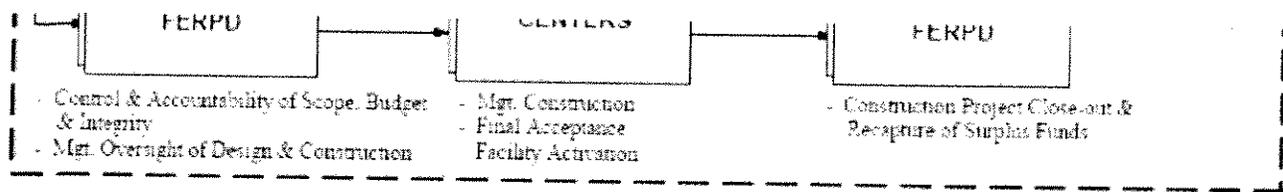
1.3.6 **Documentation** -- NASA Form 1509, Facility Project-Brief Project Document, and NASA Form 1510, Facility Project Cost Estimate are required for all CoF projects requested for inclusion in the Budget Year (BY). Discrete CoF projects also must have a Life-Cycle Cost Analysis (LCCA) and a draft budget narrative (see <http://www.hq.nasa.gov/office/codej/cc> [http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/Case\\_Guide\\_4-20-06.pdf](http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/Case_Guide_4-20-06.pdf)).

1.3.7 **Headquarters Review and Prioritization** -- The Headquarters Office of Infrastructure and Administration, FERPD shall lead the review and prioritization of institutional facility projects submitted in the Headquarters five-year Plan based upon the Centers' response to the annual guidance. This review will include an evaluation of existing capabilities to minimize or eliminate the creation of excess capacity within NASA or the private sector (e.g., construction of a ground-based test facility at a particular Center when there is adequate availability and capability to accomplish the same requirements at a different Center or in the private sector). For facilities projects funded from other sources (e.g., program direct, third party), FERPD and the associated Mission Directorate coordinate the process.

**1.3.8 Public Release** -- Until released by the appropriate committees of Congress, there shall be no public disclosure of CoF project information (including subprojects and/or work packages).

**1.3.9 CoF Program Approvals** -- Figure 1-2 depicts the CoF program approval process. The CoF program is part of the annual appropriations submitted to OMB by NASA.





**Figure 1-2 CoF Program Management**

**1.3.10 NASA Headquarters** -- Based upon the five-year plans submitted by the Centers, NASA Headquarters prepares and submits the draft appropriation request to OMB. This requires coordination with the OCFO, Mission Directorates, Mission Support Offices, and Center Management. The NASA Administrator, through the OCFO, is responsible for NASA's appropriation request.

**1.3.11 OMB Review** -- OMB reviews NASA's five-year Plan and responds with changes, comments, and questions via a "passback." After NASA answers the passback, OMB provides a "markup" for use in preparing NASA's final submission. Using the OMB budget markup, NASA prepares and submits a final budget appropriation request to OMB. Following final approval, OMB incorporates NASA's planned budget into the President's budget for submission to Congress.

**1.3.12 Facility Project Authorization and Appropriations** -- Using the President's budget as a starting point, committees in the Senate and House of Representatives develop the authorization and/or appropriation bills. The Congress approves and sends the bill(s) to the President for review and action. The bill becomes public law (or act) once the President has approved it.

**1.3.13 Program Oversight** -- As the CoF program proceeds through the authorization and appropriation process, NASA Headquarters (OCFO, FERPD, Mission Directorates, and Mission Support Offices) will inform the Centers concerning the status of proposed facility projects.

**1.3.14 Program Execution** -- Execution is the process of obligating and managing contracts to accomplish project objectives. To "obligate" funds on a project means to award a contract or purchase order. NASA HQ FERPD has set goals of obligating 90 percent of CoF projects and 80 percent of their associated budget of that fiscal year. (See NPD 8820.2, Design and Construction of Facilities at <http://nodis3.gsfc.nasa.gov> and Self-Assessment Metrics in Appendix C). Early obligation of CoF projects is encouraged, and late obligation could place a project at risk to lose project funding. (See Appendix A, Definitions, "at-risk project"). The following paragraphs describe facility program execution, and Figure 1-2 depicts this process.

**1.3.15 Financial Resources for Facility Projects** -- The annual appropriations acts contain the principal funding authorities for CoF projects. This funding supports preliminary engineering, design, and construction of those projects. Identifying, planning, and developing the requirement into a proposed project and its activation after construction are paid for using non-CoF funds (see Figure 1-3, Facilities Project Activities and Funding). The FPM may use non-CoF funds, as authorized and appropriated within annual appropriations and authorization acts, for engineering, planning, design, construction, and activation of CoF projects. In some instances, another Federal agency, State or local government, or other party

will finance facility work at a Center through Agency agreements, the private sector as specified in contracts, or a nonappropriated fund activity such as a NASA Exchange. Regardless of the source of funds, approval authority must comply with NPD 7330.1, Approval Authorities for Facility Projects.

### 1.3.16 Facility Project Fiscal Management

1.3.16.1 **CoF Thresholds** -- See paragraph 1.1 for current CoF fund types and associated thresholds. The annual appropriation legislation is the only accepted source for adjustments to CoF thresholds.

1.3.16.2 **Project Approval and Documentation** -- The authorities and responsibilities identified in NPD 7330.1, Approval Authorities for Facility Projects, apply to all facilities projects, regardless of fund source. Each facility project estimated to cost \$100,000 or more must have an approved NASA Form 1509, Facility Project-Brief Project Document, and NASA Form 1510, Facility Project Cost Estimate, prior to obligating funds on that project. The facility project manager shall prepare these documents in accordance with the instructions in Appendix C, Forms and Instructions. Approval requirements vary according to the types of funds expended as follows:

a. **Center-Approved and -Funded Projects** -- Center-Approved and -Funded Projects are projects with an estimated cost of less than \$500,000. Centers approve and fund these projects; however, FERPD reviews NASA Forms 1509 and 1510 for projects estimated to cost \$100,000 or more for compliance with the NASA policy.

b. **Facility Planning and Design Funds (FP&D)** -- Based on the results of the prioritization process, FERPD authorizes projects for design and provides funds to accomplish planning and design of CoF projects. Center CoF Managers request funds and approval via the CoF Routine Transaction Form, and FERPD replies with authority to design using the same form.

c. **MRC Projects and Discrete Projects** -- Centers request project approval by sending the signed version of the NASA Forms 1509 and 1510 to FERPD using the CoF Routine Transaction Form. FERPD reviews and approves the project and the expenditure of discrete or minor funds by signing and obtaining signatures on the NASA Form 1509. FERPD transmits copies of the signed forms, notification of funding, and approval authority using the CoF Routine Transaction Form. For MRC projects, FERPD communicates provisions for increasing expenditures on the Minor Facility Projects Summary Brief Project Document Form 800/02 at the time of issue.

d. **Third-Party Funded Facilities Projects** -- Funding approval and authority must comply with the party providing funds; however, NASA approval requirements still must comply with NPD 7330.1, Approval Authority for Facilities Projects (see <http://nodis3.gsfc.nasa.gov> <http://nodis3.gsfc.nasa.gov>). Centers request approval by sending NASA Form 1509 and 1510 to the Director, FERPD for review and approval.

1.3.16.3 **Requesting Funds** -- Center CoF Managers shall use the CoF Routine Transaction Form with NASA Forms 1509 and 1510 attached for each project to request funds.

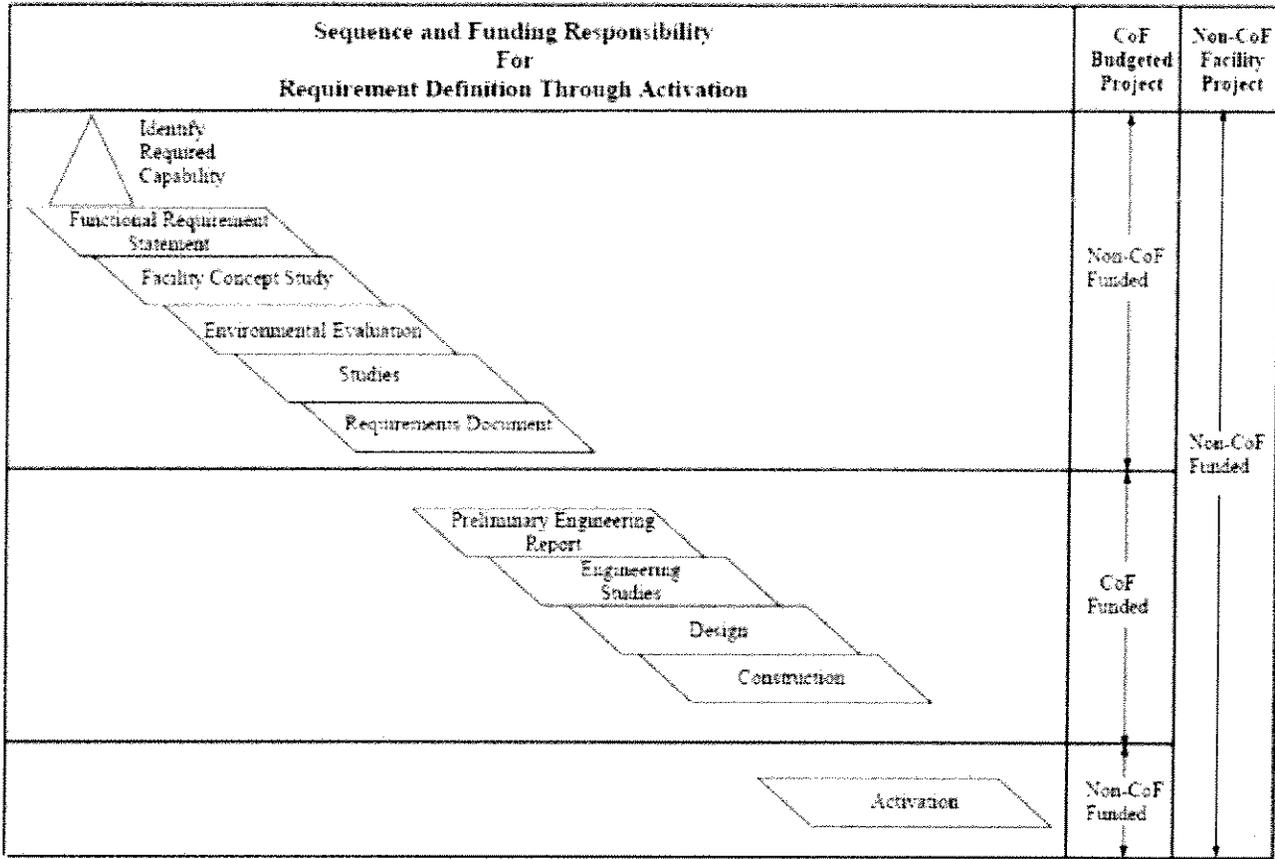
1.3.16.4 **Receipt of Funds** -- After project approval is complete, FERPD transmits funding to the Centers electronically through NASA's financial system. Centers shall award CoF contracts only upon receiving approval authority and funds.

**1.3.16.5 Procurement** -- When professional services, such as a design by an Architect Engineer (A-E) firm or a construction contractor for construction, are required, the contract acquisition shall comply with the FAR and NASA FAR supplement.

**1.3.16.6 Project Design** -- Center Project Managers must design facility projects in accordance with Chapter 3, Design. Design documents shall be prepared by or under supervision of registered or certified professional engineers or architects. However, the Center Director or designee has the authority to waive this requirement if he/she is satisfied the technical design is being performed by qualified personnel. If this requirement is waived, it must be in writing, signed by the Center Director or designee, and filed in the project folder.

**1.3.16.7 Project Design Approval** -- The Center Director or designee shall indicate technical approval by signing the design documents. This approval certifies that the design meets the scope (capability, schedule, and cost) of the approved project as described on the project documents. In addition to specific project goals and objectives, the following apply to facility projects:

- a. 14 CFR Part 1216, Environmental Quality, requires an environmental analysis for each project and an environmental assessment for each discrete project unless the action is one normally requiring an environmental impact statement or the action is categorically excluded.
- b. 10 CFR Part 434, Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings, establishes energy conservation performance standards that are mandatory for design of federal buildings.



**Figure 1-3 Facilities Project Activities and Funding**

**1.3.17 Program Reporting Requirements --** Center CoF Managers shall maintain records for each CoF project and report the following:

**1.3.17.1 Quarterly Report --** Unless the Headquarters program manager has access to current project status via a Center electronic project management system, the Center CoF Manager shall report quarterly updates to the Headquarters program manager. At a minimum, the report will include the following:

- a. Program-related requirements, such as capability, schedule, cost.
- b. A 30-percent and 90-percent design milestones including estimated and actual start, review dates, and completion dates.
- c. Construction milestones, including estimated and actual start dates, work packages, phases, commissioning, activation, beneficial occupancy, and closeout.
- d. Funds management for design and construction: Budget amount (requested during the budget formulation phase), Current Cost Estimate, funds received, funds committed, funds obligated.
- e. Outstanding issues, such as significant change orders, safety concerns, or cost overruns and the plans to mitigate these actions.

**1.3.17.2 Functional Performance Metrics --** On November 1 of each year, CoF Managers

shall report functional performance metrics as requested and communicated by FERPD. See Appendix\_C, CoF Self Assessment Metric Form.

**1.3.17.3 Sustainability Reporting Requirements** -- NASA Centers shall submit an annual report of their progress toward implementing sustainability goals. FERPD will request and transmit reporting requirements annually, but the following represent the minimum requirements:

- a. Total number of new design projects initiated during the fiscal year.
- b. Total number of new designs eligible for LEED registration.
- c. Number of new design projects registered for LEED certification and at what level (i.e., Certified, Silver, Gold, or Platinum).
- d. Number of completed construction projects eligible for LEED certification and number of completed construction projects achieving LEED certification and at what level (i.e., Certified, Silver, Gold, or Platinum).

## Chapter 2. Project Development and Planning

### 2.1 Facility Project Development

The Center CoF Manager shall develop a systematic process for developing projects for potential inclusion into the CoF process. At a minimum, this process shall include the following:

- 2.1.1 An annual call for potential projects to Center facility stakeholders.
- 2.1.2 A method for ongoing collection of requirements throughout the year.
- 2.1.3 A method for identifying operations and maintenance requirements, such as excessive trouble calls on a system or facility.

### 2.2 Facility Project Planning

The FAR and the NASA FAR Supplement control all of the acquisition phases for all facility project work. The FPM and Center facility planning office shall coordinate all acquisition planning and execution with the Center acquisition office to ensure compliance with these regulations.

**2.2.1 Center Master Plan** -- The FPM shall ensure assigned CoF projects are in accord with the Center Master Plan.

**2.2.2 Facility Project Manager** -- Centers will assign an FPM for each CoF project. The FPM shall, with support of a project team, organize, manage, and direct facility project work to meet the requirements of this NPR. The project team shall include all project stakeholders, such as representatives from the using organization, safety, health, engineering, fire protection, security, environmental, acquisition, operations and maintenance, and technicians.

**2.2.3 Front End Planning (FEP)** -- The FPM must ensure all project stakeholders take part in FEP, the process of gathering and developing sufficient information to define a facility project. Once the FPM and the planning team have identified the initial project goals and objectives, the FEP process starts and continues through the approval of the design statement of work and the start of final design. The FEP phase establishes the project requirements and concept and provides the basis for project budget and approval. The primary tool used to accomplish FEP is the Project Definition Rating Index (PDRI) (see <http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/ProjectDefinitionRatingIndex.pdf>). Initially, the FPM will use the PDRI as a checklist to determine the project areas needing clarification and further study. The FPM and the project team shall evaluate and score the project using the PDRI soon after receiving the 30-percent design documents. If at that time the PDRI score is over 200 out of 1,000 possible points, the project team will identify the problem areas and evaluate the risks to project success. If the risks are low, the project may proceed to final design. If the risks are high, the FPM will further define the project before proceeding with final design. For CoF projects receiving a PDRI score of 300 or more out of 1,000 possible points, the FPM shall prepare a written memorandum outlining the items of low definition and the reasoning behind the decision to proceed. The FPM and the Center CoF Manager must sign and date this

document and keep it on file with the project documents through project closeout.

**2.2.4 Facility Project Requirements** -- The following are required for all facilities projects regardless of fund source:

**2.2.4.1 Functional Requirements Document** -- The FPM shall complete a Functional Requirements Document containing more detail than is found on the NASA Form 1509. It forms the basis for developing documents for budget formulation and/or project approval. It is essential that the detailed requirements in this document are accurate and complete for use in further development of the project. After the Functional Requirements Document is written, it shall undergo a complete review by the project stakeholders including all functional offices necessary to ensure the project complies with internal and external requirements (e.g., safety, security, energy, legal, planning, acquisition, and environmental). The Functional Requirements Document shall include the following elements:

- a. A clear and concise statement of purpose for the project.
- b. Description of the project, including existing conditions, problems, potential or preliminary solutions, operational need dates, studies, user requests, reports, or Operations and Maintenance (O&M) data. (The FPM shall attach supporting documentation as appendices or at least note how and where it may be obtained).
- c. Justification for the project.
- d. The statement of work if the project development and design work will be done by contract.
- e. The funds source(s) and points of contact for those funds.

**2.2.4.2 Facility Project Management Plan** -- For CoF projects, The FPM shall prepare a Facility Project Management Plan that establishes a schedule for implementing a facility project and assigns roles, responsibilities, and authorities to develop and complete the project. The plan provides a detailed outline of the steps in the facility implementation process with well-defined milestones to measure progress. Prior to start of final design work, the FPM shall present the management plan for approval to the Center official exercising project technical approval authority. For discrete projects, the FPM shall submit the management plan to NASA Headquarters FERPD for review and approval. Management plan approval on discrete projects is required before start of final design (after acceptance of the 30-percent design, see paragraph 3.6.1.1 30-Percent Design). The Facility Project Management Plan shall include the following elements:

- a. Identification of the FPM, the project team members, and other individuals or organizations responsible for project implementation.
- b. Functional Requirements Document (see paragraph 2.2.4.1).
- c. Description of the planned work, including capacity, scope, location, sustainability elements, special features, and Current Cost Estimate (CCE).
- d. Identification of all safety, health, environmental, and security requirements.
- e. An acquisition plan outlining contract method and schedule that can realistically support the operational need date(s).
- f. A project schedule with key milestones for planning, environmental, design, acquisition, construction (include long-lead items; e.g., equipment items that are not typically stocked by suppliers), and activation.

- g. Configuration/change control procedures and responsibilities.
- h. Description of design review milestones, documentation, fiscal control procedures, and reporting frequency.

**2.2.4.3 Environmental** -- The FPM and the Center Environmental Manager shall ensure an environmental evaluation in accordance with NPR 8580.1, Implementing the National Environmental Policy Act and Executive Order 12114.

**2.2.4.4 Historic** -- For work on existing facilities with potentially historic significance, the FPM and the CEM shall ensure the work is done in compliance with Section 106 regulations, 36 CFR 800. Protection of Historic Properties, of the National Historic Preservation Act (NHPA).

**2.2.4.5 Occupational Safety and Health** -- The FPM and the Center Occupational Safety and Health organization(s) shall identify safety and occupational health requirements in compliance with NPR 8715.3, NASA General Safety Program Requirements and NPR 8715.1, NASA Occupational Safety and Health Programs.

a. The FPM shall prepare the Preliminary Hazard Analysis and the Preliminary Hazard List and initiate the Facility Safety Management Plan (FSMP) containing the Hazard Analysis Tracking Index (HATT) in accordance with NASA-STD-8719.7, Facility System Safety Guidebook.

**2.2.4.6 Security** -- NASA has adopted the Interagency Security Council (ISC) criteria for use in planning and designing new construction and major renovation. The General Services Administration (GSA) Office of the Chief Architect makes these criteria available on their Building Security Technology Web site.

**2.2.4.7 Risk Management** -- If applicable to any portion of a CoF project, the FPM shall ensure compliance with the risk management process as outlined in NPR 8000.4, Risk Management Procedural Requirements. The referenced NPR describes applicability.

**2.2.4.8 Energy Efficiency and Water Conservation** -- The FPM shall ensure the project incorporates the energy efficiency and water conservation requirements in 10 CFR Part 434, Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings; NPR 8570.1, Energy Efficiency and Water Conservation; and the following:

a. **Energy Efficiency** -- The FPM shall ensure the project designer:

1. Establishes a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the Energy Star7 targets for new construction and major renovation where applicable.
2. For new construction, reduce the energy cost budget by 30 percent compared to the baseline building performance rating per the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., (ASHRAE) and the Illuminating Engineering Society of North America (IESNA) Standard 90.1-2004, Energy Standard for Buildings Except Low-Rise Residential.
3. For major renovations, reduces the energy cost budget by 20 percent from prerenovations 2003 baseline.

b. **Protect and Conserve Water** -- The FPM shall ensure the project designer:

1. For indoors, reduces the potable water consumption of latrine fixtures (e.g., showerheads, faucets, water closets, and urinals) by at least 20 percent from the baseline as calculated using the Energy Policy Act of 1992 fixture performance standards.

2. For outdoors, reduces outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities) by using water-efficient landscape and irrigation strategies, including water reuse and recycling.

3. Minimizes storm water runoff and polluted site water runoff.

2.2.4.9 O&M -- The FPM shall coordinate all facility project designs and planning with the Center O&M organization. All designs shall comply with accepted maintenance policies, including the following:

a. The Reliability Centered Maintenance Guide for Facilities and Collateral Equipment (see <http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/RCMGuideMar2000.pdf>).

b. The Reliability Centered Building and Equipment Acceptance Guide (RCBEA, see <http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/RCB&EGuideJUL04.pdf>).

c. NPR 8831.2, Facilities Maintenance Management (see [http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal\\_ID=N\\_PR\\_8831\\_002D\\_&page\\_name=main](http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PR_8831_002D_&page_name=main)).

d. Predictive Testing & Inspection (PT&I).

e. Computerized Maintenance Management System (CMMS) requirements.

f. The FPM shall ensure that O&M manuals on the installed systems and equipment are written and that training (including certification training for complex technical systems) is accomplished. For real property systems and equipment, these costs shall be included in the CoF budget. For noncollateral equipment and systems, these costs shall be included in the activation budget (non-CoF).

2.2.4.10 **Sustainability** -- NASA has adopted the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) as its performance measure for sustainable development. For CoF projects, all new construction and major building renovation projects planned for award after October 1, 2005, shall meet the minimum LEED Silver rating. The FPM will evaluate (risks, benefits, and costs) and provide an executive summary to FERPD identifying the additional requirements to meet a LEED Gold rating. If LEED Silver cannot be achieved on projects, the FPM will request a waiver from FERPD. The FPM must ensure compliance with Executive Order (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management (see <http://a257.g.akamai.net/7/257/2422/01jan20071800/edocket.access.gpo.gov/2007/pdf/07-374.pdf>) and the following:

a. **Commissioning** -- Total building commissioning as defined in United States Green Building Council's LEED standard is required on all new construction and major renovation projects. Commissioning of installed items and associated systems on all other projects is required.

b. **Exemptions** -- Projects incapable of qualifying for LEED Silver certification (e.g., small, single system, or equipment) shall incorporate life-cycle cost sustainable design principles to the maximum extent practicable to reduce the overall life-cycle cost and minimize impacts on natural resources.

c. **Construction Waste** -- During the planning stage, local recycling and salvage operations that could process site-related waste will be identified. The designer shall incorporate into the construction contract documents to have the contractor recycle or salvage at least 50 percent of construction, demolition, and land-clearing waste, excluding soil, where markets or onsite recycling opportunities exist.

d. **Other Construction Standards** -- The FPM shall ensure compliance with the following standards or guidance:

**1. Indoor Air Quality During Construction** -- Sheet Metal and Air Conditioning Contractors' National Association Indoor Air Quality Guidelines for Occupied Buildings under Construction, 1995.

After construction and prior to occupancy, a minimum 72-hour flush out with maximum outdoor air must be conducted, consistent with achieving relative humidity no greater than 60 percent. After occupancy, continue flush out as necessary to minimize exposure to contaminants from new building materials.

**2. Ventilation and Thermal Comfort** -- The current ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy, including continuous humidity control within established ranges per climate zone, and ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality.

**3. Moisture Control** -- Moisture control strategy for controlling moisture flows and condensation to prevent building damage and mold contamination.

**4. Daylighting** -- A minimum daylight factor of two percent (excluding all direct sunlight penetration) in 75 percent of all spaces occupied for critical visual tasks. Automatic dimming controls or accessible manual lighting controls and appropriate glare control must be provided.

**5. Low-Emitting Materials** -- Use of materials and products with low-pollutant emissions (e.g., volatile organic compounds), including adhesives, sealants, paints, carpet systems, and furnishings.

**6. Biobased Content** -- Use of products meeting or exceeding United States Department of Agriculture's biobased content recommendations. For other products, biobased products made from rapidly renewable resources and certified sustainable wood products must be used. (See <http://www.biobased.occ.usda.gov/fb4p/>)

**7. Ozone-Depleting Compounds** -- Eliminating the use of ozone-depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990 or equivalent overall air quality benefits that take into account life-cycle impacts.

**8. Recycled Content** -- For EPA-designated products, use of products meeting or exceeding EPA's recycled content recommendations. For other products, materials with recycled content must be used such that the sum of postconsumer recycled content, plus one-half of the preconsumer content, constitutes at least 10 percent (based on cost) of the total value of the materials in the project.

**2.2.4.11 Cost Estimate** -- The FPM shall prepare or ensure their assigned CoF projects have a cost estimate. This estimate must include every element described in the project Functional Requirements Document with enough accuracy to have a reasonable expectation of project success. For CoF projects, NASA Form 1510, Facility Project Cost Estimate, summarizes this estimate with sufficient detail for review. When applicable to the specific project, estimates for the following major elements are required:

- a. Site preparation, utilities, sidewalks, parking lots, and roads.
- b. Construction materials and labor.
- c. Material and equipment tests performed at the construction site or at an offsite location.
- d. Construction management services.
- e. Commissioning services during design and construction.
- f. Environmental compliance and protection.

- g. Collateral equipment.
- h. Subcontractor and general contractor cost, overhead, and profit.
- i. Insurance bonds and taxes.

**2.2.4.12 Budget and Approval Documents** -- For MRCs (see paragraph 1.1.2), the Center CoF Program or Project Manager shall submit NASA Forms 1509 and 1510. In addition, discrete projects must have a budget narrative (i.e., Long Form Writeup) and a Life-Cycle Cost Analysis (LCCA) in compliance with OMB Circular A-94 using ECONPACK (<http://www.hq.usace.army.mil/ccmp/e/ec/econ/econ.htm>).

**2.2.5 Codes and Standards** -- The FPM must ensure designs meet or exceed locally adopted, nationally recognized building codes and standards.

**2.2.5.1** In the case where a local jurisdiction has adopted a code that is not nationally recognized, the FPM shall ensure the design meets or exceeds the International Building Code from the International Code Council.

**2.2.5.2** Regardless of locally adopted building codes, the FPM shall ensure the design meets or exceeds the National Fire Protection Association requirements for electrical systems, life safety, and fire protection, detection, and suppression.

**2.2.5.3** All CoF design drawings shall comply with the U.S. National Computer Aided Design Standard (see <http://www.nationalcadstandard.org/>).

**2.2.5.4** For all CoF project specifications, designers shall use SpecsIntact, i.e., the Uniform Facilities Guide Specifications (UFGS) found in the Whole Building Design Guide (WBDG) (see <http://specsintact.ksc.nasa.gov/> and <http://www.wbdg.org/>). For equipment or systems not adequately specified by using the UFGS, the designer may use professional judgment.

**2.2.6 Activation Budget Formulation** -- The FPM shall include budget formulation planning for activation during the planning phase of the project. The purpose is to identify costs associated with activation and ensure funds are available at the time activation starts. The budget planning must identify all costs necessary to outfit the facility for its intended operation and the source(s) of funding (see Chapter 5, Activation for details). NASA Form 1509 will include the estimated activation costs for the project. For discrete projects, the long form writeup must include the activation costs and scope.

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## Chapter 3. Design

### 3.1 Design Coordination

The FPM must keep the project team apprised of significant developments throughout the design phase.

### 3.2 Architectural-Engineering (A-E) Services

Whenever A-E services are required, the FPM and Center Procurement Office shall acquire those services in accordance with the FAR and the NASA FAR supplement.

### 3.3 Public Release

Public disclosure of CoF project information (including subprojects and/or work packages) shall occur only after release by the appropriate committees of Congress. Design documents prior to their planned construction fiscal year of execution are sensitive, and the FPM must ensure that all parties connected with project development are cognizant of this sensitivity. Design packages used for acquisition must not include any information classified as "for official use only," secret, or top secret. The FPM may share CoF project information once the designer or contractor is under contract but only after the Center Office of Security approves the action. Any information deemed sensitive but unclassified must be handled in accordance with NPR 1600.1, NASA Security Program Procedural Requirements.

### 3.4 Management of Design

It is NASA policy to award CoF projects early in the fiscal year in which it is planned. The FPM must plan and manage CoF program projects to support reaching the goal of awarding during the second quarter of the fiscal year.

### 3.5 Preliminary Engineering Report (PER)

The FPM shall ensure a PER is performed on any assigned CoF project having significant technical or financial risks associated with it (e.g., employing leading-edge technology, highly technical, complex, or with incremental funding). If a PER is performed for a project, the PDRI score shall be determined soon after its conclusion (see paragraph 2.2.3, Front End Planning). If a PER is required, it must include the following sections:

**3.5.1 Section I: Requirement Statement and Justification** -- Describe and justify the project requirements, problems, and milestones. Center directives will be referenced to support the requirements and required completion date.

**3.5.2 Section II: Descriptive Analysis** -- The problems and solutions identified must be explained with sufficient detail to adequately make rational decisions. Include schematics and one-line diagrams showing the functions and operations to be performed within the facility. A life-cycle cost analysis that meets the requirements of paragraph 2.2.4.12., Budget and Approval Documents, must be developed and provided for each alternative. Each alternative will include discussions on the pros, cons, risks, and analyses for meeting the project requirements including safety, fire protection, energy conservation, environmental, operations and maintenance considerations, and sustainability. Where applicable, each alternative must include information on architectural, site development, structural, mechanical, and electrical considerations; real estate actions; and any affected utilities. Real estate requirements, including acquisitions and easements, will be addressed in this section; Section III, Engineering, Budget, and Other Estimates; and a dedicated appendix (see paragraph 3.5.5.2, Real Estate Interest, below). If there are no real estate requirements, it must be clearly stated in this section.

**3.5.3 Section III: Engineering, Budget, and Other Estimates** -- The PER cost estimates will be prepared on NASA Form 1510, Facility Project Cost Estimate, in accordance with Appendix C, Forms and Instructions. The cost estimating process includes Engineering Estimates (EE), budget estimates, and other cost estimates.

**3.5.3.1 The Engineering Estimate (EE)** -- This represents the CoF costs developed from the draft project documents (drawings and specifications) prepared for the PER. The estimate includes the costs for materials, labor, real estate actions, and services, including contractor overhead and profit. Adequate design contingencies must be included. The EE must include all labor and material costs for all items including collateral equipment that would normally be furnished by a contractor and installed as permanent in the facility (see Appendix D, Facility and Other Related Costs, for a listing of items and types to include). When applicable, the cost to install Government Furnished Property (GFP) will be included. The EE must not include escalation, construction contingencies, or Supervision, Inspection, and Engineering Services (SIES). The basis or source used will be indicated on the estimate. Estimates will identify funding requirements by fiscal year(s) and amount(s). The EE must include unit costs (e.g., units of measure and quantities for each significant item) instead of lump sum estimates whenever feasible. The EE is the estimate used for comparing alternatives within the PER.

**3.5.3.2 Operations and Maintenance (O&M) Cost Estimate** -- An O&M cost estimate covering the expected life of the facility must be included for each feasible alternative in the PER. This cost estimate will include estimated energy and maintenance costs for installed systems over the expected life of the facility.

**3.5.3.3 The Budget Estimate** -- This estimate includes the EE of the selected alternative, escalation, construction contingencies, commissioning services, and SIES. This estimate will follow the same guidelines for unit costs as outlined in the prior paragraph. The total budget estimate becomes the budget amount (BA) after it has been submitted to OMB and is the BA for this project on all future reports to HQ (see paragraph 1.3.17, Program Reporting Requirements).

**3.5.3.4 Other Cost Estimate** -- Project requirement costs not covered in the prior two paragraphs should be included within the PER, but annotated separately. For example, non-real property equipment, furniture, and telecommunications equipment required to meet the project goals and objectives fit under this heading.

**3.5.4 Section IV: Design and Construction Schedule** -- Provide a project schedule using a commercially available project planning software and identify the software in the PER. If a predetermined need date has been established for the facility, it shall be shown in the schedule. The

schedule must address requirements for other Architectural-Engineer (A E) services, long lead items, special approvals, and other special requirements. If more than one construction contract is contemplated, an estimate of the time required for each major contract and the phasing will be provided. The schedule must include the estimated number of months required for each of the following:

- a. Preparing the final design documents.
- b. Construction acquisition.
- c. Construction.
- d. Facility activation.

### 3.5.5 Section V: Appendices to the Report

**3.5.5.1 Drawings** -- As required for clearly illustrating the project, drawings for the PER will include a location plan, site plan, single-line floor plans, and elevations. The drawings must be in 8-1/2 by 11-inch format. Foldouts are acceptable if the vertical dimension is kept to 11 inches. On the drawings, particular attention must be paid to illustrate effective land use. Any proposed land-acquisition requirements, including easements, must be indicated on the site plan. Required safety clearance distances, when applicable, must be shown on the site plan.

**3.5.5.2 Real Estate Interest** -- For those projects requiring additional real estate (on- or offsite) or easements, an appendix must be included in the PER and address the following items:

- a. A tabulation segregated by type of ownership (i.e., private, State, or public domain) of only the acreage proposed for acquisition plus easements for access and utilities. The tabulation will include the assessed value of land, assessed value of improvements, current appraised value, and the number of owners involved.
- b. The extent of any street or road closings and the extent of any road or utility relocations, including a cost estimate for such closings and/or relocations, separate from the land values indicated above.
- c. The extent and estimated costs of required additional rights such as mineral rights, timber rights, and easement rights whether outstanding in parties other than the present owners or not, and a statement as to whether title should be taken in fee simple absolute or subject to such rights.
- d. A lease-purchase analysis as required by OMB Circular No. A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, when a decision has been made to lease or purchase (construct) general-purpose real property.
- e. Compliance with EO 12372, Intergovernmental Review of Federal Programs or the basis of exception. Completing an Environmental Impact Statement, Finding of No Significant Impact, or Environmental Assessment satisfies this requirement.

**3.5.5.3 Ancillary Investigations** -- Any supplementary investigations or studies used to enhance, develop, or eliminate alternatives, such as soil conditions, environmental studies, marketing strategies, or feasibility studies, must be either attached to or summarized in the appendices.

## 3.6 Design Milestones

Regardless of the acquisition strategy selected (e.g., design-build or design-bid-build), the FPM shall ensure that all facilities projects are designed to at least the 30 percent stage prior to advertising for construction.

3.6.1 For facilities projects requiring a complete design prior to construction advertisement, the minimum design milestones are 30 percent and 90 percent. In addition to ensuring the design is coordinated with the project stakeholders during design meetings, the FPM shall distribute 30 percent and the 90-percent design documents to the project stakeholders for review. The following minimum elements must be included for these stages:

**3.6.1.1 30-Percent Design Documents** -- Besides the documentation required in paragraph 2.2.4., Facility Project Requirements, this package must include the following:

- a. For new construction or an addition to an existing building, a site plan in accordance with the Center Master Plan.
- b. A floor plan, building envelope details (e.g., finishes, roofs, walls, and floors), structural systems, mechanical systems, electrical systems, construction phasing plan, draft commissioning plan, and draft activation plan.
- c. Design analysis supporting the basis for the design with calculations. The analysis must contain important assumptions, standards, codes, and other constraints used to determine final selections. The package will include section numbers and titles for all specifications planned.

**3.6.1.2 90-Percent Design Documents** -- The design documents submitted for review will be a completely detailed set of technical design contract documents in final form. They will include the following:

- a. A complete set of drawings and specifications with sufficient detail for a prudent contractor to complete the work.
- b. A final cost estimate in accordance with paragraph 3.5.3, Section III: Engineering, Budget and Other Estimates.
- c. A construction schedule with key milestones for long-lead items, phases clearly delineated, and activation.

## 3.7 Design Reviews

The corresponding Center Mission Support Offices shall review both the 30--- percent and the 90-percent design stages for constructability, environmental compliance, sustainability, safety, security, health, and code compliance.

## 3.8 Mission-Critical Systems

For mission-critical technical facilities (for definition, see NPR 7120.5, NASA Space Flight Program and Project Management Requirements) specifically developed or significantly modified for space flight systems and associated ground systems, then the FPM shall comply with both NPR 7120.5 and this document. Where compliance to both policies would duplicate an effort (e.g. a project management plan), only one effort incorporating all required elements from both policies is necessary. For complex or mission-critical systems, the FPM must ensure a Failure Mode and Effects Analysis (FMEA) is accomplished in accordance with NASA STD 8719.7, Facility System Safety Guidebook.

## 3.9 Facility Activation Plan

For new construction and major renovation projects, the FPM shall develop a facility activation plan during the design phase. This plan will outline the process steps and resources necessary for project implementation. The activation plan must address the following items, as applicable to the specific project:

- a. Noncollateral equipment purchase and installation. For noncollateral equipment no longer needed within an existing facility, refer to NPR 4200.1, NASA Equipment Management Procedural Requirements.
- b. Subsystem tests (list each, list test limits, and the PT&I technology to be used).
- c. Integrated systems test plan and test.
- d. Integrated systems safety and occupational health review.
- e. Operational readiness review.
- f. Facility systems training.
- g. Estimated yearly budget for Operations and Maintenance (O&M) for installed systems.
- h. O&M instructions; PT&I, and CMMS information; and manuals.
- i. Prefinal inspections.
- j. Final inspections.
- k. Punch list (close out).
- l. Facility and systems as-builts.
- m. Warranty transfer.
- n. Final facilities construction contract closeout.
- o. Contractor performance records.
- p. Data systems design and installation.
- q. Systems furniture design, purchase, and installation.
- r. Telecommunications equipment installation.
- s. Personnel move in.
- t. Transfer to customer and O&M organization.

3.9.1 Prior to completion of the final design work, the office exercising project approval authority shall review and approve the activation plan.

### **3.10 Activation Budget**

The FPM shall complete the activation budget started in the planning process (see paragraph 2.2.6, Activation Budget Formulation) and submit it during the normal budget process through the Center OCFO. The activation budget includes estimated costs associated with all tasks necessary to verify that the facility meets the project requirements, the systems operate within the design parameters, and the facility and operating organization are ready to use and maintain the facility. The budget

includes all costs necessary to outfit the facility for personnel move in and its intended operation (i.e., installation of ground support equipment, integration and checkout of combined facility and noncollateral equipment systems, installation of computer data wiring and systems, installation of systems furniture, and installation of telephone systems). The FPM will include the activation estimate on NASA Form 1509. For discrete projects, the Long Form Writeup also includes the activation costs and scope.

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# Chapter 4. Construction

## 4.1 Acquisition of Construction

The designated Contract Officer (CO) is the only person with authority to obligate the Federal Government in acquiring and executing contracts. The construction phase includes preparation of the acquisition package, advertisement, negotiation, contract award, construction management, construction inspection, change control management, commissioning, and activation startup. The FPM or designee represents the CO as the Contracting Officer's Technical Representative (COTR) within the limitations granted and responsibilities assigned by the CO. The project team shall continue to provide support during this phase, especially during the change control process.

## 4.2 Preparation of the Acquisition Package

The CO shall provide direction for the required content of the acquisition package; however, at a minimum, it will include a Government cost estimate, the design documents, and either funds or a planning purchase request with the funds source identified (see paragraph 1.3.16.3., Requesting Funds).

## 4.3 Advertisement

Facility project acquisitions shall comply with the FAR and the NASA FAR supplement. For CoF projects, the acquisition process will begin only after the Authority to Advertise has been received from HQ FERPD. Funds and/or authority to advertise prior to receipt of funds may be requested when the final design is 90-percent complete and the following are submitted via a CoF Routine Transaction Form:

- a. A locally approved and signed NASA Form 1509 and 1510 for each project,
- b. For discrete projects, the approved Facility Project Management Plan (see paragraph 2.2.4.2., Facility Project Management Plan) submitted by the FPM or COTR.

## 4.4 Receipt of Bids or Negotiation

The CO is responsible for bidding and negotiating construction contracts, but the COTR shall provide technical support and advice at the CO's request.

4.4.1 The COTR shall prepare and submit the NASA Form 1579, Flash Bid Report, to FERPD immediately following the bid evaluation and the CO's acceptance of the bids as responsive.

## 4.5 Contract Award

Contract award is the CO's responsibility. The COTR may be called upon to provide assistance prior to and during the award process.

## 4.6 Construction Management

During the administration of the construction contract, the COTR shall perform partnering for all facilities projects as defined in NFS Subpart 1836.70, Partnering, 48 CFR Chapter 18 (<http://www.hq.nasa.gov/office/procurement/regs/1836.doc>).

4.6.1 The COTR shall apply change controls during the preconstruction conference (or immediately after the notice to proceed is issued) to ensure all involved with the contract understand who is responsible for directing changes and how they will be administered.

4.6.2 Either the CO or the COTR shall brief all project stakeholders on contract administration and change control procedures.

4.6.3 The COTR also shall carry out the following:

- a. Ensure the facility is constructed in accordance with the contract documents.
- b. Prepare and process status reports and inspection logs.
- c. Review contractor safety and health plan with representatives from Center occupational safety and health organizations.
- d. Review and approve contractor submittals.
- e. Process contractor requests for progress payments and requests for information.
- f. Review and approve change requests.
- g. Maintain the project Current Cost Estimate (CCE), highlighting approved and potential changes in the project cost and schedule.
- h. Ensure the preparation and delivery of O&M instructions; Reliability Centered Maintenance (RCM), PT&I, and CMMS information; and as-built drawings.
- i. Use the Reliability Centered Building and Equipment Acceptance Guide (see <http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/RCB&EGuideJUL04.pdf>) during the final inspection and acceptance of installed systems.
- j. Prepare or oversee the preparation of real property vouchers and transfer documents.
- k. Complete final project closeout.

## 4.7 Real Property Capitalization

After acceptance of the project is accomplished, the FPM and the COTR assist the Center Real Property Accountable Officer (CRPAO) in capitalizing and classifying the real property. The FPM and the COTR, with guidance from the CRPAO, shall fill out NASA Form 1046, Transfer and/or Notification of Acceptance of Accountability of Real Property (see [https://pollux.hq.nasa.gov/nef/user/form\\_search\\_list.cfm?prefix=all&search\\_type=n&chart\\_number=1046&chart\\_number\\_like=Like](https://pollux.hq.nasa.gov/nef/user/form_search_list.cfm?prefix=all&search_type=n&chart_number=1046&chart_number_like=Like)). This form is required for new construction, building additions, and other significant changes to real property.

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# Chapter 5. Activation

## 5.1 Activation

Facility activation involves the completion of facility projects, including facility outfitting, subsystems and integrated systems tests, final inspection and acceptance, final cost closeout, and release to the customer and O&M organizations.

## 5.2 Facility Outfitting

Projects or tasks associated with facility outfitting cannot be funded with CoF funding (see Appendix A, "outfitting"). Outfitting includes the following items:

- a. Noncollateral equipment installation.
- b. Data systems installation.
- c. Systems furniture installation.
- d. Telephone installation.
- e. Furniture and equipment move in.
- f. Personnel move in.
- g. Maintenance services startup.

## 5.3 Beneficial Occupancy Prior to Completion

With CO approval, beneficial occupancy of the facility or a portion of the facility may be allowed prior to final acceptance. The CO shall provide the contractor with a list of outstanding work for those areas the Government intends to use. Taking beneficial occupancy does not absolve the contractor from completing the contractual agreement.

## 5.4 Completion and Acceptance of Installed Systems

The COTR shall ensure inspections and tests are performed for equipment and installed systems to validate

<http://www.hq.nasa.gov/office/codej/codejx/RCBE0201Final.doc> compliance with O&M requirements identified in the Facility Project Management Plan (see paragraph 2.2.4.9) and the Reliability Centered Building and Equipment Acceptance Guide (see <http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/RCB&EGuideJUL04.pdf>).

## **5.5 O&M Manuals and Training**

During the activation phase, the FPM shall ensure that the O&M staff are trained on and provided with O&M manuals for installed systems and equipment.

5.5.1 For real property, funding for this effort will be in the CoF budget.

5.5.2 For noncollateral equipment and systems, funding will be from activation budget source(s).

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## Appendix A. Definitions

**A-1 Activation** -- the portion of the total facility acquisition process that normally follows construction. It includes the installation of ground support equipment, the integration and checkout of combined facility and equipment systems, installation of noncollateral equipment, and demonstration and acceptance of an operable facility.

**A-2 Addition, Expansion, Extension** -- a physical increase to a real property facility that adds to the overall dimension of the facility.

**A-3 Administrator** -- the top executive of NASA.

**A-4 Agency** -- any executive department, commission, authority, administration, board, or other independent establishment in the executive branch of the Federal Government, including any corporation wholly or partly owned by the United States and which is an instrumentality of the United States. The term as used herein does not include the municipal government of the District of Columbia.

**A-5 Apportionment** -- act of distributing according to a plan or set apart for a special purpose. OMB is responsible for apportioning NASA's appropriated funds.

**A-6 Appropriation** -- statutory authority that allows Federal agencies to incur obligations and make payments out of the U.S. Treasury for specific purposes. An appropriation usually follows enactment of authorizing legislation. The following is a list of typical appropriation terms:

a. **Annual Appropriation** -- an appropriation that is available for incurring obligations only during one fiscal year specified in the annual Appropriation Act.

b. **Continuing Appropriation** -- an authority to incur obligations until funds are exhausted or to achieve a specific objective.

c. **Current Appropriation** -- an appropriation that is available for obligation during the current fiscal year.

d. **Lump Sum Appropriation** -- an appropriation in a specified amount made for a complete program without prescribing limitation of outlays within the stated purpose and amount.

e. **Multiple-Year Appropriation** -- an appropriation that is available for incurring

obligations for a definite period in excess of one fiscal year (e.g., CoF).

**f. No-Year Appropriation** -- an appropriation that is available for incurring obligations for an indefinite period of time.

**g. One-Year Appropriation** -- an appropriation available for obligations only during one specified year.

**A-7 At-Risk Project** -- a project for which one of the following applies:

a. Final design has not started by the end of May preceding the fiscal year in which the project is proposed for Congressional authorization, or not completed by February of the fiscal year in which the project was authorized and appropriated.

b. The project scope as presented to Congress has significantly changed.

c. Construction award has not been made or is not scheduled to occur by June of the fiscal year in which the project was authorized and appropriated.

d. Modification projects that are not awarded within six months after the date of release of the construction funds. (See "Modification.")

Funding allocation may be lost when a project is at risk. The resources allocated to an at-risk project can then be made available for satisfying shortages in Congressional appropriations or be used to fund projects at locations where resources will be obligated in a timely manner.

**A-8 Authorization** -- is a legislative act authorizing money to be spent for Government programs that specify a maximum spending level without provision for actual funds.

**A-9 Beneficial Occupancy Date** -- the date a contractor releases and NASA accepts occupancy of a facility or portion of a facility.

**A-10 Bid Opening Date** -- the date when all sealed bids must have been received by the Government and when all bids are opened and recorded for an Invitation for Bid.

**A-11 Brief Project Document** (NASA Form 1509) -- See Facility Project-Brief Project Document.

**A-12 Budget** -- a formal estimate of future revenues, obligations to be incurred, and outlays to be made during a defined period and, when determined to be appropriate, based on accrued expenditures and costs to be incurred.

**A-13 Budget Cycle** -- the period that elapses from the initiation of the budget process to the completion of the budget process for a particular fiscal year.

**A-14 Budget Estimate** -- a fund requirement for any element included in a budget. Collectively, all estimated fund requirements for a particular operating agency or

component or consolidation thereof.

**A-15 Budget Process** -- the process encompassing all phases of funding formulation through execution.

**A-16 Budget Year** -- the fiscal year of execution, covering the period from October 1 through September 30 (see "Fiscal Year").

**A-17 Category A** -- used for minor projects to indicate that the requirement for the project was included in a Congressional budget submission. For substitution projects, see "Modification."

**A-18 Centers** -- primary NASA field installations, each led by a Center Director. The following are Centers:

- a. Ames Research Center (ARC).
- b. Dryden Flight Research Center (DFRC).
- c. Glenn Research Center (GRC) at Lewis Field.
- d. Goddard Space Flight Center (GSFC).
- e. Jet Propulsion Laboratory (JPL).
- f. Johnson Space Center (JSC).
- g. Kennedy Space Center (KSC).
- h. Langley Research Center (LaRC).
- i. Marshall Space Flight Center (MSFC).
- j. Stennis Space Center (SSC).

**A-19 Center Director** -- the top executive at a NASA Center.

**A-20 Change in Scope** -- a change in objectives, work plans, or schedules that results in a material difference from a prior approval from a higher authority.

**A-21 Change Order** -- a written direction from the CO to the contractor modifying the contract as awarded.

**A-22 Chief Financial Officer** -- the official in charge of all fiscal and financial plans and operations.

**A-23 Collateral Equipment (also see "Noncollateral Equipment")** -- building support equipment and large, substantially affixed equipment/property. It is normally acquired and installed as a part of a facility project and includes the following:

- a. Building support equipment that normally is required to make a facility useful and

operable. It is built in to the facility, and its removal would impair the usefulness, safety, or environment within the facility (e.g., elevators, transformers, compressors, heaters, ventilators, and air-conditioners). It also includes systems and subsystems, such as electrical, plumbing, pneumatic, fire protection, fire suppression, control systems, and monitoring systems.

b. Large, substantially affixed equipment or property of any type other than building support equipment that is built in such that the installation costs including building envelope modifications, special foundations, and utility service exceed \$300,000.

**A-24 Completion Date** -- when the Government formally accepts an item of work from a contractor. The date on which the Government accepts all contract deliverables is the contract completion date.

**A-25 Component Facilities** -- NASA installations geographically separated from the NASA Centers to which they are assigned (see "Centers"). The Component Facilities annotated with their assigned NASA Centers are as follows:

- a. **Deep Space Network** -- Goldstone, CA; Canberra, Australia; Madrid, Spain; (JPL).
- b. Ground Network at KSC (GSFC).
- c. Independent Verification and Validation Facility (IV&V) (GSFC).
- d. Michoud Assembly Facility (MAF) (MSFC).
- e. NASA Management Office (NMO)/JPL (HQ/Science Mission Directorate).
- f. Palmdale (JSC).
- g. Plum Brook Station (PBS) (GRC).
- h. Santa Susana Field Laboratory (MSFC).
- i. Space Network (White Sands, NM) (GSFC).
- j. Wallops Flight Facility (Wallops Island, VA) (GSFC).
- k. White Sands Test Facility (WSTF) (JSC).

**A-26 Computerized Maintenance Management System (CMMS)** -- computer software that is used to monitor, plan, and schedule facility and equipment maintenance functions. They provide historical data, report writing capabilities, job analysis, and more. The data describes equipment, parts, jobs, crafts, costs, step-by-step instructions, and other information involved in the maintenance effort. This information may be stored, viewed, analyzed, reproduced, and updated with just a few keystrokes. The maintenance-related functions typically include the following:

- a. Facility/equipment inventory.

- b. Facility/equipment history.
- c. Work input control.
- d. Job estimating.
- e. Work scheduling and tracking.
- f. Preventive and predictive maintenance.
- g. Facility inspection and assessment.
- h. Material management.
- i. Utilities management.

**A-27 Constructability** -- a review of the design documents from a practicality, cost effectiveness, and efficiency perspective. The review includes verifying the integration of the drawings with the various professional disciplines and clarity of the design. It also includes review for maintainability and operability.

**A-28 Construction** -- the erection or modification of real property required to support a new capability, including additions, sidewalks, parking lots, driveways, and upgrades. This includes alterations to existing facilities that change the original purpose of the facility (e.g., remodeling a warehouse, or portion thereof, into office space).

**A-29 Construction Contractor** -- a business entity (i.e., person, corporation, partnership, or joint venture) that has satisfied the CO that they are qualified to perform the work as described in the construction contract documents.

**A-30 Construction of Facilities** -- a NASA corporate program that funds planning for future facility needs, design of facilities projects, revitalization projects (repair, rehabilitation, and modification of existing facilities), construction of new facilities, and acquisition of collateral equipment.

**A-31 Contingency (Construction)** -- an allowance included in a construction cost estimate to cover uncertainties during the construction phase of the project, such as changes in site conditions and construction interferences.

**A-32 Contingency (Design)** -- an allowance included in the engineering estimate to allow for added unanticipated costs due to design uncertainties and incomplete or changing user requirements.

**A-33 Contract** -- either an agreement or an order for the acquisition of supplies or services signed by a CO.

**A-34 Contract Award Date** -- the date the CO signs the contract.

**A-35 Contract Officer** -- any person who has the authority to acquire, administer, or