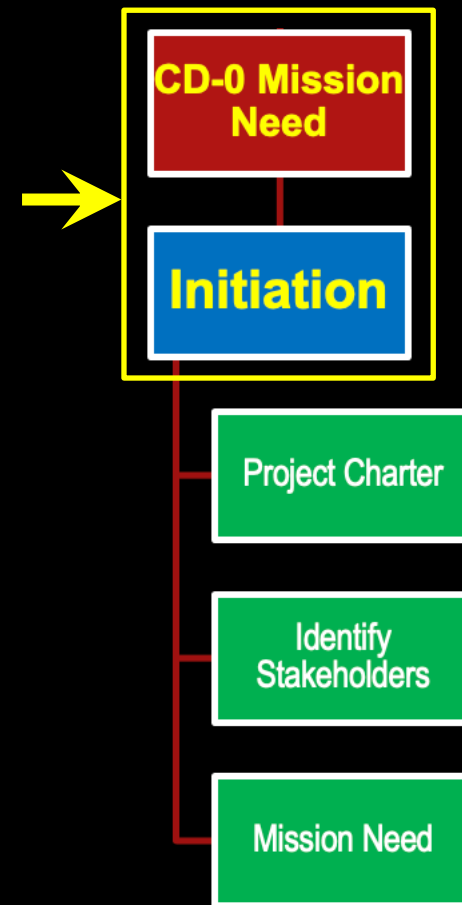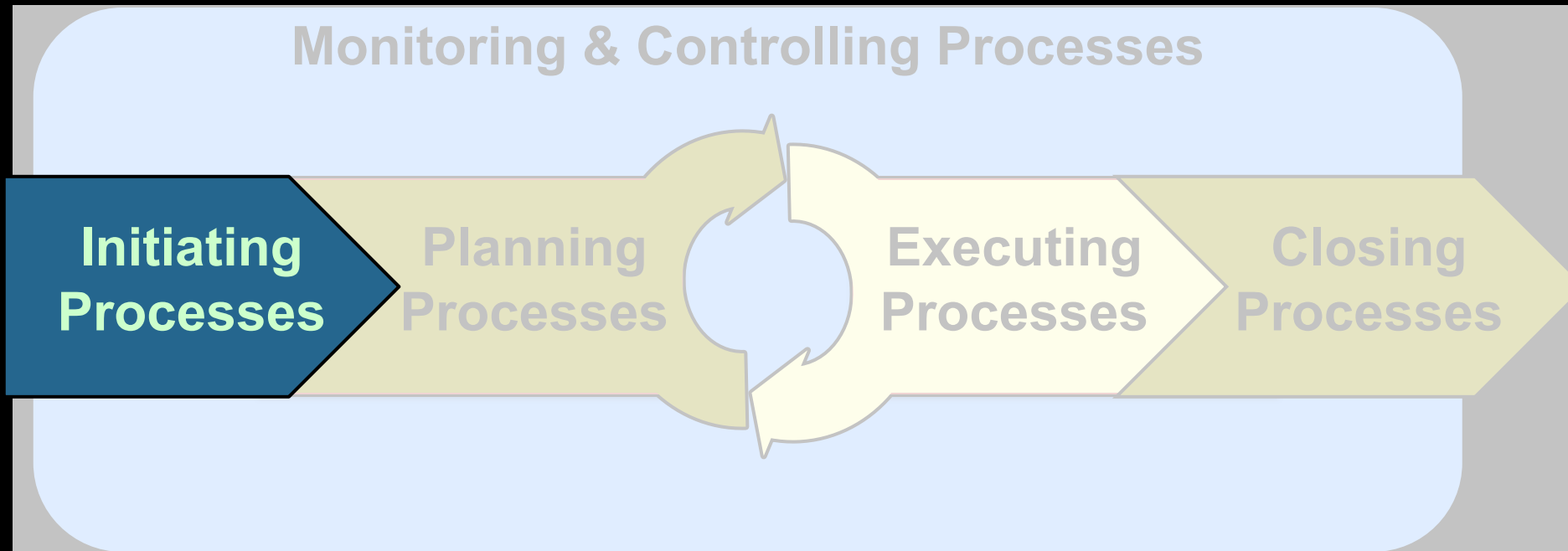# Project Initiation
CD-0 Mission Need

Rule #15: the seeds of problems are laid down early. Initial planning is the most vital part of a project. The review of most failed projects or project problems indicate the disasters were well planned to happen from the start.
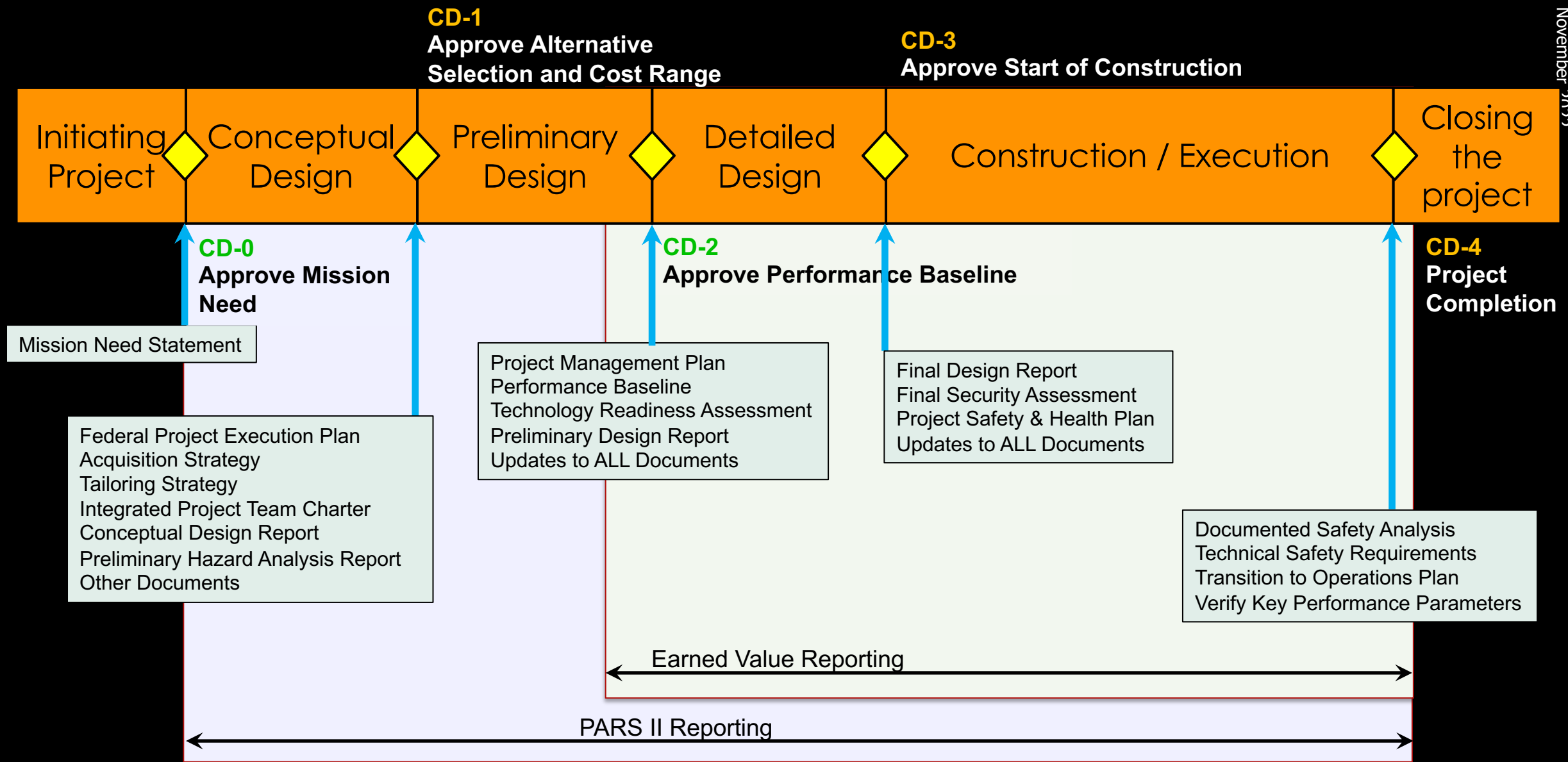
– One Hundred Rules for NASA Project Managers
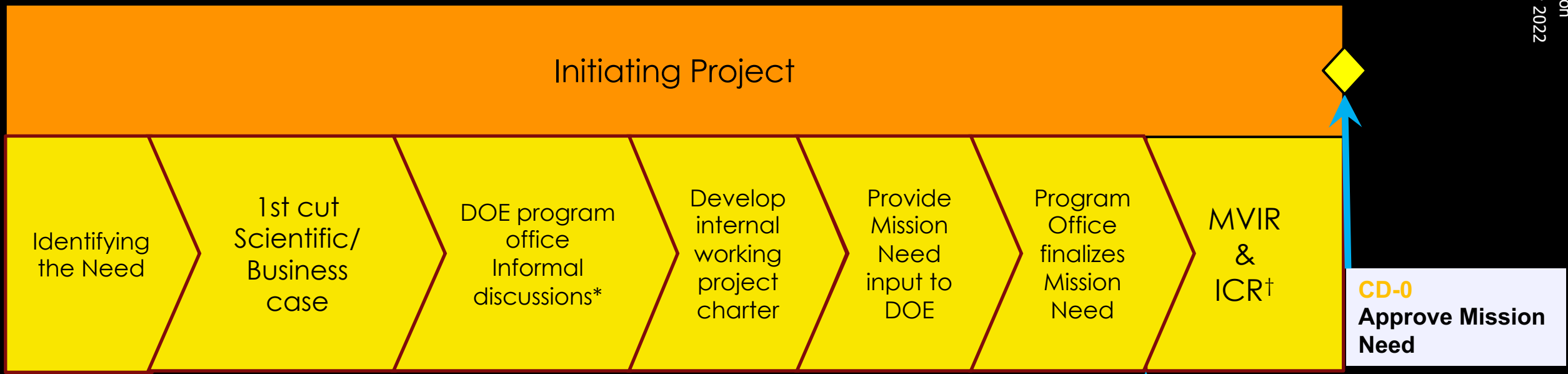
Project Management Process Groups

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DOE 413.3B Timeline – Initiation Emphasis

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CD-1
Approve Alternative Selection and Cost Range

CD-3
Approve Start of Construction

Initiating Project	Conceptual Design	Preliminary Design	Detailed Design	Construction / Execution	Closing the project

CD-0
Approve Mission Need

CD-2
Approve Performance Baseline

CD-4
Project Completion

Mission Need Statement

Project Management Plan
Performance Baseline
Technology Readiness Assessment
Preliminary Design Report
Updates to ALL Documents

Final Design Report
Final Security Assessment
Project Safety & Health Plan
Updates to ALL Documents

Federal Project Execution Plan
Acquisition Strategy
Tailoring Strategy
Integrated Project Team Charter
Conceptual Design Report
Preliminary Hazard Analysis Report
Other Documents

Documented Safety Analysis
Technical Safety Requirements
Transition to Operations Plan
Verify Key Performance Parameters

Earned Value Reporting

PARS II Reporting

Project Timeline in DOE 413.3B – Getting CD-0

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Initiating Project

Identifying the Need → 1st cut Scientific/ Business case → DOE program office Informal discussions* → Develop internal working project charter → Provide Mission Need input to DOE → Program Office finalizes Mission Need → MVIR & ICR†

CD-0 **Approve Mission Need**

Mission Need Statement

Often includes a whitepaper

MVIR: Mission Validation Independent Review
ICR: Independent Cost Review†

†For projects >$750M only

Project Initiation

► A project manager will be dogged by poor project initiation throughout the entire lifecycle of a project

► Proper initiation and planning are among the most important aspects of project management

► Frequently, during the development of projects (science in particular), project initiation is given only passing attention as focus is on justification

Shortcomings in Front End Loading Phases Account for Nearly All Project Failures

► Opportunity shaping (Business Case/Deal/Feasibility Study)

1. Understanding the context

2. Assessing the potential value

3. Assessing comparative value

4. Identifying and understanding stakeholders

5. Thinking about partners

► Additional outcome aspects

► Stakeholders solidified

► Stable project environment

► Verified value in project

► Kill criteria

► Final Closure

PMI Initiating Process Group

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► Develop project charter

► Develop preliminary project scope statement

  ► Equivalent to whitepaper and/or early proposal

► Identify Stakeholders

Initiation – Project Definition

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► Initial project definition is essential

  ► Success criteria

  ► Project limits

  ► Constraints

  ► Assumptions

  ► Background

  ► Objectives

  ► Deliverables

Initiation – Team Conception

► Initial team definition is essential

   ► Project team leadership

      ► Project Manager

      ► Subproject team leaders

   ► Roles and responsibilities

   ► Principal Stakeholders

   ► Project Sponsor

   ► Steering Committee
(Change Control Board)

Initiation – Project Charter

► The vehicle for capturing the project and team definition is the charter

  ► Draws thoughts of the team together

  ► Single documented summary of project

  ► Focus of for project discussions throughout lifecycle

  ► Shields the project team and management

Project Charter

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► The project charter is the *whitepaper* of a project

► If a scientific endeavor includes a project and submits a scientific whitepaper a project charter should be developed as well

- ► The project charter may or may not be submitted with the whitepaper

- ► The project charter documents the *boundary conditions* of the project

Project Charter – from Nicholas & Steyn

For *internal* projects, the charter describes the project to stakeholders.

- Sometimes it is used to generate interest in a proposed project
- Often it is used to announce authorization of an approved project in the organization and establish the project manager's authority to gather and make use resources
- It provide a good overview of the project and may include
  - the project objectives and scope
  - stakeholders and their stakes,
  - estimated budget and schedule
  - risks
  - assumptions and constraints
  - resources
  - key roles and the people them.
- Sometimes it is used as the project plan*; more commonly it is somewhat brief

*for smaller projects

Project Charter – from Nicholas & Steyn (cont.)

- ## Charter [may be] the scope document *internal* projects

  - ❏ May include everything in Scope Statement plus

    - ■ risk limits

    - ■ customer needs

    - ■ spending limits

    - ■ key players on project team.

  - ❏ Issued by senior management to legitimize project

  - ❏ Gives project manager authority to initiate work and apply resources to project

Charter Contents – Nicholas & Steyn

- Background
- Project Objectives
- Scope or SOW
- Deliverables
- Assumptions
- Constraints
- Approach
- Schedule
- Project Team
- Risk
- Management Plan

Project Charter – Aspects: No Surprises

Item	Comment
Project Name	Everyone associated with the project should call it the same thing
Project Abstract	A 3-sentence statement concerning the project • 1st states what the project is • 2nd states what the project will accomplish • 3rd indicates what benefit will be derived from the project
Project Sponsor(s)	Responsible for budgeting the funds to undertake the project and will have final authority to approve project completion. What structural, framing or other aspects will be imposed by sponsor(s)?
Funding Source(s)	List all anticipated funding sources
Project Champion(s)	List institutional supporters external to project
Organization	Describe the anticipated organization structure. Is it a collaboration? What institutions are involved? What groups within institutions are involved? Is there a separate organization for scientific research?
Participants	To the extent known, who are the principal individuals involved?
Project Management Team	Who is principally responsible for the organizing and managing of the project? Is there a distinction between scientific research conduct and project management?
Stakeholder List	Who are likely to be the stakeholders requiring specific engagement and management

Project Charter Considerations (cont.)

Item	Comment
Project Background	Motivation, and short summary reasons for the project (scientific background)
Scope	Description of what is included and excluded from the project
Objectives	List of specific objectives the project is anticipated to achieve
Deliverables	Specific items expected from the project and how they fulfill the objectives. Must be tangible.
Initial working Key Performance Parameters (KPP)	Initial listing of critical end performance objectives of the project
Constraints	Limiting factors to project and team options
Assumptions	A factor (aspect, factor, or situation) that is considered to be true, real, or certain, without proof or demonstration and considered necessary for a successful project
Risks	Initial short list of technical and external risks which would threaten successful completion of objectives. (Don't bother with funding risks at this point)
Special Institutional Commitments	Are any special commitments being made by any institution. For example, facilities, special overhead rates, etc.
ROM Budget & Profile	Rough order of magnitude budget for project including rough spend plan (if multiple budget cycles)
ROM Schedule	Rough order of magnitude schedule for project including rough key milestones (if multiple planning cycles)
Controls Reporting	Anticipated approach to monitoring/reporting and controlling project

Project Charter Flow

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► The project charter should be viewed as both a *gate* document and an *evolutionary* document

   ► It often has formal approvals/acknowledgments at some point (*gate document*)

   ► It progresses throughout the phases of the project

      ► Focus statement: Initial alignment of project with strategic objectives of the customer

      ► Project charter: Frames aspects of the project context

      ► Statement of Work (Scope Statement): Detailed version developed as proposal is accepted

Statement of Work / Project Charter
Similar but different focuses

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▶ The Project Charter / Mission Need will have a summary scope narrative

▶ The **Statement of Work** is a more complete narrative description of the products, services, work, and results to be accomplished on the project

▶ The statement of work should include:

  ▶ Project purpose

  ▶ Project objectives

  ▶ Performance measures

  ▶ Performance specifications

  ▶ Constraints on performance, funding, or schedule

    ▶ (limitations or needs)

  ▶ Assumptions underlying the project plan

▶ In a DOE/SC projects the statement of work is fully described in the **Conceptual Design Report** (post CD-0)

Project Charter Questions

► What is the difference between Constraints Assumptions and Requirements?

  ► Constraints are limiting factors that affects the execution of a project. Think of a constraint as an imposed restriction that will affect the performance/execution of the project.

  ► Assumptions are factors that, for planning purposes are considered to be certain, real, and true.

  ► Requirements are conditions or capabilities that are required to be present in a product, service, or result needed to meet successful project completion

Project Charter Questions

► Should the project timeframe be included in Objectives or Constraints?

   ► A timeframe should be included within Objectives if a project completion date is a stated goal of the project and/or time critical.

   ► Constraints should include a timeframe if it is an external restriction that will affect the performance of the project.

Checklist for Reviewing the Project Charter Objectives

► Are all objectives associated with the project specified?

   ► Are the intended impact or result of the project specified?

   ► **Are all of the key aspects of the deliverables to be produced specified?**

   ► **Is the date for project completion specified?**

► Are all of the objectives in written down?

► Is each project objective brief and to the point?

► **Is each project objective measurable?**

► Is all wording used, clear and easily understandable?

"Assume nothing. Trust, but verify."

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► **Do you feel that it is within your control to accomplish each of the stated project objectives?**

► **Do you feel that it is possible to accomplish each of the stated project objectives?**

► Will the achievement of any one project objective make it impossible to achieve one or more of the other stated objectives?

► **Have key project stakeholders reviewed and agreed to all project objectives?**

Checklist for Reviewing the Project Charter Constraints

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► Are there constraints regarding the time by which all project work must be completed?

► Are there constraints on the availability of needed project staff?

► Are there constraints on the availability of equipment needed to perform the project?

► Are there any other projects with which the project must interface?

► Are there any constraints regarding the way in which the project must be made operational?

► **Are there any constraints regarding the general strategy which can be used to meet the project objectives?**

► **Are all the known constraints documented?**

Checklist for Reviewing the Project Charter: Troubleshooting

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► Were any audiences uneasy about signing off on one or more of the objectives?

► Do there appear to be any hidden objectives that people might not want to identify?

► Is the situation which created the impetus for the project likely to change?

► Are there any objectives for which it is difficult to develop appropriate and acceptable performance specifications?

Project Charter Questions

► What is the difference between Scope and Objectives?

    ► The Objectives are the overall goals for the project.

    ► The Scope is the work required to meet objectives.
       The Scope includes parameters stating what work will and will not be included.

CD-0 Mission Need

CD-0 Mission Need

Initiation

Project Charter

Identify Stakeholders

Mission Need

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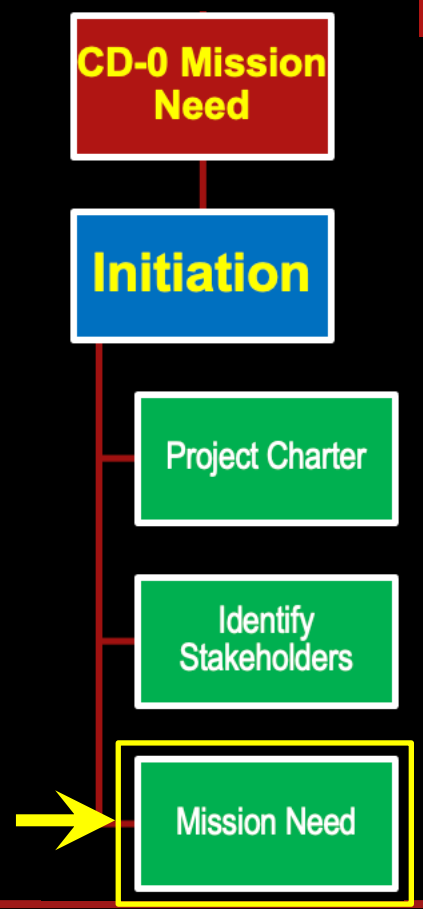
An Approved CD-0 Mission Need Statement is the Initiation Phase Deliverable

▶ Inputs to the Mission Need

  ▶ The internal business / scientific justification analysis

  ▶ The internal project charter

  ▶ Whitepaper/ proposal or other documentation used in discussions with DOE Program offices

Project Initiation and DOE – Getting to CD-0
The Mission Need Statement (MNS)

- ► The project charter is an **internal** document
  - ► Documents the organization's understanding, justification, and approach to the project
  - ► It typically goes hand in hand with a business justification
- ► The Mission Need Statement (MNS) is a **DOE** document, but…

  … the laboratory project team must provide the input

- ► The Mission Need Statement is the DOE justification and *its charter* for the project
- ► MNS Sections (DOE/SC-OPA Template)
  - ► 1. Mission Need
  - ► 2. Capability Gap / Mission Need
  - ► 3. Potential Approach
  - ► 4. Resource and Schedule Forecast
    - ► Cost
    - ► Schedule
    - ► Funding

will eventually inform a Mission Need Statement by the Department

Remember the ROM Trap:

- Natural and historical tendency of stakeholder to know "what will it cost."
- Desire to please stakeholder
- Incorrect assessment of political thresholds
- Insufficient contingency on top-down pre-conceptual ROMs
- Optimism Bias is ALWAYS present

- Remember:
  ROM = Rough Order of Magnitude **NOT** "*Right On the Money*"

Example

(2) Estimated critical decisions

Milestone Event	Fiscal Year
CD-0 Approval	FY 10
CD-1 Approval	FY 12
CD-2 Approval	FY 13
CD-3 Approval	FY 14
CD-4 Approval	FY 17

E. Resource and Schedule Forecast

Inputs to the cost estimate are based on extensive BES and contractor experience in building major light source facility projects.

(1) Initial cost range

The initial Cost range of this project is $300M to $400M. The initial cost range is based upon expert analysis and opinion from technicians, engineers, scientists, and accelerator physicists who have recently constructed and/or fabricated systems similar to those systems and components at the current facility that is being upgraded. They have used discussion with vendor and suppliers that they are familiar with to assist in the estimating process. The details and the TPC will continue to mature up to CD-2, Performance Baseline approval.

(3) Initial funding profile

The funding profile has been estimated for planning purposes only and has not been approved.

	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	Total
CDR and R&D (OPC)	$5M	$10M	$ 10M						$ 25M
Long-Lead Procurement (TEC)			$10M	$40M					$50M
Design & Construction (TEC)				$ 20M	$95M	$80M	$60M	$20M	$275M
Total Project Cost (TPC)	$5M	$10M	$ 20M	$ 60M	$95M	$80M	$60M	$20M	$350M

DOE/SC-OPA Mission Need Statement Caveats

► The DOE O 413.3B requires a MNS with the approval by the Program Secretarial Officer for projects with Total Project Cost of $50M or greater

► The site for the project is not selected until alternative analysis is complete (as part of the CD-1) process

  ► No site or laboratory logos, contract numbers, or other info that may be viewed as a site selection having already made

► The MNS is submitted by Headquarters Program Staff

► Funding forecast supports programmatic strategic planning efforts and budget requests for the five-year planning period

  ► Currently projected ROM funding profile with a breakout of OPC and TEC

  ► Should be based on the high-end project cost estimate

DECISION / REQUIREMENTS[1] / APPROVAL[2]		$750M or more	Less than $750M to $400M	Less than $400M to $100M	Less than $100M to $50M*	Less than $50M* to $20M	Less than $20M to $10M** Delegation Allowed
CD-0--APPROVE MISSION NEED		S-2 (CD-1 to 4 delegated)	SC-1	SC-1	SC-AD	SC-AD	SC-AD
PRIOR TO CD-0-- PRECONCEPTUAL PLANNING	Perform Pre-Conceptual Planning Activities	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Mission Validation Independent Review	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Approve Mission Need Statement	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-AD
	Conduct an Independent Cost Review (ICR) for Major System Project	PM	N/A	N/A	N/A	N/A	N/A
	For NNSA--Prepare a Program Requirements Document	N/A	N/A	N/A	N/A	N/A	N/A
	For Hazard Cat. 1,2,3 Nuclear Facility--Develop & approve a Preliminary Safety Design Strategy document	*Safety Basis Approval Authority (SBAA)*	*Safety Basis Approval Authority (SBAA)*	*Safety Basis Approval Authority (SBAA)*	*Safety Basis Approval Authority (SBAA)*	*Safety Basis Approval Authority (SBAA)*	*Safety Basis Approval Authority (SBAA)*
POST CD-0	Submit approved CD or equivalent documents to PM	SC-28	SC-28	SC-28	SC-28	SC-28	SC-28
	Submit request for PED funds. Prepare PDS and OMB 300s. MIE and O&E--request funding.	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Proceed with Conceptual Design using Operating funds	Project	Project	Project	Project	Project	Project
	Start monthly status PARS II reporting	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)
	Start Monthly or Quarterly Project Reporting/Meeting	SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-2 and SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28

PRE CD-0

► Preform Pre-Conceptual Planning

► Mission Validation Independent Review (MVIR)

► Independent Cost Review (ICR) [>$750M only]

► Approve Mission Need Statement

POST CD-0

► Approved CD-0 submitted to DOE-PM

► PED Request

► Project Data Sheet and OMB 300

► Start Conceptual Design with Operating funds

► Project reporting/meeting & Monthly PARS-II reporting

- Mission Validation Independent Review – conducted by program offices

  MNS Adequate?

  High level requirements defined?

  TPC and Schedule Range Adequate?

- Budget Profile Planning fit within the Program and Administration priorities

- Establishing PARS II Reporting

- OMB 300 or Construction Project Data Sheet (submitted to Congress)

- Project Data Sheet for Preliminary Engineering & Design (PED) funds

- Operations Funding if Project is a Major Item of Equipment (MIE).

MVIR SLI Charge example

► Purpose is to review in support of the MNS preparation:

  ► Assess the current capability gaps,

  ► Potential benefit

  ► Preliminary cost range

► Mission Need:

  ► Is the documentation adequate to confirm the project will address a specific capability gap, risk, and/or impediment to the execution of Office of Science mission?

► Program Requirements:

  ► Are high-level requirements sufficiently defined to identify preliminary alternatives to address the capability gap, risk, and/or impediment?

  ► Are the preliminary alternatives reasonable for this stage?

► Cost Range and Schedule:

  ► Are the preliminary cost range and preliminary schedule reasonable for this stage of the project?

  ► Does the cost range bound the preliminary alternatives deemed to be viable?

  ► Is planning for this project being appropriately coordinated to ensure that it does not interfere with ongoing operations or projects?

▶ **[TJNAF: CEBAF Renovation and Expansion (CRE) Project](#)**

▶ **[SLI Example #1](#)**; **[SLI Example #2](#)**

Assignment: Project Teams

► You will each be assigned into a project team

► Each project team will develop two projects

   1. Scientific/Engineering or Facilities construction project from target projects

   2. A weeklong SuperKEKB site visit for understanding of project and facilities management challenges of the upgrade project plus an additional week of personal travel

► These example projects will be used to highlight various aspects of the project management throughout the course

Breakout activity – Charter / MNS development

1. Biosciences program building with wet labs, roof greenhouse, ground floor field deployment area
2. Climate change / seismic retrofit of existing laboratory building
3. Advanced Concept Synchrotron Radiation Storage Ring
4. COSY – Several ion sources into Ion storage ring; modifications to existing facility
5. CUBIX – Inverse Compton Scattering Experiment and facilities
6. Decommission & Demolition (D&D) of old accelerator and building
7. DIANA – Ion accelerator located in a deep underground laboratory
8. ELISA Electrostatic Storage Ring
9. Helium liquification plant for support of a major scientific facility
10. New hard x-ray beamline with hutches, facility modifications, large-scale precision goniometer
11. Isotope Linac and facility
12. Low temperature surface physics and engineering program building
13. LUX – Recirculating SRF ling for fsec synchrotron radiation
14. New computing server building
15. New Office building and numerous dry lab spaces and precision assembly area
16. Site-wide underground utilities upgrade (electrical, gas, water, sewer, storm drain)
17. Visible Oscillator Experiment – Linac-based FEL Oscillator and facility

2nd Project: Site Visit, Trip and Case Study

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► Site visit to SuperKEKB to understand their approach to managing and implementing the major upgrade project.

► Final closeout required within 6 months of start but no later than 28 June 2023

► Sponsor Objective:

  ► Provide a full case study report on the SuperKEKB upgrade with documented

    ► Lessons learned

    ► Challenges

    ► Risks, threats, opportunities, issues encountered

    ► Developmental approaches (R&D within project)

    ► Funding constraints

    ► Systems and technical management and design development

    ► Facility upgrades, repairs, retrofits post 2011 9.0 earthquake

► Sponsor Approved Approach:

  ► 1-week (5 working days) site visit to KEK in Tsukuba, Ibaraki, Japan

  ► Additional 1-week allowed for personal travel

  ► Video conference with initial findings prior to departure from Japan by entire project team

Assignment: Target Project

▶ Complete a charter for a project of chosen for your team

(A sufficiently detailed description of what you intend to do as a project is also necessary in order to do this)

▶ Complete a bulleted Mission Need Statement

▶ Summary bulleted Statement of Work

▶ List 10 requirements for the project and (initial basis for requirements/acceptance document)

  ▶ Develop an initial task list with a minimum of items for the project (initial basis of WBS)

  ▶ List 10 risk/issues list the project (initial basis for risk registry)

▶ **N.B.: Choose your project carefully as your team will take it through the entire planning process**

Assignment: Site Visit, Trip, and Case Study

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- ► Develop charter,
- ► Requirements
- ► Initial scope
  - ► Pre-visit
  - ► Site visit
  - ► Personal Travel
  - ► Initial Video Report
  - ► Final Oral/Written report