National Nuclear Security Administration

CMRR Project - PEI1 Subproject
Los Alamos National Laboratory

Project Execution Plan

Major System Acquisition Project

CMRR-PLAN-00018, R1

July 2017

☒ Unclassified ☐ Restricted Data ☐ Confidential ☐ Formerly Restricted Data ☐ Secret ☐ National Security Information ☐ Unclassified Controlled Nuclear Information ☐ Official Use Only	**Derivative Classifier:** **Name:** Amy Wong **Title:** Program Manager **Date:** 7/13/17 **Derived from:** CG-SS-5, July 2016, DOE-OC

REVISION 1 ADMINISTRATIVE CHANGE APPROVAL SIGNATURES

U.S. Department of Energy and the National Nuclear Security Administration

Approved by:

Everett Trollinger
Director, CMRR Project Management Office, NA-APM 1.5
CMRR PEI1 Federal Project Director
National Nuclear Security Administration

7-14-17
Date

Submitted by:

Rayford Patterson
CMRR Project Manager

Los Alamos National Laboratory

7/13/17
Date

Submitted by:

Craig Bachmeier
PEI1 Area Project Manager
Los Alamos National Laboratory

7/13/17
Date

APPROVAL SIGNATURES

U.S. Department of Energy and the National Nuclear Security Administration

Approved by:

Frank G. Klotz
Administrator, NA-1
National Nuclear Security Administration

10/31/2016
Date

Concurred by:

Philip T. Calbos
(Acting) Deputy Administrator
for Defense Programs, NA-10
National Nuclear Security Administration

10/21/16
Date

Concurred by:

Robert Raines
Associate Administrator for Acquisition
and Project Management, NA-APM
National Nuclear Security Administration

19 OCT 16
Date

Recommended by:

Michael Thompson
Assistant Deputy Administrator for
Major Modernization Programs, NA-19
National Nuclear Security Administration

10/21/16
Date

Recommended by:

POR

John P. Michele
Plutonium Program Manager, NA-196
National Nuclear Security Administration

10/19/16
Date

APPROVAL SIGNATURES

U.S. Department of Energy and the National Nuclear Security Administration

Concurred by:

Kimberly D. Lebak
Manager
NNSA Los Alamos Field Office, NA-LA

10/3/16
Date

Concurred by:

Jody Pugh
Assistant Manager
National Security Missions
NNSA Los Alamos Field Office, NA-LA

9.26.2016
Date

APPROVAL SIGNATURES

For Los Alamos NNSA CMRR Project Management Office

Concurred by: _____ 9-26-2016
Everett Trollinger — Date
Director, CMRR Project Management Office, NA-APM 1.5
CMRR PEI1, Federal Project Director
National Nuclear Security Administration

Concurred by: _____ 9-26-2016
Teresa King — Date
Branch Chief, Los Alamos Office
Albuquerque District
U.S. Army Corps of Engineers

APPROVAL SIGNATURES

For Los Alamos National Laboratory

Concurred by:

Richard Kacich
Deputy Laboratory Director
Los Alamos National Laboratory

10-24-16
Date

Concurred by:

Larry Simmons
Principal Associate Director for Capital Projects
Los Alamos National Laboratory

10/24/16
Date

Concurred by:

Dr. Robert Webster
Principal Associate Director for Weapons Programs
Los Alamos National Laboratory

10/24/16
Date

Concurred by:

Dr. Craig Leasure
Principal Associate Director for Operations and Business
Los Alamos National Laboratory

10/24/2016
Date

Concurred by:

Jeffrey Yarbrough
Associate Director for Plutonium Science and Manufacturing
Los Alamos National Laboratory

10-24-16
Date

HISTORY OF REVISIONS

Document Number	Document Date	Action	Description
CMRR-PLAN-00018, R0, Draft	March 2016	New Document	The document was created for CD-2/3 (Reference CMRR-CD-00037) to evolve from the CD-1 PPEP CMRR-PLAN-PM-1901, R2 to PEP dedicated to performance measurement baseline for execution of PEI1 work.
CMRR-PLAN-00018, R0	October 2016	Finalize Rev 0 for CD-2/3 ESAAB	Rev. 0 Draft was issued with CD-2/3 Request Package. Rev. 0 was finalized to address CD-2/3 EIR Major Findings.
CMRR-PLAN-00018, R1	July 2017	Administrative Revision	• Revisions:Updated scope, cost, and schedule data throughout to reflect values and dates within the CD-2/3 Baseline implementation • Updated NNSA Risks • Added Baseline Change Control Log to as Appendix B • Minor editorial changes

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ACRONYMS AND ABBREVIATIONS

AC	analytical chemistry
ACWP	actual cost of work performed
ADPM	Associate Directorate for Project Management
ADPSM	Associate Directorate for Plutonium Science and Manufacturing
AE	Acquisition Executive
AFP	approved funding plan
AHJ	authority having jurisdiction
APM	area project manager
BCA	baseline change approval
BCCB	baseline change control board
BCP	baseline change proposal
BCR	baseline change request
BCWP	budgeted cost of work performed
CA	contingency allocation
CAM	Control Account Manager
CAPE	Department of Defense Office of Cost Assessment and Program Evaluation
CBB	contract budget base
CD	Critical Decision
CE	chief executive
CEFMS	Corps of Engineers Financial Management System
CFO	Chief Financial Officer
CIPT	Contractor Integrated Project Team
CMR	Chemistry and Metallurgy Research Building
CMRR	Chemistry and Metallurgy Research Replacement Project
COR	contracting officer representative
CPDS	Construction Project Data Sheet
CS-DO	Cost-Schedule Division Office
CSE	cognizant systems engineer
CSF	Construction Support Facility
D&D	decontamination and decommissioning
DA	design agency
DAR	design authority representative
DCF	design change form
DoD	Department of Defense
DOE	U.S. Department of Energy
DOR	division of responsibility
DSA	documented safety analysis
EAC	estimate at completion
EIR	external independent review
ES&H	Environment, Safety, and Health
ESAAB	Energy Systems Acquisition Advisory Board

ACRONYMS AND ABBREVIATIONS

ESM	Engineering Standards Manual
EVMS	Earned Value Management System
FIPT	Federal Integrated Project Team
FOD	facility operations director
FPD	Federal Project Director
FY	Fiscal Year
gPE	grams of Pu-239 equivalent
HAR	Hazard Analysis Report
HC	hazard category
ICE	independent cost estimate
INP	Integrated Nuclear Planning
IPR	Independent Project Reviews
IPT	integrated Project Team
ISSM	integrated safeguards and security management
IWD	integrated work documents
IWM	integrated work management
JET	Joint Evaluation Team
KPP	key performance parameter
LANL	Los Alamos National Laboratory
LBO	LANL building official
LCC	life cycle cost
LI	line item
LLW	low level waste
M&O	management and operating
MAR	material at risk
MC	materials characterization
ML	management level
MNS	Mission Need Statement
MR	management reserve
MS	major systems
MSA	management self-assessment
NA-APM	NNSA Office of Acquisition and Project Management
NA-LA	Los Alamos Field Office, NNSA
NDA	nondestructive analysis
NEPA	National Environmental Policy Act
NF	nuclear facility
NNSA	National Nuclear Security Administration
OPC	other project costs
PA	protected area
PADCAP	Principal Associate Directorate for Capital Projects
PADOPS	Principal Associate Directorate for Operations and Business

ACRONYMS AND ABBREVIATIONS

PADWP	Principal Associate Directorate for Weapons Programs
PARS II	Project Assessment and Reporting System II
PB	performance baseline
PC	performance category
PCM	Project Controls Manager
PDT	Project Delivery Team
PEI	PF-4 Equipment Installation Project (restructured to execute the scope under PEI1, PEI2, and RC3)
PEI1	PEI-Phase 1
PEI2	PEI-Phase 2
PEP	*Project Execution Plan*
PLRR	product line resource review
PM	Project Manager
PMB	performance measurement baseline
PMBP	Project Management Business Process
PME	Project Management Executive
PMO	Project Management Office
PMOA	Project Management Oversight and Assessments
PMP	Project Management Plan
PMRC	Project Management Risk Committee
PPEP	*Preliminary Project Execution Plan*
PQMP	*Project Quality Management Plan*
PR	purchase requisition
PRD	*Program Requirements Document*
PR-ID	permits requirements identification
PSI	Plutonium Strategy Infrastructure
PSO	Program Secretarial Officer
Pu	plutonium
PuPM	Plutonium Program Manager
QA	Quality Assurance
QMP	Quality Management Plan
R&R	reconfiguring and reusing
RAD	responsible associate director
RAMI	reliability, availability, maintainability, and inspectability
RAR	Risk Assessment Report
RC3	Re-categorizing RLUOB to Hazard Category 3 (Nuclear Facility)
RCD	requirements and criteria document
REI	RLUOB Equipment Installation
RIM	RLUOB Infrastructure Modifications
RLUOB	Radiological Laboratory and Utility Office Building
RMP	Risk Management Plan

ACRONYMS AND ABBREVIATIONS

RPA	Request for Project Authorization
REI2	RLUOB Equipment Installation Project Phase 2
RPV	replacement plant value
RWP	radiological work permit
S&S	safeguards and security
SAE	Secretarial Acquisition Executive
SC	safety class
SDD	systems design description
SDIT	Safety Design Integration Team
SII	Site Infrastructure Improvements
SME	subject matter expert
SNM	special nuclear material
SS	safety significant
SSC	systems, structures, and components
STR	subcontract technical representative
TA	technical area
TEC	total estimated cost
TPC	total project cost
TPRA	technical and programmatic risk assessment
TRL	technology readiness level
TTO	transition to operations
USACE	U.S. Army Corps of Engineers
USQD	unreviewed safety question determination
VA	vulnerability assessment
VE	value engineering
WBS	work breakdown structure
XRD	x-ray diffraction
XRF	x-ray fluorescence

PROJECT EXECUTION PLAN UPDATE AND REVISION PROCEDURES

1. **Terminology:** The following terms are used throughout to identify participants of the Chemistry and Metallurgy Research Replacement (CMRR) Project and associated subprojects:

   - The term "Project" refers to the CMRR Project and its various subprojects unless noted otherwise.
   - The term "Subproject" means one of the lower level and subordinate (but discrete) major scope elements within the CMRR Project as defined in Section 1 of this Project Execution Plan (PEP).
   - Federal Integrated Project Team (FIPT) refers only to the Department of Energy (DOE)/National Nuclear Security Administration (NNSA) integrated project team (IPT) members for the Project or Subproject
   - Contractor Integrated Project Team (CIPT) refers only to Los Alamos National Laboratory (LANL) IPT members for the Project or Subproject.
   - Project Team – this term will be used to identify any combination of FIPT and CIPT members.

2. **Distribution and Revisions:** Once approved, a copy of this Project Execution Plan (PEP) will be distributed to each member and organization of the CMRR Project Team. The Federal Project Director (FPD) will perform and control distribution of the PEP. This PEP will be periodically reviewed by the NNSA and the FPD, or (as requested) by the FIPT. Changes in approved technical scope, cost, or schedule baselines defined herein will require revision of the PEP. Revision approvals will require review and concurrence by the original parties or current office holders of the positions, or delegates. Minor changes, such as administrative, grammatical, typographical, and organizational errors, may be incorporated at the discretion of the FPD without further reviews.

3. **Responsibilities:** The FPD has lead responsibility for initiating and coordinating review and updates. Reviews and updates must be coordinated with the signatory offices. The formally appointed members of the IPT shall review and concur with the PEP. The FPD is responsible for maintaining a complete documented PEP history of changes or modifications, including reviews and review comments.

4. **Change Process:** This PEP shall be reviewed and updated at each Critical Decision (CD). Revisions and updates are classified into three categories. Revisions and updates are classified into three categories. For each category, a summary of revisions and changes will be documented in the Revision History section. The FPD is responsible for ensuring distribution of the final document to Project Team members and other involved organizations, as necessary.

   a. *Minor Administrative Changes:* Minor changes such as administrative, grammatical, typographical, organizational errors, and etc., may be identified by any member of the project team and brought to the FPD's attention. Acceptance of minor administrative corrections, revisions, etc., is at the FPD's discretion. Changes will be incorporated into the appropriate sections using a track change function or other tools to highlight the changes. Notification to the signatories of such changes may be at the next regular review or, if a significant number of changes are involved, a new revision will be generated.

b. *Project Baseline Changes:* Upon CD-2/3 authorization, appropriate updates and revisions will be incorporated to reflect Project changes. Changes within approved limits will be controlled through change control processes including baseline change requests (BCRs) and associated baseline change approvals (BCAs).
c. *Major Changes:* Major changes that require a full rewrite will be processed in the same manner as described in the above categories, as appropriate.

5. **Review Process:** The review process for updates/revisions may be completed either through normal hard copy/mail distribution or electronically through computer, at the FPD's discretion. In all cases, the most expeditious and efficient method shall be selected.

1 INTRODUCTION

The PEI1 PEP has been prepared in accordance with the Department of Energy (DOE) O 413.3B, Change 2, *Program and Project Management for the Acquisition of Capital Assets*, and associated DOE G 413.3-15, *Department of Energy Guide for Project Execution Plans*. It provides the management framework to guide execution of the Chemistry and Metallurgy Research Replacement (CMRR) Plutonium Facility-4 (PF-4) Equipment Installation-Phase 1 (PEI1) subproject at LANL.

The CMRR Project will install analytical chemistry (AC) and materials characterization (MC) equipment within existing facilities at LANL to meet the approved Mission Need Statement (MNS, CMRR-MNS-008-R2, July 2014), summarized as follows:

> "*The mission of the Chemistry and Metallurgy Research Replacement Project is to ensure continuity in enduring analytical chemistry and materials characterization capabilities for NNSA actinide-based missions in support of stockpile stewardship."*

A revised CD-1 was approved in August 2014 to begin the planning and execution of the CMRR scope under two separate subprojects:

- Radiological Laboratory/Utility/Office Building (RLUOB) Equipment Installation-Phase 2 (REI2)
- Plutonium Facility-4 (PF-4) Equipment Installation-Phase 1 (PEI1)

Revision 1 of the overall *CMRR Preliminary Project Execution Plan* (PPEP, CMRR-PLAN-PM-1901, Rev.1) was approved with the revised CD-1 in 2014.

In October 2015 the Energy Systems Acquisition Advisory Board (ESAAB) approved a restructuring of the CMRR Project to better execute the PEI scope and pursue expanding use of RLUOB for higher material at risk (MAR) activities. On November 25, 2015, direction was provided to restructure from two subprojects to four subprojects through memorandum between Elizabeth Sherwood-Randall (Deputy Secretary of Energy) to Frank G. Klotz (Under Secretary for Nuclear Security and NNSA Administrator), "Approval of Project Restructuring for the Chemistry and Metallurgy Research Replacement (CMRR) Project." Revision 2 of the CMRR PPEP was approved to define the subprojects within the bounds of currently approved revised CD-1. In addition the Sherwood-Randall memorandum, defining the four current active subprojects, requires each subproject have a standalone PEP.

Based on the restructuring of the CMRR Project, the overall mission need will be achieved through execution of six subprojects, as shown in Figure 1-1. With RLUOB and REI complete, the remaining work will be executed through the following four subprojects:

- REI2 – scope to support the programmatic milestone to cease operations in CMR
- PEI1 – scope to support the programmatic milestone to cease operations in CMR
- PF-4 - Equipment Installation-Phase 2 (PEI2) – remaining PEI scope to support programmatic milestones for establishing enduring AC/MC capabilities
- Re-categorizing RLUOB to Hazard Category 3 (RC3) – scope that enables an increase in RLUOB MAR limit to 400 grams plutonium-239 (Pu-239) equivalent (gPE) and allows the facility to achieve HC-3 status.

The CMRR PPEP will remain in force for the overall Project. This PEP is specific only to PEI1. It defines the subproject plans and strategies to be executed after approval of CD-2/3 remaining work as well as the complete PEI1 performance measurement baseline (PMB).

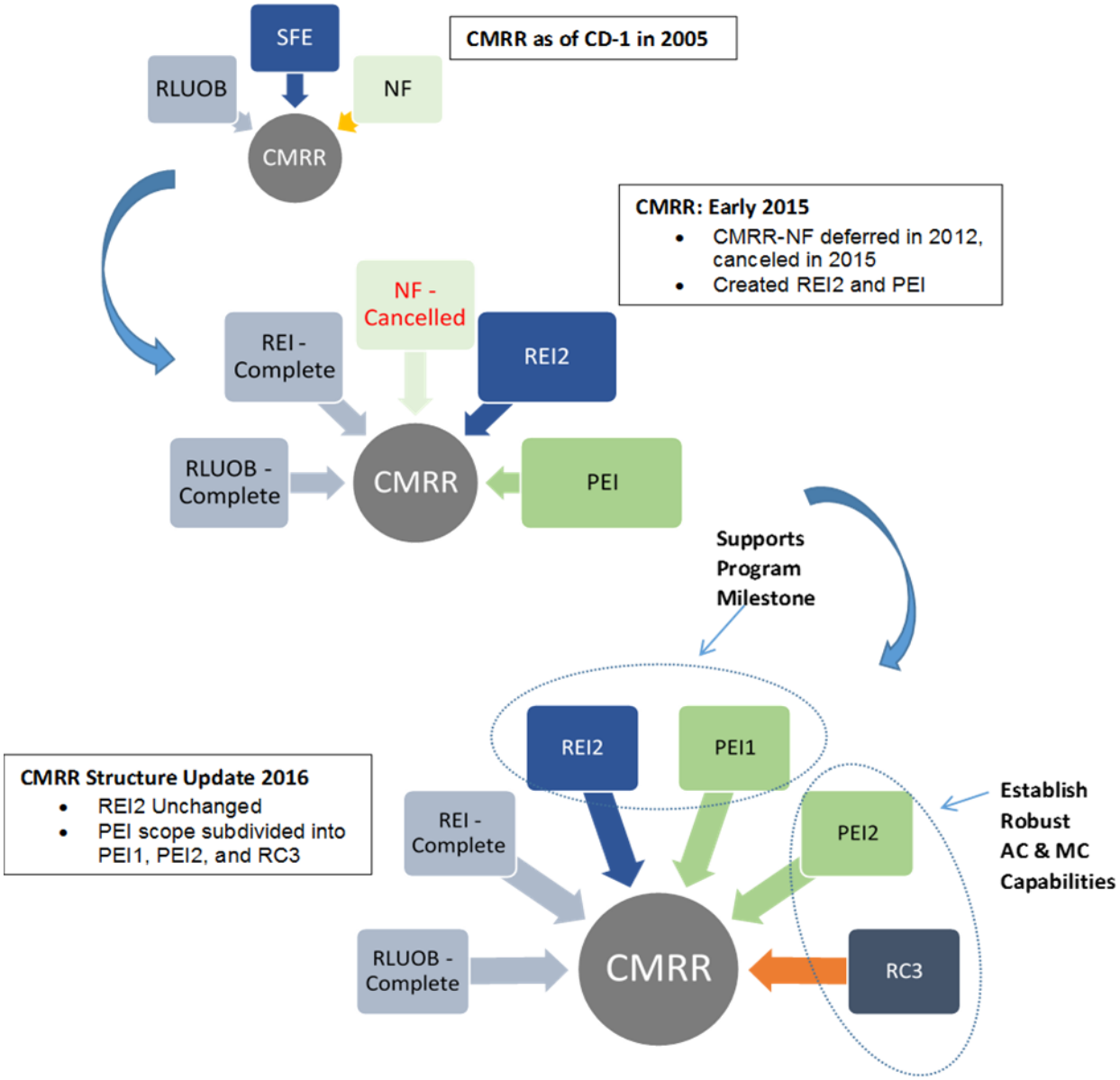

Figure 1-1 CMRR Project Structure Over Time

1.1 CMRR Project Description and Background

The CMRR Project has evolved over time. This section describes the project evolution to its current structure of four (4) subprojects and provides details of the PEI1 subproject.

The CMRR Project was originally planned to meet its mission need with three subprojects. The first, construction of RLUOB, was successfully completed in 2010. The second, procurement and installation of programmatic equipment (RLUOB Equipment Installation [REI]), was completed in 2013. REI's scope included outfitting a limited number of radiological laboratories in RLUOB. At the time, RLUOB was restricted to 8.4 gPE, which resulted in a limited set of laboratories targeted to move a portion of operations from the Chemistry and Metallurgy Research (CMR) Building. The third subproject would have designed and constructed a Security Category I, Hazard Category 2 (HC-2) nuclear facility (NF), which could have contained up to 6 metric tons of special nuclear material (SNM). The CMRR NF would have primarily supported three capabilities: AC, MC, and SNM storage. In the fiscal year (FY) 2013 Congressional Budget Request, the remaining design and construction of the CMRR NF was deferred for at least five years. After deferring the CMRR NF, NNSA and its supporting contractors were tasked to identify an alternative path for maintaining AC/MC operations without the CMR Building and without constructing the CMRR NF for at least several more years.

The NNSA developed a three-step plutonium infrastructure strategy to maintain continuity for plutonium missions at LANL by maximizing use of the recently-constructed laboratories within RLUOB and repurposing existing laboratories in the PF-4 Security Category 1, HC-2 NF at TA-55. The strategy was endorsed by the results from a congressionally-directed business case analysis jointly conducted with the Department of Defense (DoD) Office of Cost Assessment and Program Evaluation (CAPE). The strategy was supported by recent increases in the amount of plutonium allowed in a radiological facility through Supplemental Guidance NA-1 SD G 1027, *Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE-STD-1027-92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice No. 1*, approved 11/28/2011. The first two portions of the strategy to be executed under CMRR focused on maintaining continuity in AC/MC operations.

As approved in 2014, the revised CD-1 authorized the planning and design for the entire CMRR Project scope and officially cancelled the CMRR NF subproject.

The CMRR restructuring aligns the REI2 and PEI1 scope with activities required to support the programmatic milestone to cease programmatic operations in the existing CMR Building and to provide robust, efficient AC/MC capabilities at the RLUOB and TA-55 to support NNSA actinide-based missions. While work progresses on the REI2 and PEI1 subprojects, planning and preparation for the PEI2 and RC3 subprojects will progress toward providing enduring AC/MC capabilities. To achieve the CMRR Mission Need, the program requirements for the remaining "to-go" work will be executed through four subprojects: REI2, PEI1, PEI2, and RC3. The CMRR revised CD-1 cost estimate range for all six subprojects approved in 2014 remains at $2.4B to $2.9B. The cost estimate range for the remaining work to be completed by the four active subprojects is $1.5B to $2.04B. Figure 1-1 ("CMRR Project Structure Over Time") shows the changes in plans for execution of CMRR work over time.

Relocation of existing processes from the CMR Building to the two established and operating facilities at TA-55, PF-4, and RLUOB will be achieved within each of their respective safety, environmental, and security envelopes. PF-4 is an HC-2 and Security Category-I NF. PF-4 has an approved documented safety analysis (DSA). RLUOB is an operating radiological facility with a material limit of 38.6 gPE [a]. Operations in the laboratories outfitted under REI2 can be accomplished within the existing material limit and facility hazard category. The RC3 subproject will establish programmatic capabilities, install equipment originally planned for PF-4, and re-

[a] RLUOB implemented SD G1027 in August 2015 and increased the material limit from 8.4 gPE to 38.6 gPE.

categorize RLUOB to a Hazard Category 3 (HC-3) NF with an increased material limit of 400 gPE, optimizing space within RLUOB and providing programmatic benefit.

The transition of existing and well established AC/MC processes from the CMR Building into PF-4, is not a major modification (as defined by DOE-STD-1189, *Integration of Safety into the Design Process*), does not require an extensive set of facility system modifications, and does not challenge the established safety, security, and environmental, systems, structures, and components (SSC).

1.2 PEI1 Scope Summary

The CMRR PEI1 subproject will maximize use of PF-4 by decontaminating and decommissioning (D&D) old gloveboxes and equipment, reconfiguring and reusing (R&R) existing gloveboxes, consolidating and relocating existing capabilities, and installing new gloveboxes and equipment for AC/MC capabilities. This subproject will support the programmatic milestone to cease program operations in CMR. The program milestones associated with ceasing operations in CMR are separate and independent from the PEI1 subproject milestones. For example; the PEI1 CD-4 date is not tied to cessation of program operations in CMR.

Subsequent to the revised CD-1 approval, PEI1 has progressed through the design phase and has achieved authorizations for long lead procurement and site preparation. D&D, procurement, and preparations for construction are proceeding according to subproject plans.

Additional details of the PEI1 scope are provided in the following sections of this document:

- Section 3, *Acquisition Strategies*, provides details of the PEI1 execution strategy;
- Section 4, “Integrated PEI1 Subproject Baselines,” provides additional discussion on the PEI1 technical, schedule, and cost baselines;
- Appendix C presents the PEI1 work breakdown structure (WBS) dictionary.
- Site Infrastructure Improvements (SII) Scope Summary

An additional component of PEI1 includes elements of the Site Infrastructure Improvement (SII) activities. SII scope (with the primary focus of supporting project construction activities) will enable increased construction capacity, risk mitigation, and efficiency.

Site infrastructure activities executed through PEI1 include the 13-plex temporary office trailers, PF-314 warehouse upgrades, PF-3 locker room upgrades, and construction support facility for construction/glovebox/equipment staging and controlled storage. The NNSA acquisition strategy includes using the U.S. Army Corps of Engineers (USACE, via an Interagency Agreement [IA] process), for design, procurement, construction, and commissioning of the construction support, glovebox and equipment staging, and warehouse facilities. See Sections 2 (“Management Structure and Integrated Project Teams”) and 3 (“Acquisition Strategy”) for additional details on SII and USACE work scopes.

1.3 Key Performance Parameters (KPP)

Key Performance Parameters (KPPs) are derived from the major expectations identified in the *Program Requirements Document* (PRD, CMRR-PLAN-PM-0101, Rev. 3, July 2014) and are flowed down from preliminary KPPs in the CMRR Preliminary Project Execution Plan (PPEP) (CMRR-PLAN-PM-1901, R2, July 2016). The KPP to achieve successful completion of PEI1 is listed below. Any substantive changes in this KPP will be governed by change control thresholds prescribed in Section 4.

KPP: Transfer AC/MC capabilities from CMR to PF-4 and complete transition to operations (i.e., preparation of operational startup, management self-assessments and hot testing) of AC/MC capabilities in PF-4 Rooms 115/124 and nondestructive analysis (NDA) capability as referenced in the CMRR REI2 and PEI1 Transition to Operations (TTO) Plan (CMRR-PLAN-00004) and PEP Section 5.20 Transition to Operations.

1.4 Document Hierarchy

The CMRR Project will support the CMRR MNS and PRD. The CMRR PPEP serves as the execution plan and overall agreement for subprojects under the CMRR that do not yet have approved PEPs and associated performance baseline (PB). The CMRR PPEP and this PEI1 PEP are subordinate to the MNS and the PRD. The PEP is the basis for implementation/execution of the subproject. The PEP is approved by NNSA and is the primary document establishing the baseline and management plan.

CMRR and PEI1 management plans, functional execution plans, programs, and procedures subordinate to the PPEP and this PEP define the requirements, methods, and activities necessary to successfully execute the design, procurement, construction, commissioning and turnover of this complex nuclear project. As shown in Figure 1-2, the document hierarchy flows down from program documents through the PPEP/PEP, the *CMRR Project Management Plan* (PMP), and the project functional execution plans. See the CMRR PMP (CMRR-PLAN-00005) for more detail on the implementation plans and processes.

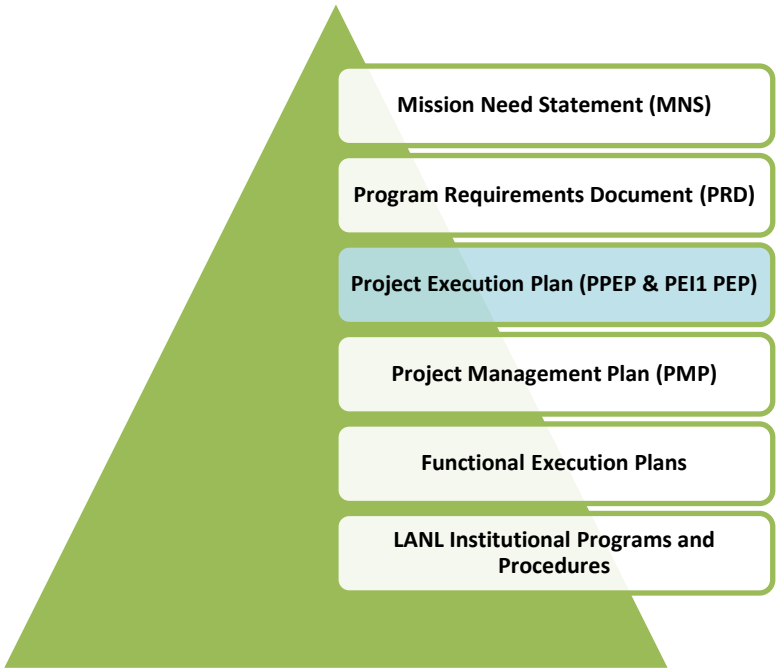

Figure 1-2 CMRR/PEI1 Document Hierarchy

2 MANAGEMENT STRUCTURE AND INTEGRATED PROJECT TEAMS

DOE/NNSA has identified participants in the FIPT, including the FPD. The FIPT Charter and Appointment Letter identifies the FIPT members along with their roles and responsibilities. Similarly, the LANL management and operating (M&O) contractor, has formed a CIPT and developed appointment letters to identify members. The CMRR and PEI1 IPT letters (in coordination with the CMRR PMP) delineate the CIPT roles and responsibilities. The IPT appointment documents will be updated as required.

2.1 Project Teams

The FIPT supports the FPD in accordance with requirements of the FIPT Charter. The team is self-contained, with a management structure that focuses on the key personnel for each organization. The FIPT includes the management shown in Figure 2-1 ("NNSA and LANL CMRR Management Structure") and Figure 2-2 ("NNSA CMRR PMO Structure"). Details for the LANL management team are provided in Figures 2-3, 2-4, and 2-5.

The oversight and management of the LANL M&O contractor and work contracted to USACE will be handled through the NNSA CMRR Project Management Office (CMRR PMO, NA-APM-1.5).

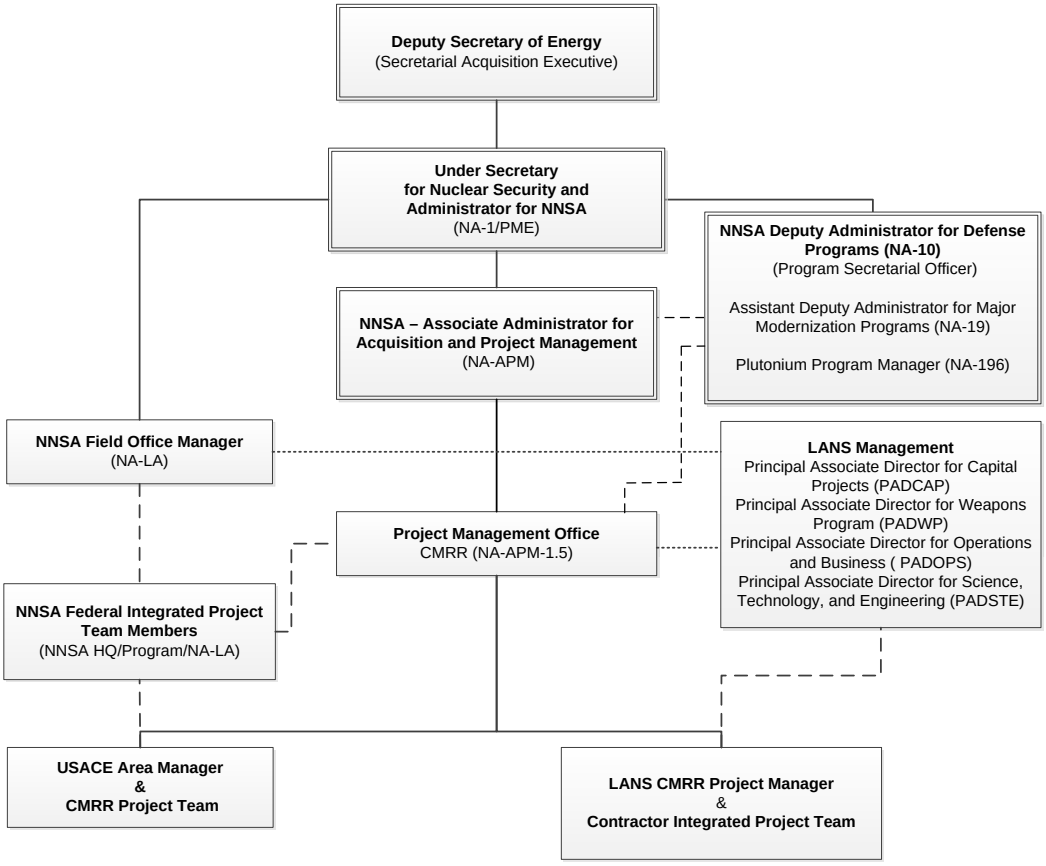

Figure 2-1 NNSA and LANL CMRR Management Structure

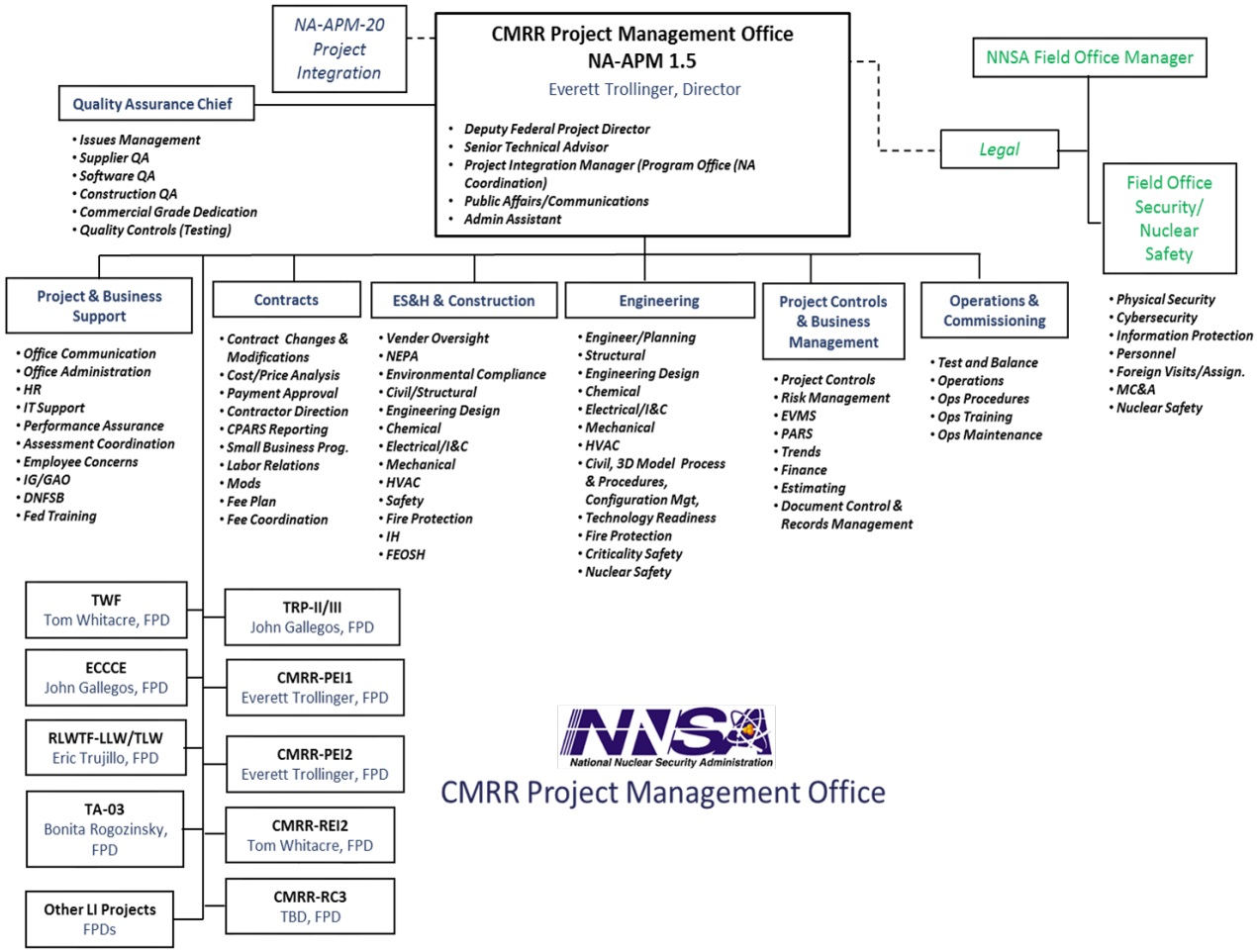

Figure 2-2 NNSA CMRR PMO Structure

Per the *NNSA Acquisition Strategy* (CMRR-PLAN-0702) for the CMRR Project, the FIPT is responsible for project execution from design through construction and start-up, including control of budget and schedule through the Earned Value Management System (EVMS). The CIPT was formed to meet the requirements of LANL SD350, *Project Management for Capital Asset Acquisition and Construction*, P313, *Roles, Responsibilities, Authorities, and Accountability*, as well as the special challenges for subproject work inside an operating non-reactor defense nuclear facility.

2.2 Roles and Responsibilities of the DOE/NNSA Organization

Key roles and responsibilities for each of the major DOE/NNSA organizations involved in the Project are discussed below and are summarized from Appendix C of DOE O 413.3B, Change 2.

2.2.1 Deputy Secretary of Energy

- As Chief Executive for Project Management, approves CDs, unless delegated to the Undersecretary
- Approves the PPEP
- In coordination with NA-APM-1, ensures that the FPD is qualified to manage and lead the project.
- Approves disposition of anticipated PB changes (see Table 4-4 for thresholds)

- Serves as the Chair for the ESAAB
- Conducts quarterly performance reviews
- Approves exemptions to orders and other DOE/NNSA directives
- In accordance with the size and scope of each subproject following restructuring, the Chief Executive (CE) for Project Management delegates Project Management Executive (PME) authority for the PEI1, PEI2, and RC3 projects to the Undersecretary for Nuclear Security, NA-1.

2.2.2 Project Management Risk Committee (PMRC) Chair

- For projects over $100M, receives a pre-briefing and provides input before ESAAB and ESAAB-E briefings with the PME.
- For nuclear projects over $100M, reviews peer reviewed plans and receives debriefs from Independent Peer Reviews.
- Receives briefs on Independent Cost Estimates (ICE) and External Independent Reviews (EIR).

2.2.3 Director, Office of Project Management Oversight & Assessments

- Conducts ICEs and EIRs.
- Serves as ESAAB Secretariat and schedules briefings to the PMRC and ESAAB, as appropriate.
- Validates the project's PB before including it in the Department's annual Budget Request.

2.2.4 Undersecretary for Nuclear Security and Administrator for NNSA

- Responsible for all NNSA program and project activities.
- Upon delegation of authority from the Deputy Secretary of Energy, is responsible for acquisition and CDs as needed.
- Concurs with the PPEP.
- Approves the PEPs
- Provides functional oversight of NA-APM and project execution.
- Provides functional oversight of NA-10.
- Accountable to the CE for Project Management.
- Approves CDs, as delegated by the CE.

2.2.5 NA-APM-1: Associate Administrator for Acquisition and Project Management

- Recommends and concurs with CDs and acquisition decisions
- Develops the Acquisition Strategy and the Procurement Plan
- Concurs with the PPEP and the PEP
- Responsible for project execution and delivery, including safety, health, safeguards and security
- Holds line accountability for applicable capital asset project execution and implementation of policy
- Provides functional oversight of project activities
- Approves disposition of projects and performance baseline changes in compliance with change control levels identified in the PPEP and PEPs
- Recommends selection of the FPD and key IPT members
- Monitors the effectiveness of FPDs and support staff
- Conducts monthly project performance reviews

2.2.6 NA-10: Deputy Administrator for Defense Programs

- Program Secretarial Officer (PSO)
- Approves mission need and program requirements
- Approves acquisition strategy
- Approves charge memos for independent project reviews (IPRs)
- Concurs with the PPEP and PEPs
- Aligns program priorities and budget needs with project budget profile
- Ensures that programmatic requirements are included in the design documents and the constructed assets
- Concurs with disposition of projects and PB changes below the Secretarial Acquisition Executive (SAE) approval level following PB deviations
- Approves selection of the FPD
- Nominates programmatic members of the FIPT

2.2.7 NA-19: Assistant Deputy Administrator for Major Modernization Programs

- Concurs with mission need, program requirements, and acquisition strategy
- Recommends approval of acquisition strategy and PPEP and PEPs
- Concurs with disposition of projects and PB changes in compliance with change control levels identified in the PPEP and PEPs
- Concurs with selection of the FPD
- Reviews and coordinates to ensure that mission needs and program requirements are met through the project

2.2.8 NA-196: Plutonium Program Manager (PuPM)

- Involved in all major project decisions as Program sponsor and funding authority for the CMRR Project
- Responsible for programmatic requirements, mission need, conceptual design, and budgeting for CMRR and its subprojects
- Reviews the CMRR Project's interpretation and application of regulatory design requirements that affect estimated construction costs
- Involved in cost trade-off decisions associated with risk acceptance during all phases of the project
- Balances planned budget allocations between new builds, existing facilities, and program operations accounts
- Oversees the program elements to ensure that NNSA maintains its plutonium capabilities in support of mission requirements and coordinates with the CMRR FPD, who is responsible for delivering the CMRR Project on time and within budget

2.2.9 Manager, Los Alamos Field Office (NA-LA)

- Approves the IPT assignment letter to document personnel from the Los Alamos Field Office assigned to the CMRR FIPT
- Ensures that safety is fully integrated into design and construction at LANL
- Proposes project performance measures for the LANL M&O's annual contractor performance plan and evaluates performance against those measures with input from the Associate Administrator for Acquisition and Project Management
- Provides staff resources to support the National Environmental Policy Act (NEPA) permitting, Environment, Safety, and Health (ES&H) requirements, and other functions associated with the Project

- Is the risk acceptance official and Safety Basis approval authority for the site

2.2.10 Federal Project Director

- Accountable to NA-APM
- Accountable to the CE for Project Management
- Plans, implements, and completes the Project scope using a Systems Engineering approach
- Initiates development and implementation of key Project documentation (e.g., Acquisition Strategy, PPEP and PEPs)
- Defines project cost, schedule, performance, and scope baselines
- Responsible for design, construction, environmental, safety, security, health, and quality efforts and to comply with the contract, public law, regulations, and Executive Orders
- Ensures compliance with DOE O 413.3B, Change 2, requirements
- Responsible for timely, reliable, and accurate integration of contractor performance data into the project's scheduling, accounting, and performance measurement systems, including Project Assessment and Reporting System (PARSII)
- Evaluates and verifies reported progress; makes projections of progress and identifies trend for the overall project
- Serves as the single point of contact between federal and site contractor staff for all matters relating to a project and its performance
- Concurs with project cost, schedule, performance, and scope baselines
- Leads the IPT and provides broad project guidance. Delegates appropriate decision-making authority to the IPT members
- Reviews and approves changes in compliance with the approved change control process documented in the PPEP and PEPs
- Prepares, approves, and maintains the IPT Charter and operating guidance with IPT support and ensures that the FIPT is properly staffed
- Independently evaluates project cost and schedule performance, controls federal contingency, and concurs on use of contractor management reserve (MR)

2.2.11 Director, Office of Project Analysis, Oversight, and Review

- Provides independent oversight and analysis of construction project management
- Manages the NA-APM peer review process in accordance with DOE O 413.3B, Change 2, and NNSA BOP 06.04
- Reviews and coordinates to ensure that mission needs and programmatic requirements are met through the project

2.2.12 Federal Integrated Project Team

- Includes members from NNSA headquarters elements and NA-LA
- Ensures that all project interfaces are identified and completely defined
- Identifies and defines appropriate and adequate project technical scope, schedule, and cost parameters
- Reviews and comments on project deliverables; participates in monthly reviews and assessments of project performance and status against established KPPs, baselines, milestones, and deliverables
- Plans and participates in project reviews, audits, and appraisals (as necessary)
- Reviews change requests (as appropriate), and supports change control boards

- Reviews all applicable safety documents and provides written documentation of that review (the designated safety expert)
- Plans and participates in project transition to operations (TTO)
- Supports the preparation, review, and approval of project completion and closeout documentation
- Adheres to project schedule for deliverables by providing timely input

As a project progresses from initiation to transition/closeout, FIPT membership will change to incorporate the necessary skills and expertise required. Team membership may be either full- or part-time, depending on the scope and complexity of the project.

2.3 Subcontract Design and Construction Services

NNSA will use the LANL M&O contractor (as well as USACE) to execute the PEI1 scope. LANL and USACE will perform as independent contractors to NNSA. Accomplishment of USACE scope will require significant interaction and support from LANL. The division of responsibilities between NNSA, USACE, and LANL is defined in a division of responsibility (DOR) document published through NNSA. Reference*, CMRR Project - Interface Plan Division of Responsibility: NNSA/USACE/LANS* (latest revision).

NNSA will contract portions of the infrastructure directly to USACE via the Interagency Agreement. USACE will provide planning, design, estimating, construction, construction management, and commissioning services directly or through their qualified subcontractors. PEI1 scope planned for USACE execution includes new structures outside existing facilities: 13-plex office trailer and construction support and warehouse facilities.

NNSA will use the LANL M&O contractor for PEI1 work within existing facilities. LANL will perform project management, planning, design, estimating, construction, construction management, commissioning, TTO, and technical specialties. Equipment fabrication designs will be procured through qualified design agency and equipment will be procured from LANL qualified vendors.

2.4 Roles and Responsibilities of LANL M&O Project Team

The CMRR Project employs a LANL CMRR Project Manager (PM) through the LANL Associate Director for Project Management (ADPM). The PM is responsible for overall execution of the CMRR Project. The PM will acquire necessary project management resources from the ADPM and the Manager of Functions (MOF). Other team members will be acquired from the Associate Directorate for Plutonium Science and Manufacturing (ADPSM), Chemistry Division, Materials Science and Technology Division, other organizations at LANL, and subcontractors (as needed). The PM will coordinate with program and facility operations through the ADPSM, who is the responsible associate director (RAD) for operations at the TA-55 site.

The PM provides the day-to-day management of project functions for Operations, Environment, Safety, Health, Quality, Security, Facility Integration, and Readiness and Program coordination functions.

To support design and construction activities for the CMRR subprojects, the CMRR Project will use both self-perform and subcontract support.

The project management and organizational approach is based on lessons learned from other TA-55 and NNSA nuclear projects. It is structured to integrate with PF-4 and LANL operations. A key lesson learned is that the PEI1 subproject must be managed with strong interfaces to the facility, program, and support management organizations as shown in Figure 2-3. The Laboratory senior management team will focus on project strategic directions through the Integrated Nuclear

Planning (INP) process with coordination and integration support from the Plutonium Strategy Infrastructure (PSI) Division. This structure supports the subprojects directly with various functional disciplines.

The CIPT is shown in Figure 2-3 representing the CMRR team and senior management interface, Figure 2-5 in the form of a team table ("CMRR Contractor Integrated Project Team") for the overall CMRR Project and in Figure 2-6 for PEI1 ("PEI LANL Integrated Project Team"). Additional subproject-specific CIPTs will be developed for each CMRR subproject. The PEI1 CIPT roles and responsibilities are addressed in the PEI1 IPT assignment letter and in the *CMRR Project Management Plan* (PMP, CMRR-PLAN-00005).

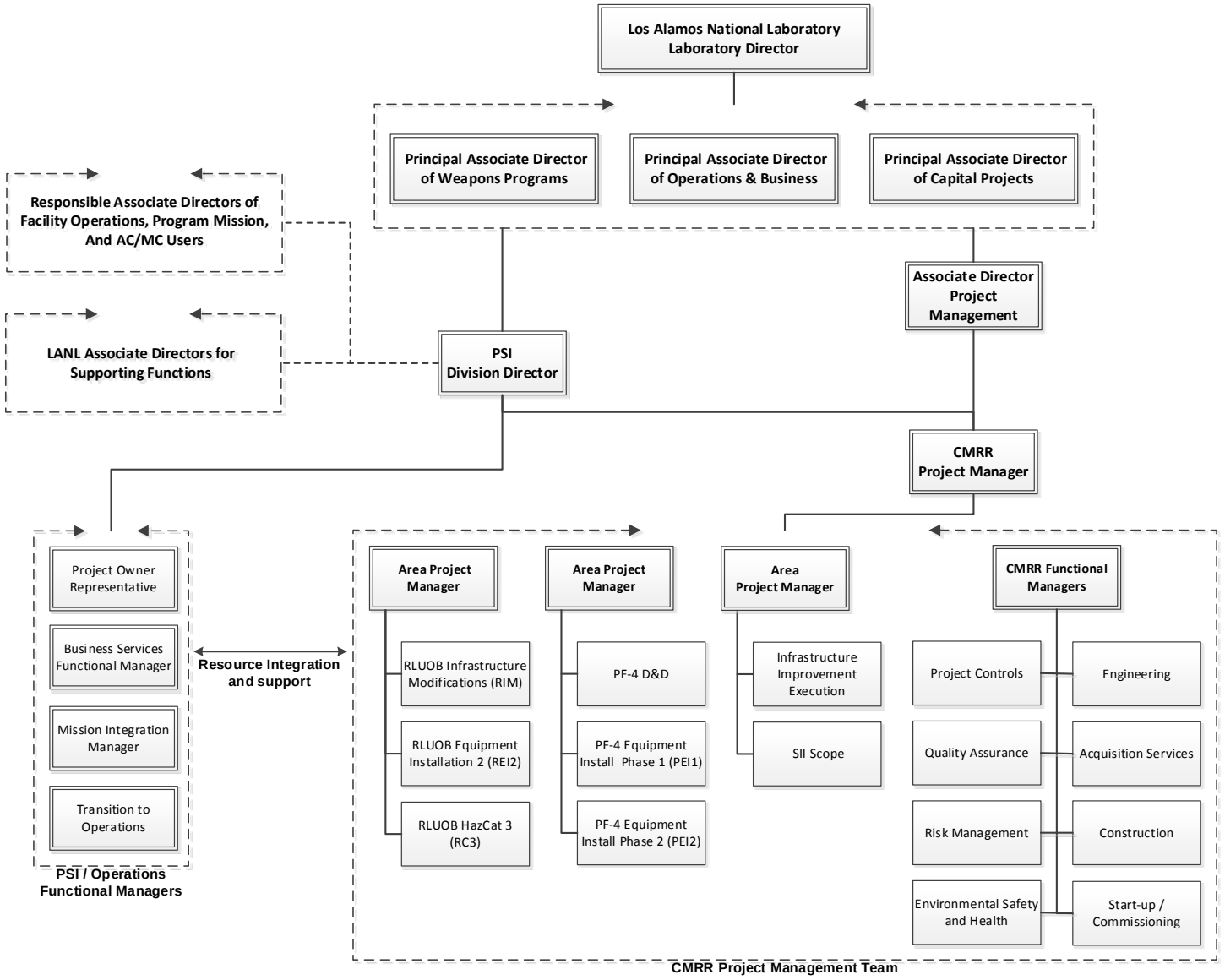

Figure 2-3 LANL CMRR Project Team and Senior Management Interface

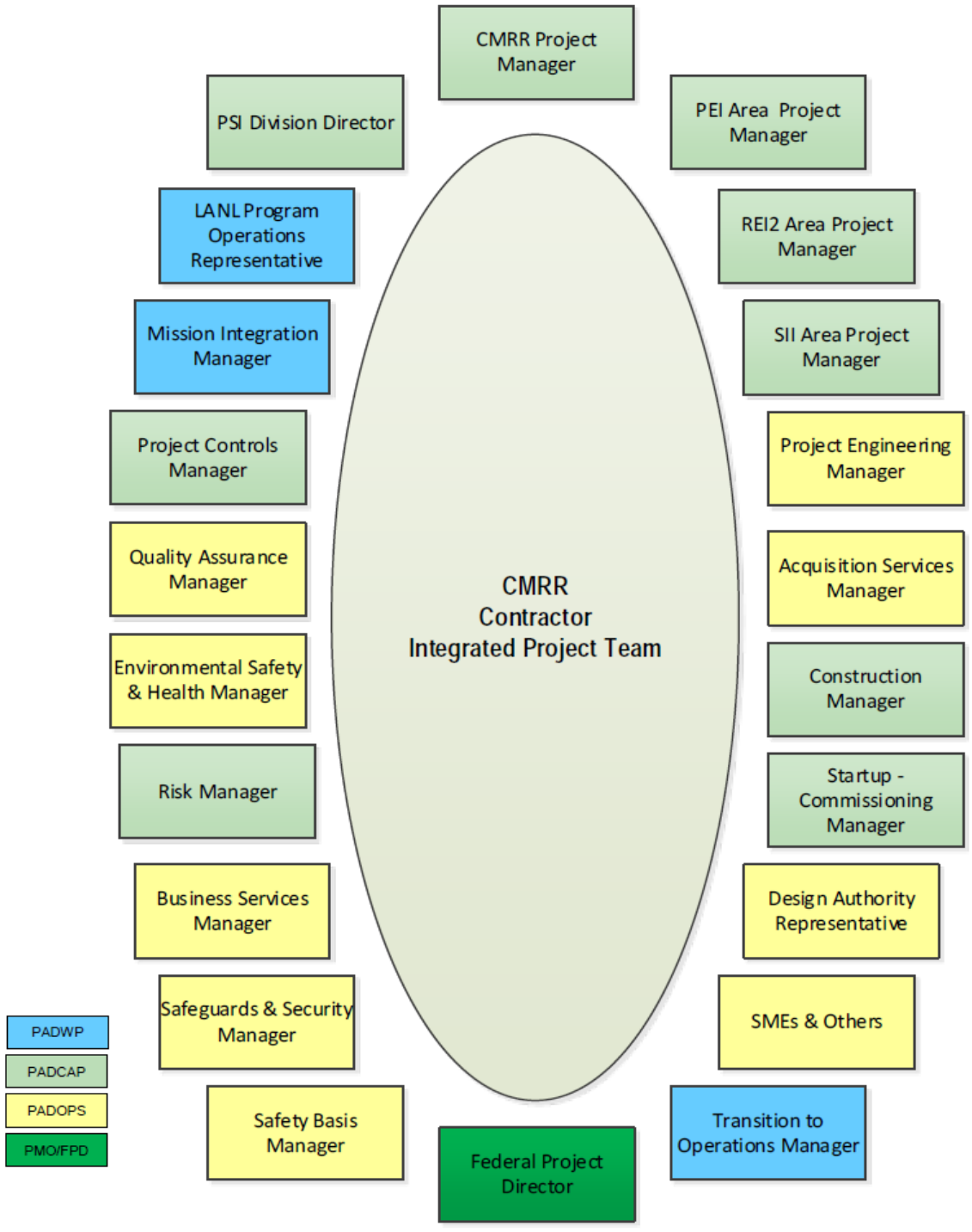

Figure 2-4 CMRR Contractor Integrated Project Team

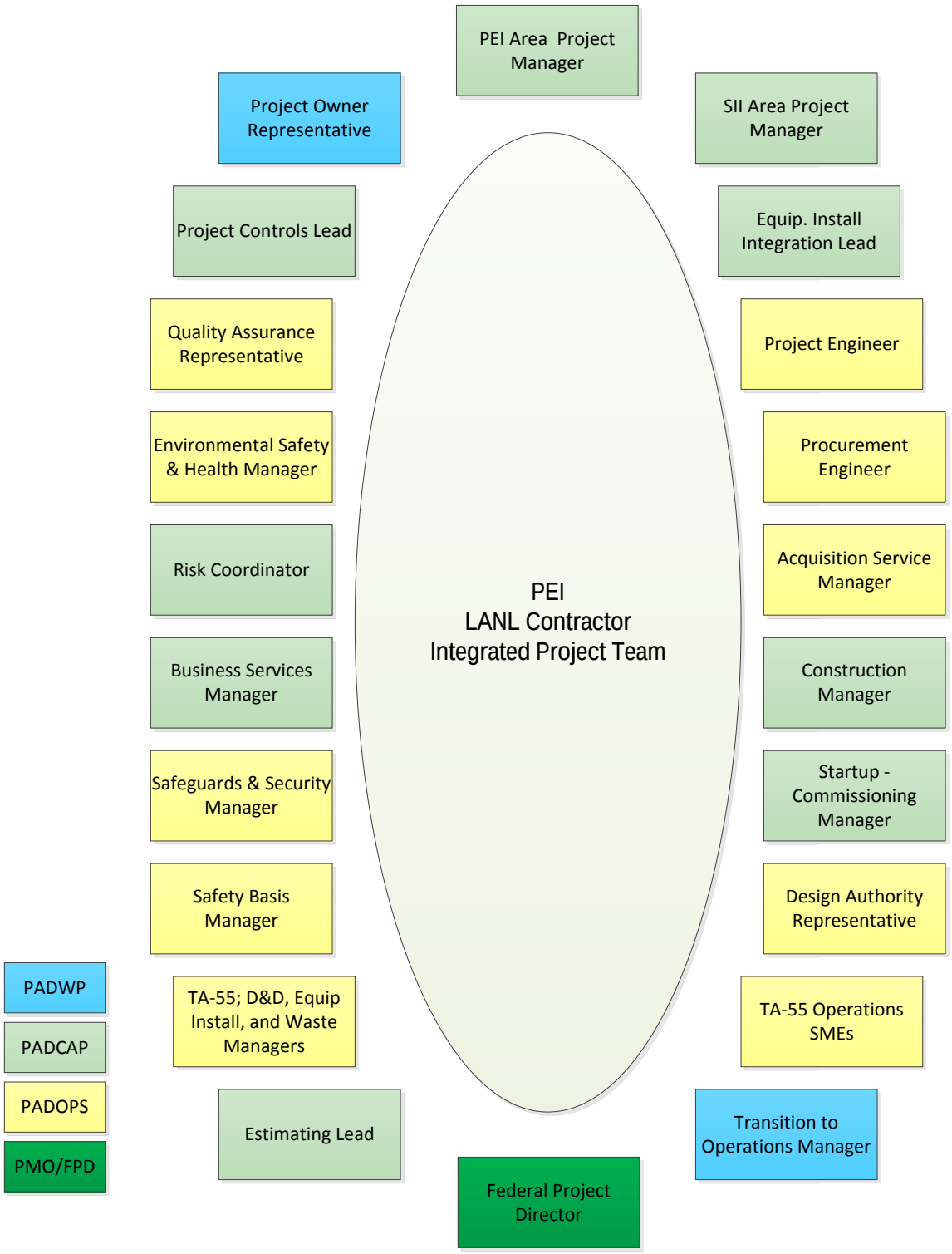

Figure 2-5 PEI Integrated Project Team

2.4.1 LANL CMRR Project Manager

The LANL CMRR PM is assigned by ADPM to lead the multi-disciplinary project management team. The PM's responsibilities are outlined in SD350. The PM's duties focus on the project scope, cost, and schedule performance of the project.

Responsibilities include:

- Assess project scope, develop quantities, and job hour estimates for assigned project tasks; provide updated forecasts and estimates to project controls; and perform confidence assessments for use in contingency development
- Ensure management of project scope, cost, and schedule in accordance with DOE orders and institutional requirements, as defined in LANL SD350
- Analyze and monitor project risks
- Develop and maintain management reserve (MR) and contingency plans (cost and schedule) that are commensurate with the Project Owner's acceptable risk level for the project

Authorities include the following:

- Approve or concur with project execution approaches and documentation, as required by SD350
- Review and approve project estimates
- Authorize the expenditure of project funds within approved work authorities
- Approve proposed changes (within authority limits defined in the PEP) and endorse other changes affecting the cost, schedule, and technical parameters within the formal project baselines
- Approve project trend notices
- Approve purchase requisitions (PRs) and PR change notices within authority limits
- Approve the assignment and re-assignment of key CIPT members
- Manage the project schedule to maximize project efficiency and performance
- Require CIPT accountability

Accountability includes the following:

- Accountable to the Principal Associate Directorate for Capital Projects (PADCAP) and Principal Associate Directorate for Weapons Programs (PADWP) for successful planning and execution of assigned projects and tasks
- Accountable to the FPD to ensure that project definition and execution are compliant with NNSA requirements and for timely and accurate communication regarding project activities
- Accountable to CIPT leadership and day-to-day direction

2.4.2 LANL Area Project Manager

The LANL CMRR PM has assigned area project managers (APMs) to manage execution of the PEI1/SII scope elements. PEI1/SII is led by dedicated APMs who report to the CMRR PM and are responsible for the day-to-day management of PEI1 execution. The APMs chair the PEI1/SII IPTs, which include resources such as project controls, finance, project engineering, acquisition services, construction, commissioning, turnover, start-up, PF-4 facility, and TA-55 operations personnel. The APM will integrate and interface

the subproject activities with the priorities of the operating facility. Additional discussion of the APMs and IPTs are provided in the CMRR PMP.

2.4.3 LANL Facility and Mission Integration

Because the PEI1 subproject will be executed in an operating Security Category-I and HC-2 facility with multiple competing facility and program mission priorities, all work must be planned, designed, and constructed within strict security, safety basis, configuration management, conduct of operations, and work coordination processes used by TA-55.

2.4.4 Integration within TA-55 Protected Area and PF-4

To ensure full integration of activities within the TA-55 protected area and PF-4, the PEI1 subproject interactions with the facility will begin, prior to design, in the assignment of Engineering Service Requests and coordination/prioritization of activities through the TA-55 Change Control Board. Scope and requirements and criteria documents (RCDs, which include design criteria) are developed in coordination with the TA-55 cognizant systems engineers (CSEs) and approval of the design authority representative (DAR). Design and construction documentation are developed through the TA-55 design change form (DCF) work process, which includes review/approval by safety basis, CSEs, the DAR, and other key SMEs. The DCF is a controlled process and is the tool for integration of PEI1 activities into the facility processes for conduct of operations and configuration management.

In addition to the procedurally driven integration, the PEI1 subproject has several high-level managerial integration activities.

- The subproject has representation on the TA-55 Change Control Board
- The subproject obtains resource coordination through participation in ADPSM product line resource review (PLRR) meetings
- The subproject coordinates with the ADPSM Program Management Board to ensure appropriate integration and prioritization of project work.
- The subproject coordinates installation and construction activities within facility operations through integrated plan-of-the-day processes.

The PEI1 subproject has established interface agreements to ensure that facility interfaces are formally identified, documented, and approved.

Additional integration with the PEI1 subproject is established through facility and operations personnel participation in the subproject IPTs and PSI interfaces to facility and operations management.

2.5 USACE CMRR Project Team

2.5.1 USACE CMRR Project Manager

A detailed list of PM responsibilities can be found in ER 5-1-11, USACE Project Management Business Process (PMBP) and in the division of responsibility (DOR) document published through NNSA (*CMRR Interface Plan for USACE Executed Projects at Los Alamos National Laboratory)*. The PM will be responsible for executing all aspects of the scope assigned to USACE and meeting all reporting requirements and deadlines.

The PM is responsible for preparing a PMP and submitting it to the USACE leadership and to the NNSA FPD. The PMP shall identify all NNSA requirements and deliverables, scope, schedule, estimated cost, processes, and other requirements.

The PM is also responsible for the following:

- Scope interpretation and resolution of scope variations with NNSA's FPD
- Obtaining approval and concurrence within their organizational structure to execute the scope of NNSA Work Requests to USACE
- Developing and leading a Project Delivery Team (PDT)
- Coordinating with the FPD

2.5.2 Integration with LANL Facility Operations Directors (FODs)

The integration between USACE and the LANL facility operations directors (FODs) is defined and executed in accordance with the DOR. Communications between USACE and the LANL FODs is coordinated through NNSA. The USACE PDTs will ensure that LANL FODs are provided documents for review and comment during the design phase. During construction, integration with the LANL FODs will include submittal reviews, and participation in commissioning, turnover activities, and final utility tie-ins, as requested by the NNSA FPD.

3 ACQUISITION STRATEGY

3.1 General

In accordance with the approved Acquisition Strategy approved at CD-1, NNSA will use the M&O contractor to execute the bulk of the subproject and USACE for select federally-directed SII work scope. PEI1 will be executed as a standalone subproject under the CMRR line item. Execution and approvals will be through the processes established through DOE O 413.3B, Change 2. PEI1 will follow standard work authorization policies.

The tailoring strategy uses a combination of long-lead procurements and site preparation activities (approved via CD-3A/3B) in 2015 and then a combined CD-2/3 for the PEI1 work in June 2016. The PEI1 CD-2/3 submittal will establish the plan for PEI1 M&O performed work. Section 3.2 (“Critical Decisions”) provides a summary of the CD strategy.

USACE and NNSA will work collaboratively on a routine basis to identify appropriate contract tools for executing projects and delivering services according to the individual project requirements.

For USACE acquisitions, USACE Acquisition Instruction (UAI) will be combined with the applicable Federal Acquisition Regulation (FAR), the Defense Federal Acquisition Regulation Supplement (DFARS), the Army Federal Acquisition Regulation Supplement (AFARS), or higher-level agency regulations to guide the process. The UAI establishes uniform policies and procedures to ensure that business practices are consistent throughout USACE, and to provide internal guidance, delegations of authority, assignments of responsibilities, work-flow procedures, procedures that are required to be established by the Head of the Contracting Activity (HCA), procedures that implement policies, and internal reporting requirements.

3.2 Critical Decisions

PEI1 supports the execution of work in and around PF-4 for a phased delivery of AC/MC capabilities in support of the programmatic milestone to cease operations in CMR. A phased CD approach is used including advanced authorizations for site preparation and long lead procurements. CD-3A/3B were requested in advance of CD-2/3 as schedule risk reduction measures.

Table 3-1 provides a breakdown of completed and planned future CDs and the required level of Project Management Executive (PME) approval for PEI1.

Table 3-1 Critical Decision Strategy for PEI Subproject

Critical Decision	Scope Summary	Forecast or Actual Date	CE or PME Level
Revised CD-1	Approved estimate/schedule range, design development, CD package preparation, and minor work	August 21, 2014A	S-2
PEI1 CD-3A	Approved long-lead procurement for the XRD units and approved site preparation D&D activities	March 18, 2015A	S-2

Critical Decision	Scope Summary	Forecast or Actual Date	CE or PME Level
PEI1 CD-3B	Approved additional long-lead procurement for enclosures and programmatic equipment. Approved site preparation activities to relocate XRDs and begin glovebox repurposing. XRD and glovebox readiness activities were also approved.	December 22, 2015A	S-2 (delegated to NA-1)**
PEI1 CD-2/3	Remaining PEI1 scope and the SII construction support, glovebox and equipment staging, and warehouse facilities will be approved	October 31 2016A	S-2 (delegated to NA-1)**
PEI1 CD-4	Completion of PEI1 subproject scope	April 2022*	S-2 (delegated to NA-1)**

* Includes Management Reserve and Federal Contingency
** CMRR Project; Preliminary Project Execution Plan, CMRR-PLAN-PM-1901, R2, July 2016

3.3 PEI1 Subproject Tailoring Strategy

The PEI1 modified/installed enclosures and equipment will support AC/MC capabilities that require the processing of nuclear material amounts that cannot be handled in RLUOB. Key elements of the PEI1 subproject scope include the D&D of existing gloveboxes and existing equipment in PF-4 to create open laboratory space, installation of new equipment, installation of new gloveboxes, repurposing of existing gloveboxes, relocation of existing program activities, and several improvements to the site infrastructure (including construction support facilities [CSFs]).

The PEI1 subproject will be executed with its own DOE-authorized baseline. The CMRR Project Manager will maintain a coordinated approach for PEI1 and other CMRR subprojects to enhance team stability, approvals, and transitions between execution phases. Where possible, the coordinated approach will allow use of a common set of implementing plans and procedures for all subprojects.

An APM is dedicated to managing the PEI1 subproject. The APM reports to the CMRR PM and manages a dedicated PEI1 IPT (which includes personnel from the TA-55 facility) and operations personnel to help integrate and interface activities within the priorities of PF-4. The management approach includes further definition of activities that are discrete work elements. Each work element is broken down to the point where sufficient management and control will ensure that subproject objectives are met.

The PEI1 APM will manage and integrate a combination of deployed LANL employees and subcontractors. In a manner consistent with regulatory and DOE requirements, they will manage the following major activities:

- Develop and maintain subproject requirements and all project execution documents
- Design processes, equipment, and facilities based on the defined project requirements. Design execution will use in-house LANL engineering services and outside architect/engineer (A/E) services. Design and engineering support to construction activities are required to accomplish D&D, refurbishment-reconfiguration activities, new enclosures fabrication, and installation.
- Procure equipment, materials, and services through PEI1 personnel
- Reconfigure existing systems, install new enclosures and program equipment, and install support utility services by LANL craft
- Start up and turnover to operations new and reconfigured equipment by project personnel and operations SMEs

Tailoring of the overall CMRR execution into discrete subprojects allows focus on the PEI1 subproject critical near-term activities that are necessary to support programmatic milestones to cease programmatic operations in CMR. The PEI1 subproject execution strategy is summarized in Figure 3-1 (“PEI1 Execution Strategy”).

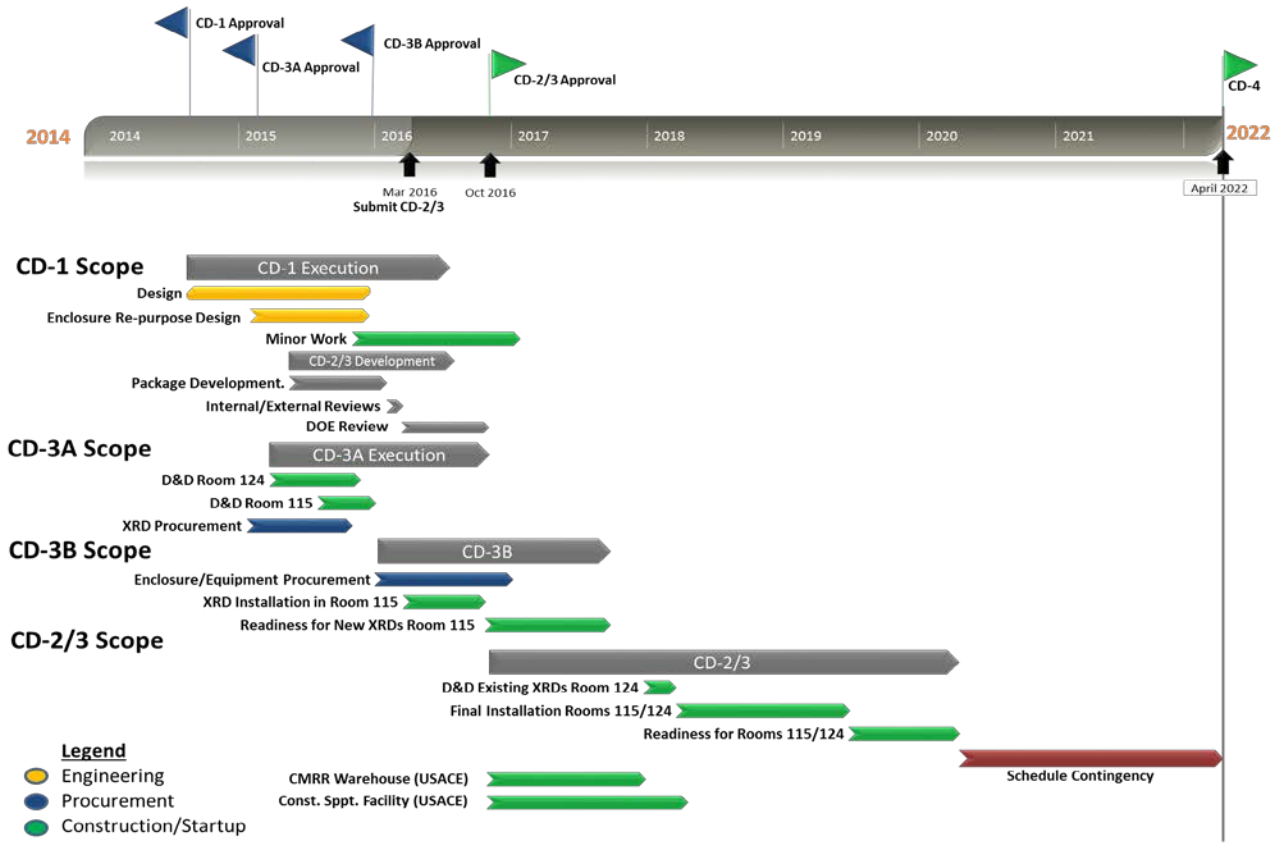

Figure 3-1 PEI1 Execution Strategy

3.4 CD-3A and CD-3B Tailoring Strategies

The tailoring strategy is structured to achieve the timeline for completion of high priority capabilities, reduce overall construction congestion, and improve resource leveling during construction (including reducing programmatic work interferences).

To implement the strategy, the Project has achieved approval of CD-3A/3B. The CD-3A/3B process from DOE O 413.3B, Change 2, has been used with long-lead procurements and site preparation activities to reduce schedule risk.

3.4.1 PEI1 D&D

PEI1 CD-3A approval facilitated the start of the execution of PF-4 D&D activities. The rooms are prepared for D&D and equipment installation sooner in the project life cycle to minimize disruptions to ongoing programs. PEI1 work is progressing to remove enclosures and equipment to prepare spaces for new equipment and enclosures.

Executing D&D early in the project schedule is a strong risk mitigation measure.

3.4.2 R&R of Existing Enclosures

PEI CD-3B approval facilitated the start of the PF-4 reconfiguring and reusing (R&R) activities. R&R efforts minimize the number of new enclosures by repurposing existing gloveboxes for the new AC/MC operations. Several gloveboxes in PF-4 will be repurposed for use by compatible AC/MC capabilities. They will require some

modification, selected decontamination, utility reconfiguration, and new support equipment to be installed. Repurposing the suitable gloveboxes for new capabilities will help mitigate project schedule issues and reduce costs.

3.4.3 PEI1 Long Lead Procurement

PEI1 CD-3A approval facilitated the start of procurement for the X-Ray Diffraction (XRD) equipment. Subsequent CD-3B approval enabled the start of early procurement for the custom enclosures/gloveboxes required for AC/MC operations in PF-4. Early initiation of glovebox procurement allows for the integration of fabrication schedules within the capacity limitations of qualified glovebox manufacturers.

3.4.4 Advanced Authorizations for Site Preparation Activities

An important part of the success for the CMRR subprojects is the ability to act as early as possible on tasks that can affect the critical path. To support these early actions, NNSA has approved the execution of minor work for several key infrastructure activities. This scope will support the construction efforts ramping up in FY2016 and 2017. These support activities include:

- A 13-plex temporary office space
- PF-314 warehouse upgrades
- PF-3 change room upgrades for increased shower and locker space

3.4.5 Site Preparation Activities in CD-2/3 Documentation

The strategy for execution of the construction support, glovebox and equipment staging, and warehouse facilities is for NNSA to contract directly to USACE for the siting, design, construction, and commissioning. LANL will provide support to NNSA, USACE, and USACE subcontractors as defined by the approved DOR to complete the requirements, siting, design, construction, commissioning, beneficial occupancy, and turnover to operations for the new facilities.

3.5 Project Cost Strategy

Cost strategies for PEI1 address the overall subproject performance baseline to the total project cost (TPC) while separating work contracted through USACE from work contracted through the M&O contractor. For PEI1, the LANL M&O contractor and the USACE will have their respective Contract Budget Base (CBB) comprised of a Performance Measurement Baseline (PMB) and the M&O contractor-held Management Reserve (MR) or USACE held Federal Contingency. The PEI1 subproject TPC includes the Federal IPT Support Other Direct Costs (ODCs) and Federal Contingency held outside the CBBs to address government risks on work being executed by LANL and USACE.

Even though LANL is not responsible for performance tracking on NNSA and USACE activities, CMRR monthly reports uploaded to the Project Assessment and Reporting System II PARS II by LANL will include integration of data provided by NNSA and USACE.

Figure 3-2 presents a simple block diagram for the PEI1 subproject TPC cost and reporting structure. This figure is provided to highlight that the cost buildup includes work performed by NNSA, USACE, and LANL. Additional details on buildup of the PMB and CBB are provided in Section 4.6, and the scope breakdown for the PEI1 subproject is provided in the description of the technical baseline in Section 4.1 ("Contractor Management Reserve and Federal Contingency Management") and the WBS (see Appendix C). The interfaces and DOR between NNSA, USACE, and LANL are addressed in the DOR (*CMRR Interface Plan for USACE Executed Projects at Los Alamos National Laboratory*).

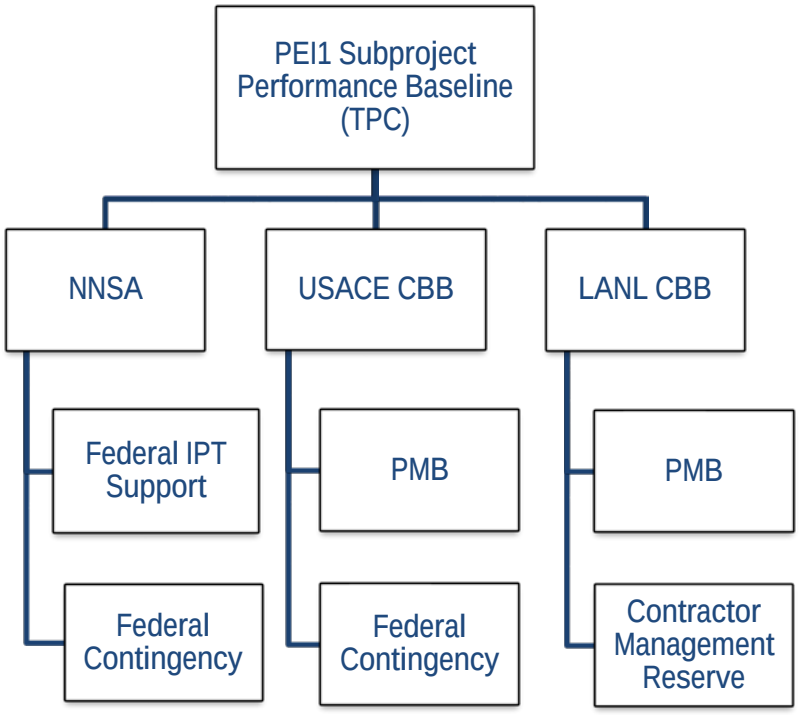

Figure 3-2 PEI1 Subproject Performance Baseline Cost Structure

4 INTEGRATED PEI1 SUBPROJECT BASELINES

The PMB technical, cost, and schedule baselines for PEI1 provide the basis for proposed future changes to be measured. The WBS is shown in Figures 4-1 ("CMRR Work Breakdown Structure") and 4-2. The PEI1 WBS dictionary is found in Appendix C. Schedule and cost baselines were updated and approved in February 2017 to reflect the CD-2/3 decision granted on October 31, 2016.

4.1 Scope Baseline

The PEI1 technical baseline for CD-2/3 is based on the WBS dictionary and the Final Design deliverables. PEI1's technical baseline will be implemented through construction and TTO.

The PEI1 subproject technical baseline documentation is provided in the *PEI1 Final Design Repor*t (CMRR-RPT-00003), which includes the following:

- Design requirements and design criteria in the form of a requirements and criteria document (RCD)
- Code of Record
- Design products: drawings, specifications, and calculations
- Design review records/report
- Approval for construction through a LANL Building Official (LBO)

The PEI1 technical baseline documentation will include design change documentation, as-built/record drawings/specs after completion of construction; as well as, verification and validation documentation showing that designs were properly implemented through construction. Systems and equipment installed by PEI1 will complete readiness and turnover to operations to ensure that systems and program operations performed within them are bounded within the PF-4 safety basis.

SII scope is included in the PEI1 baseline. Portions of the SII work have been assigned by NNSA to USACE. USACE scope includes design, construction, start-up, commissioning of a 13-Plex office trailer complex, and a new construction support facility, , and a warehouse facility.

The PEI1 M&O baseline includes staffing and equipment necessary for LANL to provide support to USACE from engineering, utilities, surveying, security, Project Management, ES&H, operations, the facility operations director (FOD), the LBO, authorities having jurisdiction (AHJs), and others as defined in the approved DOR.

Additional SII scope within the PEI1 baseline (which is to be executed by LANL) include the following:

- PF-314 warehouse renovations; engineering, procurement, construction, and turnover to operations; and
- PF-3 locker room expansion; engineering, procurement, construction, and turnover to operations.

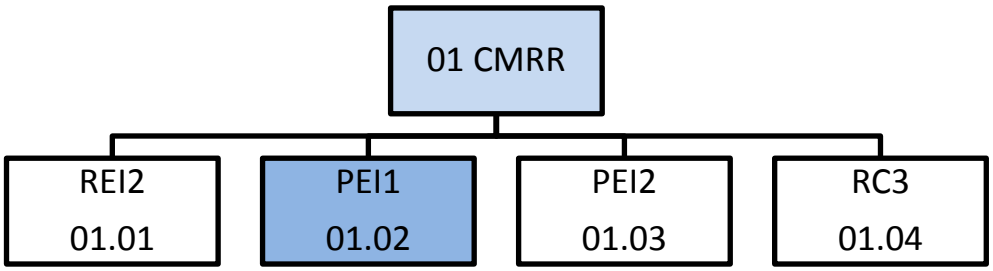

Figure 4-1 CMRR Work Breakdown Structure

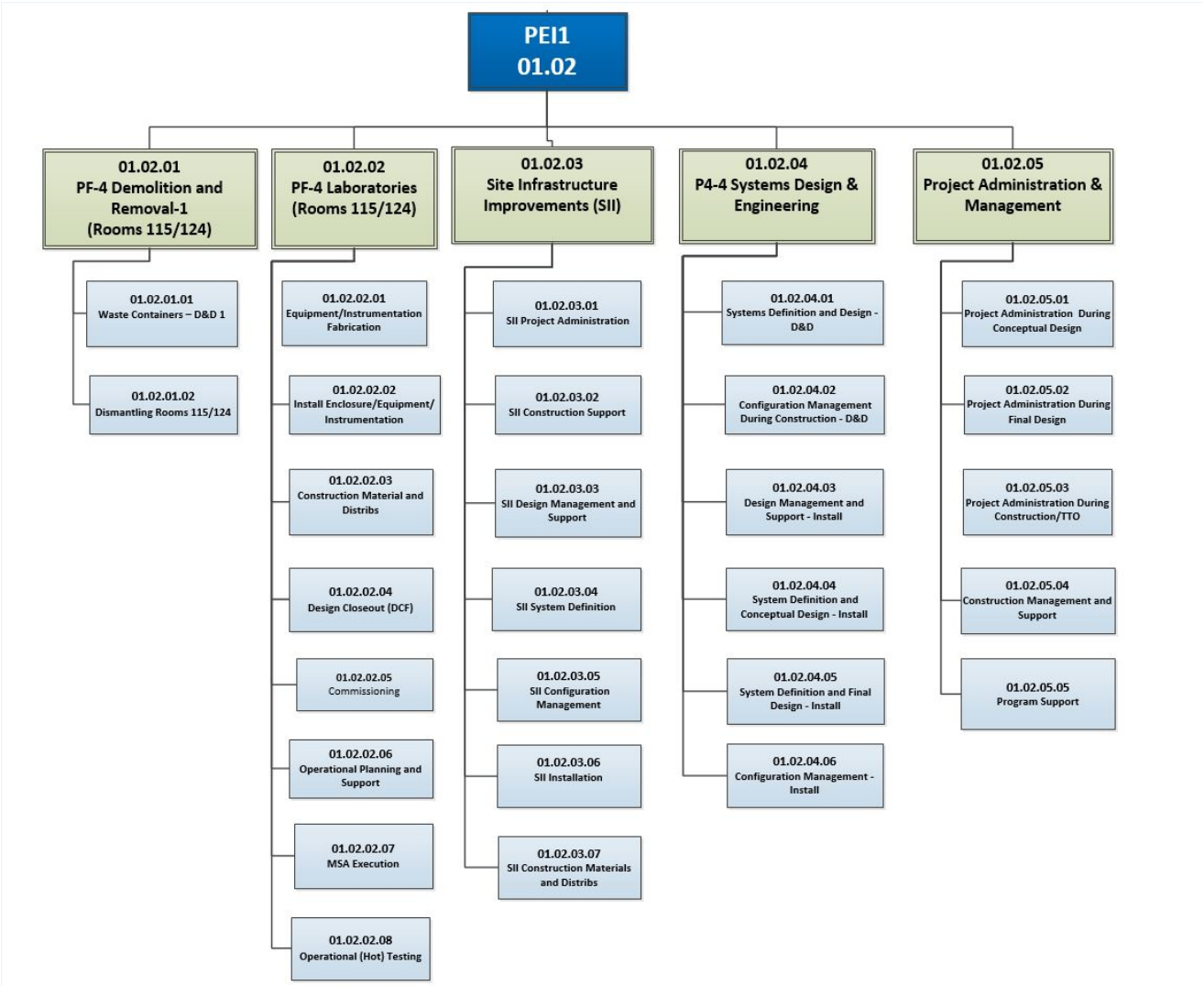

Figure 4-2 PEI1 Level 4 WBS

4.2 Schedule Baseline

The schedule completion dates are consistent with the integrated master schedule (IMS) approved by NNSA in February 2017. Key milestones for PEI1 are provided in Table 4-1.

Table 4-1 PEI1 Key Milestones

Level	Description	Date
1	Revised CD-1	8/21/2014
1	CD -3A Approved	3/20/2015
1	CD-3B Package Approved	12/22/2015
3	LANL-Submit CD-2/3 Package	3/30/2016
1	CD-2/3 Authorization for PEI-1	10/31/2016
3	LANL-Complete Glovebox Fabrication & Delivery	3/29/2017
3	LANL-Complete Room 115 Installation	6/25/2018
3	Complete CMRR Warehouse	11/21/2018
3	Complete Construction Support Facility	2/21/2019
3	LANL-Complete Room 124 Installation	9/4/2019
3	LANL-Complete Equipment Testing and Method Qualifications	12/20/2019
1	CD-4 Complete	4/30/2022

***Only the CD-4 schedule milestone date includes M&O MR and Federal Contingency.*

PEI1 must coordinate with ongoing operations in PF-4 in order to prioritize activities in support of the programmatic milestone to cease AC/MC operations in the CMR Building. As part of the prioritization, CMRR will work with the programmatic customers to develop alternatives for providing AC/MC analyses if there are gaps in AC/MC capabilities in the time between ceasing operations in CMR and completion of TTO for operations in PF-4.

4.3 Cost Baseline

The cost baseline includes all costs from design through procurement, construction, commissioning, readiness, and TTO.

The cost baseline for PEI1 subproject (updated in Table 4-2) aligns the approved CD-2/3 estimates with the final Contractor's Budget Base (CBB) and NNSA's PMO ODC, USACE CBB, and Contingency values approved through the implementation of the CD-2/3 Baseline in February 2017.

The cost baseline for the PEI1 subproject includes the following:

- CD-1 scope for management, planning, design, and minor work
- CD-3A scope for procurement of XRD equipment and D&D activities
- CD-3B scope for procurement of enclosures, procurement of additional programmatic equipment, installation/start-up of XRD instruments, repurposing/start-up of existing gloveboxes

- CD-2/3 scope for remaining enclosure repurposing, new enclosure installation, equipment installations, readiness/TTO activities, and SII work for the new construction support, glovebox and equipment staging, and warehouse facilities.

Subsequent to approval of the CD-2/3 Performance measurement baseline the PEI1 subproject completed the baseline Implementation as documented in the approved of the Baseline Change Proposal BCP-2017-001.

Table 4-2 PEI1 Subproject TPC Performance Summary ($M)

	CD-2/3 Baseline at ESAAB	CD-2/3 Baseline Implementation
Total Estimated Cost (TEC)	$168.9	$182.6
Other Project Cost (OPC)	$66.5	$65.9
Performance Measurement Baseline (PMB)	**$235.4**	**$248.5**
M&O Management Reserve (MR)	$65.7	$60.1
Contract Budget Base (CBB)	**$301.1**	**$308.6***
DOE Fee*	[1]	[2]
Total Contract Price	**$301.1**	**$308.6**
USACE CBB (TEC)**	$18.8[3]	$18.8[3]
NNSA Contingency	$48.5	$41.0
NNSA Project Management Oversight (ODC)	$25.6	$25.6
Total Project Cost (TPC)	**$394.0**	**$394.0**

[1] For FY2017 through FY2021, DOE Fee is currently part of the indirect rate applied to the CBB at 3.75% or $8.3M
[2] For FY2017 through FY2021, DOE Fee is part of the indirect rate applied to the CBB at 3.75% or $11.6M
[3] TA-46 Warehouse and TA-55 Construction Support Facility

The estimate basis for the PEI1 M&O cost baseline is a Class 2 bottom-up estimate, completed based on 100% design for construction, detailed staffing plans, vendor quotes for equipment procurements, commissioning, and TTO activities. Lessons learned from previous PF-4 work have been included in establishing resources and crews required to perform the work. The estimate includes traditional cost and schedule uncertainties as well as risk based contingency.

4.4 Spend Profile

A PEI1 subproject spend profile has been updated to reflect the CD-2/3 approved Performance Baseline. The summary-level spend profile, as shown in Table 4-3 PEI1 Subproject Planned Spend Profile includes M&O contractor costs, M&O contractor MR, USACE costs, NNSA project management oversight costs, and NNSA Federal Contingency.

Table 4-3 PEI1 Subproject Planned Spend Profile ($M)

	Prior Years	FY2017	FY2018	FY2019	FY2020	FY2021	Total
PEI1 TEC	$50.50	$44.30	$50.40	$29.00	$8.40	$0.00	$182.60
PEI1 OPC	$5.90	$11.60	$20.00	$20.20	$8.20	$0.00	$65.90
Subtotal	**$56.40**	**$55.90**	**$70.40**	**$49.20**	**$16.60**	**$0.00**	**$248.50**
Management Reserve	$0.00	$0.00	$4.00	$9.00	$35.00	$12.10	$60.10
CBB Total	**$56.40**	**$55.90**	**$74.40**	**$58.20**	**$51.60**	**$12.10**	**$308.60**
DOE Fee*							$0.00
Total	**$56.40**	**$55.90**	**$74.40**	**$58.20**	**$51.60**	**$12.10**	**$308.60**
USACE TEC	$2.90	$0.00	$15.30	$0.60	$0.00	$0.00	$18.80
Federal Contingency	$2.00	$3.00	$2.50	$4.60	$10.00	$18.90	$41.00
Federal IPT Support	$0.50	$4.30	$5.40	$5.80	$5.70	$3.90	$25.60
Total Project Cost	**$61.80**	**$63.20**	**$97.60**	**$69.20**	**$67.30**	**$34.90**	**$394.00**
Total Project Funding	**$97.81**	**$75.62**	**$50.21**	**$70.58**	**$78.18**	**$21.61**	**$394.00**
Forecasted Carryover	**$36.01**	**$48.42**	**$1.03**	**$2.41**	**$13.29**	**$0.00**	

* For FY2017 through FY2021, DOE fee is currently part of the indirect rate applied to the CBB at $3.75% or $11.6M.
FY Fees values: FY17 $2.1, FY18 $2.8, FY19 $2.2, FY20 $1.9, FY21 $0.5.

4.5 Baseline Change Control

As described in DOE O 413.3B, Change 2, a PB change represents an irregular event, which should be avoided to the maximum extent possible. Therefore, only changes to use contingencies to mitigate assumed risks (when materialized) are appropriate for baseline changes within the performance baseline management thresholds.

Upon CD-2/3 authorization, the scope, schedule, and cost baselines will be controlled under a formal baseline change control process. At that time, no change may be made to performance baseline elements without the review and approval of the appropriate Baseline Change Control Board (BCCB).

DOE/NNSA maintains overall authority for the PB and holds LANL accountable for the M&O CBB and the USACE to the USACE CBB. MR is held and controlled by LANL. Federal Contingency is held and controlled by DOE/NNSA.

Change control authority has been established by the DOE/NNSA at four levels to control baseline changes made during the performance of a project:

- Level 0 - Administrator of NNSA (NA-1)
- Level 1 - Administrator of NNSA (NA-1) and Associate Administrator for Acquisition and Project Management (NA-APM-1)
- Level 2 - Federal Project Director (FPD, NA-APM-1.5)
- Level 3 - LANL M&O Contractor (LANL CMRR PM with support from CMRR CIPT) and U.S. Army Corps of Engineers (USACE)

For the PEI1 subproject, the BCCB is chaired as outlined below:

- Level 0 BCCB - NA-1
- Level 1 BCCB - NA-1 and NA-APM-1
- Level 2 BCCB - FPD
- Level 3 BCCB - LANL M&O Contractor or USACE

The FPD will be a member of the LANL and USACE BCCBs and provide concurrence on the use of management reserve or Federal Contingency. The change thresholds for scope, schedule, and cost at each approval level are identified in Table 4-4. At each level, the designee who serves as the BCCB Chair approves baseline changes with concurrence and recommendation of BCCB members. The threshold table may be revised and updated, as appropriate, during the life of the Project.

At the subproject level, a request for a baseline change is initiated by preparing a formal change request using the latest approved change control process, i.e., baseline change proposal (BCP) or contingency allocation (CA). Backup documentation that provides the rationale and justification for a change to an approved baseline, and adequate cost estimate are reviewed by either the M&O contractor's BCCB, the USACE BCCB, or NNSA's BCCB (as appropriate to their levels of authority). The BCCB meets as needed to consider and deliberate each request, which may then be (1) approved or disapproved within the Board's approval authority; (2) endorsed and forwarded to the next higher-level board if the Board's approval authority is exceeded; or (3) deferred if additional study and/or information is needed. LANL will notify the PEI1 FPD when authorization and change control is necessary to ensure that no work is performed outside of the approved PMBs until a BCP or CA is approved. The PMBs and the CBBs will be kept in alignment with project changes as appropriate. The respective BCCBs should approve or reject a change request as soon as practical to ensure that the subproject schedule is not jeopardized.

The PEI1 PEP has incorporated the approved Baseline Change Proposals (BCP) actions through February 2017 in Appendix B which documents modifications of the Contractor's Budget Base from the CD-2/3 approval date of October 31, 2016.

4.6 Contractor Management Reserve and Federal Contingency Management

M&O contractor MR is the portion of the subproject budget that is available to the CMRR PM to handle realization of risk(s) that impact the subproject. MR amounts and thresholds are identified to provide flexibility in dealing with uncertainties and risks associated with the subproject elements (cost and schedule uncertainties, scope definition, etc.). MR is developed as part of the estimating process. In addition, risk-based MR is determined through a risk and opportunity assessment process currently known at LANL as a technical and programmatic risk assessment (TPRA). Risks identified as transferred outside the subproject are not covered by the MR and are addressed as part of the Federal Contingency.

MR amounts and event-based MR (determined by the TPRA analysis) will be managed by the CIPT using the Project Change Control Process. MR will be managed in accordance with Section 4.5.

Risk-based Federal Contingency determined by the federal TPRA will be managed at the NNSA level as a federal subproject contingency and included in the PB as each subproject achieves CD-2/3 authorization.

Contractor MR and Federal contingency will be managed in accordance with change control processes and thresholds provided in Table 4-4 ("Baseline Change Control Thresholds").

Contractor MR and Federal Contingency use logs will be maintained and distributed with approved BCP forms. The potential need for use of the contractor MR and Federal Contingency will be provided through the monthly trend reports. Adjustments to the estimate at completion (EAC) for MR and Federal Contingency will be made monthly. The EAC value of MR and Federal Contingency reflects the current estimate of remaining reserve available through project completion. A PEI subproject Baseline Log will be used to trace the MR and Federal Contingency distribution.

Schedule contingency is a risk-based period of time added to the subproject's critical path to accommodate unknowns and delays that may arise during work performance. Risk-based schedule contingency will be determined and presented in the Appendices with the baseline information. The schedule contingency durations and segments are included in the resource loaded schedule as a predecessor to final CD-4 closure and will be managed in accordance with the change control thresholds specified in Table 4-4.

Scope contingency can be defined as either additional or lesser scope (i.e., if the subproject has an EAC below the TPC, additional scope may be added or vice versa; if the subproject has a projected EAC above the TPC, reductions in scope may be made).

Table 4-4 Baseline Change Control Thresholds[1]

	Level 0 Deputy Secretary of Energy (Chief Executive of Project Management) (1)	Level 1 Undersecretary for Nuclear Security (Project Management Executive) and Associate Administrator for Acquisition and Project Management (1)	Level 2 Federal Project Director	Level 3 Contractor or USACE
Administrative			Administrative Changes: e.g. Name, title and editorial changes; Correction of Charge Code and/or WBS changes; changes that do not alter the subproject scope, cost, or schedule.	
Scope	Any changes in scope and/or performance that affect the ability to satisfy the mission need requirements as documented in the Program Requirements Document (PRD), a Key Performance Parameter, or are not in conformance with the approved Project Execution Plan, which must be reflected in the Project Data Sheet	Any changes in program driven requirements that impact project scope. Any changes in scope and/or performance that affect the Level 0 threshold.	Any change that affects the ability to comply with the Functional Requirements as documented in the RCD. Any change to the project description, justification, scope, and acquisition strategy that do not affect the Level 0 and 1 thresholds that does or does not require additional funding request from Congress. Any addition, deletion, or change of any WBS element at the control account level or higher.	Any changes not affecting defined Level 2 or higher scope baseline changes, including conversion of Planning Packages to Work Packages.
Schedule	Single or cumulative schedule extension of 12 months or more beyond CD-4 Performance baseline (PB) date approved at CD-2 that does or does not require additional funding request from Congress. Approval of twelve-month extension to CD-4 PB date (single or cumulative) requires notification to the Deputy Secretary, whether or not	Any change requiring the use of Federal Contingency (schedule) once the cumulative limit of 75% is exceeded compared to the approved CD-2/3 TPC Performance Baseline. Single or cumulative schedule extension of less than 12 months beyond CD-4 Performance baseline (PB) date approved at CD-2 that does or does not require additional funding request from Congress.	Single or cumulative baseline schedule changes to major milestones defined in the PEP. Any change requiring the use of Federal Contingency (schedule) to a cumulative limit of 75% of the Federal Contingency compared to the approved CD-2/3 TPC Performance Baseline.	Any change to activities in the project schedule that do not result in changes to major contractor milestones or USACE milestones. Any baseline change that uses contractor Management Reserve (cost and schedule).

	Level 0 Deputy Secretary of Energy (Chief Executive of Project Management) (1)	Level 1 Undersecretary for Nuclear Security (Project Management Executive) and Associate Administrator for Acquisition and Project Management (1)	Level 2 Federal Project Director	Level 3 Contractor or USACE
	additional fund request from Congress is required.			Any USACE baseline change that uses NNSA Authorized Reserve (cost and schedule).
Cost	An increase TPC in excess of the lesser of $100M or 50% (cumulative) of the approved CD-2/3 TPC Performance Baseline.	Any change requiring the use of Federal Contingency (cost) once the cumulative limit of 75% of the Federal Contingency delineated in the approved CD-2/3 TPC Performance Baseline is exceeded. An increase greater than the TPC but less than $100M or 50% (cumulative) of the approved CD-2/3 TPC Performance Baseline.	Any change requiring the use of Federal Contingency (cost) to a cumulative limit of 75% of the Federal Contingency delineated in the approved CD-2/3 TPC Performance Baseline.	Any distribution of contractor Management Reserve (cost and schedule) to the Performance Measurement Baseline.

[1.] Modified to incorporate the delegation of Project Management Executive (PME) authority for the PEI1 project to the Undersecretary for Nuclear Security, NA-1. Reference: CMRR Project: *Preliminary Project Execution Plan*, Major System Acquisition Project, CMRR-PLAN-PM-1901, R2, July 2016

4.7 Contractor Management – Work Authorization

In accordance with DOE O 412.1A, the PEI1 FPD (within their respective contracting officer representative [COR] delegated authority) will concur on NNSA issued major systems (MS) and line item (LI) project/subproject work authorizations. The MS/LI work authorization will authorize project/subproject work in accordance with the Approved Funding Plan (AFP), programmatic guidance, contract-specific COR appointment letters, and established procedures for administrative control of funds.

The PEI1 FPD will ensure MS/LI work authorization requirements have been satisfied before authorization to proceed by approving a Request for Project Authorization (RPA). The RPA specifies the defined scope of work authorized and the limit of funds that can be expended for that work. The RPA will include Total Estimated Cost (TEC), Other Project Costs (OPC), and Management Reserve (MR) for the project duration from inception to date of request without regard to multi-year funding profiles and will specify the current annual scope and annual funding (TEC, OPC, and MR) amounts being authorized. Periodically, the PEI1 FPD will review all RPAs under their cognizance to ensure they are consistent with MS/LI work authorizations and are appropriate for performance measurement; within mission and program institutional plans as applicable, within scope, and the agreed to general levels of effort.

The M&O contractor will notify the FPD and the Contracting Officer (CO), in writing, whenever there is reason to believe that the costs that is expected to be incurred under the approved RPA in the next ninety (90) days, when added to all costs previously incurred, will exceed 75% of the total amount so far authorized under the RPA. Within thirty (30) days of this notification, the M&O contractor will notify the FPD and the CO, in writing, of the estimated amount of additional funds, if any, required to continue timely performance under the performance period outlined in the RPA or for any further performance period needed, and when the project funds will be required.

5 PROJECT MANAGEMENT/OVERSIGHT STRATEGY

PEI1 will be managed by NNSA consistent with DOE O 413.3B, Change 2, NNSA will control the PEI1 baseline and oversee Laboratory personnel who will manage the day-to-day activities.

The LANL team will use the management system defined in SD350, *Project Management for Capital Asset Acquisition and Construction*. This section highlights the processes to be used by the CIPT. The interfaces and DOR between NNSA, USACE, and LANL are addressed in *CMRR Interface Plan for USACE Executed Projects at Los Alamos National Laboratory*.

The Project Controls approach established for Laboratory projects is defined in AP-350-109, *Project Controls*. The integrated Project Controls systems include use of work planning, scheduling and reporting software, cost control, funds control to include contingency management, project status meetings, Project status reporting, and the various parameters of the change control process.

NNSA management processes will govern the interface between USACE, NNSA and LANL personnel. The USACE Program Management Business Process (PMBP) process will govern the assigned work being executed through USACE contracts. The PMBP processes are defined in ER 5-1-11*, U.S. Army Corps of Engineers (USACE) (PMBP), September 2008.*

5.1 Project Reporting

The PEI1 FPD is responsible for ensuring integration of the M&O contractor and USACE reporting activities for the CD-2/3 Scope. The M&O Contractor is responsible for maintaining their PEI1 Baseline documentation and provides baseline reports to the FPD. USACE (and any direct federal contractor) is responsible to provide input to the M&O contractor related to their baseline as required per the approved DOR. The FPD will establish the specific project reporting requirements for the M&O and USACE. The PEI1 FPD is responsible for communications to NNSA PMO Manager for performance issues and impacts to the overall CMRR Project. The PEI1 FPD, LANL APM, and USACE will also produce PEI1 subproject reports for incorporation into the overall CMRR Monthly report. The M&O contractor is responsible for ensuring performance is reported in the PARS II. The PEI1 FPD approves the subproject performance data reported in PARS II.

All USACE funds management for NNSA project support will use standard USACE procedures using the Corps of Engineers Financial Management System (CEFMS) and USACE's Project Management System (P2). CEFMS will be used for financial management and reporting of all program/project funds, both in-house and contractor.

5.1.1 Earned Value Reporting/Performance Measurement Reporting

To report progress and ensure timely identification of potential performance slippage, earned value reporting is provided in accordance with AP-350-110, *Earned Value Management System*. Schedule status will be updated for physical progress at a minimum of once a month. The budgeted cost of work performed (BCWP) from this updated schedule and actual cost of work performed (ACWP) is recorded in the cost processor from the Laboratory's project accounting system. Control account managers (CAMs) are responsible for the management of work scope based on the evaluation of EVMS information. The Project manager is responsible for Project scope, performance, change control, and overall funds management on the Project.

Cost and/or schedule performance variances that exceed thresholds are reported in accordance with the *CMRR Project Controls Plan*, CMRR-PLAN-00013. Topics include but are not limited to:

- Estimate at or to completion
- Accruals
- Trend program

To-date variances and projections of to-go variances are identified in the Project trend program as defined in AP-350-152, *Trend Program.*

Control account performance analysis and reporting are prepared by the CAMs, issued to the APM for approval and submittal to the PEI1 FPD, and uploaded to PARSII. Data are validated to ensure integrity of the baseline, early identification of potential issues, and appropriate corrective action.

Prior to LANL EVMS certification, the CMRR Project will implement approved Project-specific surveillances to ensure, compliance with ANSI EIA 748-A, *Standard for Earned Value Management Systems*. ANSI EIA 748-A provides control points for capital asset projects in accordance with the DOE EVMS Gold Card. Applicable control points include:

- PB = CBB + contingency + fee + other direct costs
- CBB = PMB + MR
- PMB = authorized control accounts + planning packages + undistributed budget

For implementation of DOE O 413.3B, Change 2, requirements for an EVMS, PEI1 maintains reports and data for earned value management following AP-350-110, Project Controls. The LANL EVMS provides guidelines for carrying out activities associated with funds management, accounting, and work authorization. Control account planning is initiated by the identification of work scope, schedule, and budget. Targets from this plan are treated as primary constraints in the planning process. Control accounts are subdivided into detailed work packages for near-term work and planning packages for long-term work, where information is insufficient for detailed planning purposes. (See Section 5.1 for additional discussion of EVMS).

USACE projects are firm fixed price. As such, schedule performance and payments on the approved schedule of values will be reported monthly to NNSA by USACE.

5.1.2 Accounting Practices

Processes for carrying out activities associated with funds management, accounting, work authorization, and performance reporting are provided in SD350 and implementing AP-350-110. Formal reporting to DOE is performed at the control account and total project level. Control accounts are subdivided into detailed work packages to support contractor near-term work management processes and may be presented in planning packages for long-term work where information is insufficient for detailed planning.

Standard LANL processes are used in Project accounting. The following elements are included:

- Relevant accounting practices
- PADCAP procedure related to EVMS and ACWP
- Reconciliation to the Chief Financial Officer's (CFO's) accounting system
- Reporting available to aid in cost analysis

Funds received for the Project are reconciled to the associated scope of work and discrepancies are documented through the funds management process. Procedures and plans ensure that funds received are used for the specific scope. These controls ensure the project will not incur costs in excess of authorized funding. The EAC (per AP-350-155) is used to analyze funding requirements against authorization as changes are processed and trends are recognized.

5.1.3 Internal and External Reporting

Reports for both external and internal use are prepared in accordance with AP-350-110 and the requirements defined in DOE O 413.3B, Change 2,

The Project Controls engineer provides the CAMs and the PM with periodic reports and analysis of performance against the approved baseline. The data is validated to ensure the integrity of the baseline, identification of potential problems, and appropriate corrective action. Several measures of performance, including cost and schedule variances from the baselines, schedule progress, and estimates-at-completion, are managed.

5.2 Project Performance

Performance data will be prepared as appropriate for each reporting cycle.

5.2.1 Performance Measurement and Analysis

Milestones are established as part of the approval process of the Project baseline and are represented on the Project's Management Summary Schedule. The assessment of Project performance is performed at the control account level on a monthly basis. Project Controls integrates progress from the schedule and incurred cost data from LANL's accounting system with Project baseline data in LANL's EVMS database to provide a series of performance reports. The Project Controls Manager (PCM) monitors and reports the overall status of progress on a monthly basis. Progress is evaluated against the approved Project baseline using cost and schedule variance thresholds as part of this evaluation. The corrective actions will be tailored according to the Project impacts, such as major milestones agreed upon with the FPD. Interim progress reports or corrective action plans are tailored and, if necessary, formally documented and tracked. These interim progress reports or corrective action plans are used as part of corrective actions to bring the Project back to acceptable cost and schedule variance thresholds.

Variance analysis at the control account level is required for cost or schedule variances exceeding the established control thresholds. When cost and schedule variance thresholds are exceeded, the monthly executive summary report and variance analysis reports will provide a documented variance analysis. Variance analysis may be provided for variances below the established thresholds to manage emerging issues. The analysis will explain root causes and determine impacts. Variance analysis will also document proposed mitigation actions to reduce future similar variances. The EAC at the control account levels will be reviewed (with revisions made to the forecast, as appropriate) in the executive summary. In addition, corrective actions will be identified (if appropriate).

5.2.2 Accounting

All costs that are incurred are accurately recorded against the appropriate control account/work package/charge number. The monthly reports demonstrate that funding was used only for the purpose authorized. The costs for performing work on each control account will be documented on a monthly basis. The financial records will be complete and

accurate. The Project team CAMs will ensure that costs are posted accurately in their control accounts.

5.2.3 Program Codes/Control Accounts

The Project control accounts are based on the WBS to ensure that costs for every product and service are captured. The Project Controls team maintains the code of accounts. Before starting work, the program code/control account/work package must be activated or opened by notifying the assigned CFO Division representative. The code of account is closed to charges once the scope of work has been completed.

5.2.4 Validation of Charges

Each month, costs that have been posted through the end of the previous month are available for review. The Project CFO representative will provide a list of time and expenses that have been charged. The list is checked for accuracy.

Validation of Subcontractor Costs – The LANL subcontract technical representative (STR) receives invoices and accruals from subcontractors and will work with the Project CAMs to combine subcontractor's costs with the Laboratory costs to verify invoices, confirm work was performed, and that contractor costs are accurate. This verification must be performed before approval of the invoice. If incurred costs are not properly posted in the financial system, an accrual will be posted using one of three methods noted below.

1. Performance-Based Accruals System (PBAS) – a CFO-maintained database used to record accrual performance data, including all subcontract accruals
2. A manual method of posting accruals may be used to process accrual requirements. During the fiscal year, manual accruals to CFO require notification with justification to the Cost-Schedule group leader or designee. Manual accruals for year-end closing are required.
3. As necessary, estimated ACWP (accruals) posted directly into the cost tool for ensuring ACWP is directly related to BCWP. Estimated ACWP requires the approval of the Cost and Scheduling Division Office (CS-DO) and are reversed and re-accrued in the subsequent month(s) until the invoice is received (if necessary).

5.3 Risk Management

The Project risk management process and assessment is documented in the *Risk Management Plan* (RMP, CMRR-PLAN-1902) and *PEI Risk Assessment Report* (RAR), (CMRR-RPT-00001), which are part of the CD-2/3 package.

The risk management process includes a TPRA, which is a summary of large event-based risks that are outside the control of the Project and which can have dramatic effect on the successful completion of the Project. The RMP and RAR describe the risk management strategy. The RMP defines the scope and process for identification, evaluation of impact, and management of applicable risks and opportunities. The RAR provides detailed risk assessment and quantification information as well as a statistical analysis used to calculate the risk-based cost and schedule contingencies or TPRA contingencies. Risk management considerations have been used throughout the Project's development to allow the early incorporation of risk handling/mitigation strategies into the base project. Risks will continue to be managed throughout the Project on a relative basis to ensure planned mitigations are in place and are supporting the planned risk-handling strategies.

The risk and opportunity assessment forms were developed using Laboratory guidelines and checklists and discuss each risk element in detail. For each risk element, the cost and schedule impacts as well as mitigation and control features and residual risks are discussed. The residual risk impacts will be used to help establish the Project cost contingencies. The established risk contingency confidence level used in the CD-2/3 cost estimate for TPRA contingency is 85%; although confidence levels and associated costs are provided in the RAR at 80%, 85%, and 90%.

The role of Project risk assessment and management in overall Project management is shown in Figure 5-1. The Project risk assessment team worked with the Project team and SMEs to identify potential sources of unwanted performance and opportunities, the likelihood of occurrence, and the predicted effect on performance.

Risks and impacts that are outside the Project's control are transferred to the federal risk register. These NNSA risks for PEI1 are presented in Appendix A.

When NNSA requests USACE serve as construction agent for a project, NNSA and USACE will consult closely to ensure that there is agreement on cost and schedule risks, and this is reflected in the level of contingency for the project, prior to NNSA CD-2 - Approve Performance Baseline (PB). USACE may assist with the development of the tailored NNSA Risk Management Plan included in the project specific PEP. USACE will ensure that NNSA identified risks are included in the Risk Management Plan of each project specific PMP.

5.3.1 Risk-Based Contingencies

The Project has defined contingencies for unplanned events within the current Project scope. These contingencies are incorporated into the Project baseline for both cost and schedule as required by DOE G 413.3-7A, *Risk Management Guide.*,

Based on the TPRA, cost contingency will be included in the TPC to establish 85% confidence of Project completion within estimated costs. In addition to the TPRA risk-based contingency, traditional contingency will be identified and included in the TPC.

Risks associated with PEI1 (including SII scope) that were determined by the PEI1 Risk Management Board to be transferred to NNSA are presented in Appendix A ("PEI NNSA Risks"). The LANL Risk Management team will support NNSA in statistical analysis of the transferred and federally owned risks and establish a risk-based federal contingency.

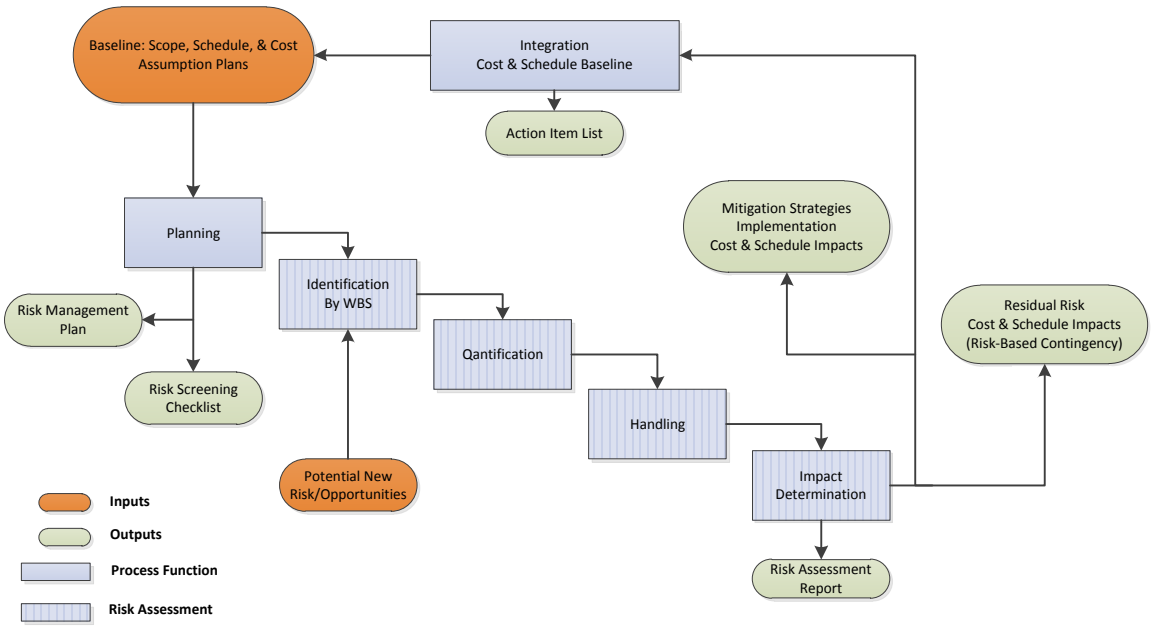

Figure 5-1 Project Risk Analysis

Risk-based schedule contingency will be added to the completion dates to establish the CD-4 milestones. The cost of schedule contingency will address the confidence-based traditional schedule contingency as well as the risk-based schedule contingency. The risk-based cost of schedule contingency is primarily based on hotel loads for delays or additional work. The traditional schedule contingencies for individual subprojects are not cumulative because of subproject overlaps and are bounded by the TPRA schedule contingency.

Note that the Risk Analysis and the Risk Watch List transfer some risks to NNSA. For example, all design and construction risks for USACE-performed activities are transferred to NNSA. Risks for NNSA and the contractor are managed in a combined database per the RMP. The PEI1 RAR was developed to include a separate analysis of the contractor- and NNSA-owned risks.

5.4 Engineering and Technology Readiness

DOE guidance is provided in DOE G 413.3-4A, *Technology Readiness Assessment Guide*. As shown in Figure 5-2, the technology readiness level (TRL) scale ranges from TRL-1 (basic principles observed) through TRL-9 (total system used successfully in Project operations). The scope of CMRR entails installing commercially available and well known equipment and processes. Much of the same equipment is currently operating in existing CMR Building, PF-4, and RLUOB. No new critical technologies or first-of-a-kind engineering endeavors are being developed or installed by PEI1.

The Project will install modern technologies for analytical processes. The equipment is comprised of commercially available catalog items, not developmental. Systems such as enclosure fire protection are commercially available, code compliant systems.

As design is completed for construction/installation, all of the technologies are at a minimum of technology readiness level (TRL) -7 and some score at a TRL-9.

The engineering readiness for PEI1 is established through requirements of DOE O 413.3B, Change 2, and related guides, the LANL *Engineering Standards Manual* (STD-342-100), and national consensus standards.

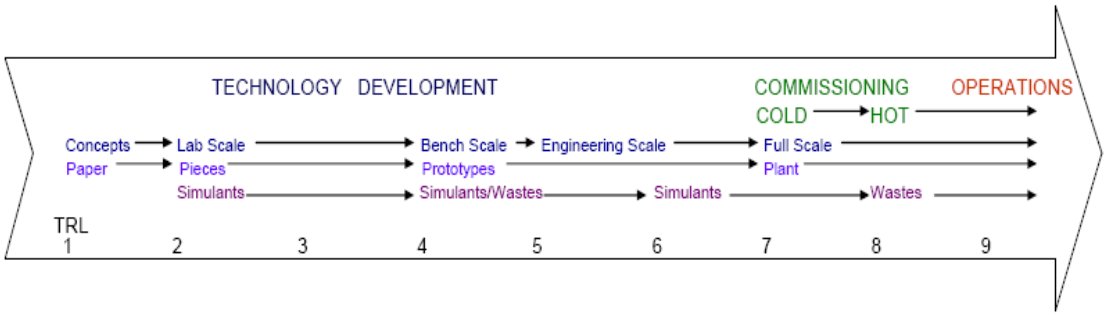

Figure 5-2 Technology Readiness Level

5.5 Alternatives Analysis and Selection

The presentation of alternatives and the selection of preferred alternatives for PEI are presented in the *Conceptual Design Report* for revised CD-1. This PEP is developed around the CD-1 selected alternative to use existing facilities (including PF-4) to house AC/MC programmatic capabilities.

5.6 Environment, Safety, and Health

The CMRR Project will follow the established TA-55 ESH requirements and processes for subcontractor health and safety plans, integrated work documents (IWDs), permits requirements identification (PR-ID) documentation, radiological work permits (RWPs), waste minimization/pollution prevention (WMin/PP), and other items.

For USACE executed work, all construction site and office safety will be addressed on a project specific basis. NNSA will provide appropriate safety training regarding hazards, responsibilities, and procedures unique to NNSA sites such as those related to nuclear materials. However, in addition to the safety requirements in place at the respective sites, USACE personnel and contractor provided resources will be in strict compliance with OSHA 1926, *Safety and Health Regulations for Construction*, and Engineer Manual 385-1-1, *Safety and Health Manual*. Additional Safety training requirements are described in DOE O 440.1B. In the event of a conflict between the USACE Safety Manual and the applicable site safety requirements, including OSHA, the more stringent requirement will govern.

5.6.1 Environment

For LANL performed work (or work that is performed by Laboratory employees or staff-augmentation subcontract personnel) the Project will use the Institutional environmental implementing documents flowing from the LANL PD400, *Environmental Protection*, program description and SD400, *Environmental Management System*. The Project relies heavily on the PR-ID tool to help clarify Project-specific environmental requirements and acceptable methods to address these requirements. Construction activities from the Project are expected to generate several different types of waste (hazardous and chemical waste, low level radioactive waste, mixed-low level radioactive waste, transuranic waste and non-hazardous industrial waste). The Project will coordinate with TA-55 and LANL Waste Management Services as part of construction planning and will endeavor to minimize waste

generation. For subcontracted environmental work, LANL P101-12 (*ES&H Requirements for Subcontractors*) is flowed down to the subcontractor using subcontract Exhibit F. As required in Exhibit F, the subcontractor shall address environmental requirements in a subcontractor-developed, Project-specific, ES&H plan. The plan is reviewed and accepted by the Project to ensure that it meets requirements prior to the start of work.

Environmental requirements/implementation for USACE-managed work will be controlled through USACE EM-385 Manual.

5.6.2 Safety and Health

For LANL self-performed work (or work that is performed by Laboratory employees or staff-augmentation subcontract personnel), the Project uses the Institutional safety implementing documents, which are driven by 10 CFR 851, *Worker Safety and Health Program*, 10 CFR 835, *Occupational Radiation Protection*, and DOE O 151.1C, *Comprehensive Emergency Management System*. Existing and approved Laboratory procedures provide a procedure set for self-performed work and a basis for managing subcontractor safety and health performance.

For subcontracted work, P101-12, *ES&H Requirements for Subcontractors*, is flowed down to the subcontractor through their subcontract. As required in Procurement's Solicitation Exhibit F, the subcontractor shall address occupational health and safety requirements in a subcontractor-developed, Project-specific ES&H plan and associated IWDs. The plan is reviewed and accepted by the Project to ensure that it meets requirements prior to the start of work.

5.6.3 Integrated Safety Management

The integrated work management (IWM) for the Project is provided by tailored actions of the Project to achieve implementation of IWM per the DOE approved description P300, *Integrated Work Management*. The five-step IWM process for performing work is executed by the Project as follows:

1. Define the Work – Functional and operational requirements will drive design activities. In support of the Project scope, implementation of IWM per P300 and/or the work provider subcontract addresses industrial safety, occupational health, and nuclear safety.
2. Identify and Analyze Hazards – As an integral part of the development of the design criteria and detailed design package, health and safety professionals review and comment on the documentation. At the end of the design process, the facility manager generates a site hazard analysis. This information is provided to the construction subcontractor.
3. Develop and Implement Controls – The construction subcontractor is required to develop task-specific IWDs based on the site hazards and the work to be performed. To ensure that work is performed safely, the subcontractor shall develop a health and safety plan. The IWDs are reviewed daily with all workers to ensure site safety.

4. Perform Work Safely, Securely, and in an Environmentally Responsible Manner – The construction subcontractor shall have safety professionals as part of the Project team ensure t0hat construction activities are performed safely and according to applicable regulations. In addition, a Laboratory STR and safety oversight inspectors shall oversee the subcontractor to ensure the work is performed in a safe manner.
5. Provide Feedback and Strive for Continuous Improvement – At the end of the Project, the Project team will seek and collect feedback from Project team members, subcontractor and sub-tier personnel, and the customer on the safety process and opportunities to improve the process. These lessons learned shall be documented and distributed for future project considerations.

5.6.4 Quality, Safety and Occupational Health

LANL SD330, *Los Alamos National Laboratory Quality Assurance Program* (QAP) describes the shared attributes of quality and safety management systems through the integrated safety management system described in SD100, *Integrated Safety Management System Description* with embedded 10 CFR 851, *Worker Safety and Health Program*.

5.7 Safety Design Strategy

PEI1 will be executed within established (and DOE-/NNSA-approved) facility safety and security envelopes at the TA-55 site. PF-4 is an operational HC-2 and Security Category-I facility. LANL has evaluated PEI1 to determine if the scope constitutes a major modification to PF-4 in accordance with (1) the DOE-/NNSA-approved safety and operating requirements and (2) the six criteria established in Table 8-1, *Major Modification Evaluation Criteria* of DOE STD-1189-2008, *Integration of Safety into the Design Process*. The major modification determinations developed by LANL and approved by NNSA confirmed that none of the PEI work constitutes a major modification.

To document the safety basis approach for PEI, an approved *CMRR PEI Safety Design Strategy* (CMRR-AP-0321) identifies the continuing safety evaluation approach during the design, construction, and start-up by performing updates to the Major Modification Determination, hazard evaluations, and USQD for PEI and PF-4 design packages (as needed).

Key safety basis deliverables and support activities for the Project were identified and are integrated into the project schedules. To ensure that safety-in-design concepts are implemented throughout the Project, a safety basis representative is a member of the CIPT, with responsibilities to include performing major modification determinations and participation in formal project reviews.

The Safety Basis group maintains control of the formal safety basis documentation and they will incorporate any necessary project subsystem documentation into the DSA as necessary.

A safety design integration team (SDIT) has been established (including PEI1 representation) to maintain close communication and interface between PEI1 and the TA-55 Safety Basis organization.

5.8 Hazard Analysis

As defined in the 10 CFR 830, *Nuclear Safety Management*, areas of TA-55 are non-reactor NFs and must meet safety basis requirements of Subpart B of the rule. Subpart B recommends use of DOE STD 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses, Change Notice No. 3*, as a safe harbor for meeting safety basis requirements. Under this standard the need for safety class (SC) and/or

safety significant (SS) SSC is based upon the unmitigated consequences of the associated bounding accidents. PF-4 has an approved DSA and defined SC and SS SSCs. Project execution will include continuing safety evaluation during the design, construction and start-up, and performing necessary hazard evaluations (as needed).

PEI1 will be executed within the established DOE/NNSA-approved, safety basis, and security envelopes at the TA-55 site. LANL has evaluated PEI and determined that none of the PEI1 scope constitutes a major modification to PF-4 in accordance with (1) the DOE/NNSA approved safety and operating requirements, and (2) the six criteria established in Table 8-1, *Major Modification Evaluation Criteria*, of DOE STD-1189-2008. LANL has determined that none of the work constitutes a major modification.

TA-55 has successful and proven operations, safeguards & security (S&S), safety, and management processes and procedures are in place to ensure that work is executed safely, and that AC/MC operations will not challenge the approved safety basis. PF-4 has been specifically designed and operated to accommodate future equipment installations similar to those proposed under PEI1. Proposed equipment installations include gloveboxes and other laboratory enclosures as well as scientific equipment to be located in various rooms in PF-4. These rooms are configured to support new equipment installations with minor modifications to interface with facility.

To document the safety basis approach and integration of safety into design for PEI1, *a CMRR PF-4 Equipment Installation Safety Design Strategy* (CMRR-AP-0321) was prepared to document safety evaluations during the design, construction and startup. Updates to the Major Modification Determination and hazard evaluations have been completed. Unreviewed safety question determination (USQD) for the PEI1 100% design packages have been completed.

The new facilities to be designed and constructed through USACE are required to have hazard analysis performed to document construction and operations hazards for the new facilities. The analyses have been performed for the non-nuclear facilities through LANL and include Facility Hazard Characterization Determinations. Reference, Facility Hazard Categorization Determination (CMRR-HAR-55-CSF) *CMRR Construction Support Facility, TA-55 Building CSF.*

5.9 Fire Protection

The Fire Protection and suppression program required by DOE 420.1C, *Facility Safety*, is defined by the LANL Fire Protection Program as documented in PD1220, *Fire Protection Program*, and the LANL Fire Protection Manual. Also applicable are TA-55-specific fire requirements. PEI1 implements the LANL Fire Protection Program to ensure that fire protection and fire suppression capabilities are not impacted. The design process includes input and review by Laboratory Fire Protection and (when required by code or LANL Fire Protection Program) approval by the Fire Marshall. Construction planning documentation will stress limitations on combustible loading and will place limits on the combustible materials that can be introduced into work areas inside TA-55.

For USACE executed work, Fire Protection and Fire Alarm designs and submittals shall be coordinated with the NNSA-designated authority having jurisdiction (AHJ) prior to issuance for construction. The AHJ shall also be involved in all inspections and testing of these systems.

5.10 Value Engineering/ Value Management

PEI1 is replacing systems and equipment with new ones that perform the same, or nearly the same, functions; hence value options and alternatives are limited (i.e., implementation of value

engineering [VE] is not appropriate for this effort). Detailed VE studies will be documented for the new facilities designed through USACE.

5.11 Life Cycle Cost

The Life Cycle Cost (LCC) was developed for the revised CD-1 approval in 2014. The CD-2/3 submittal was developed to implement the recommended path forward to execute the CMRR subprojects at LANL as envisioned by NNSA. The alternative to use existing RLUOB and PF-4 facilities at TA-55 to achieve programmatic AC/MC operations remains valid. See the PPEP, CMRR-PLAN-PM-1901, for additional LCC discussions.

5.12 Safeguards and Security

The safeguards and security (S&S) requirements established for PEI1 are integrated into design, construction, and operations in accordance with NNSA policies for integrated S&S management (ISSM). The *Safeguards and Security Plan* (CMRR-PLAN-2505) is closely integrated with the established S&S requirements at the TA-55 site. A review of existing TA-55 Vulnerability Assessment (VA) report as completed by LANL's security division and it was determined that PEI1 activities are all bounded within existing VA. The VA review was documented in a letter to the Project.

5.13 Configuration Management

CMRR *Configuration Management Plan* and the *Project Engineering Execution Plan* take credit for existing institutional and TA-55 configuration control processes. For work in PF-4, Configuration Management will use existing and approved processes required by the TA-55 facility owner and operations. The TA-55 Configuration Management system and procedures have been previously approved by DOE and are compliant with DOE STD-1073-2003, *Configuration Management*. Project documentation for work within TA-55 and its SSC will be managed and executed through the TA-55 design change process and the USQD processes for PF-4 to ensure coordination and compliance with the approved configuration. PEI1 will submit DCFs to accomplish work through existing procedures and processes, the *Engineering Standards Manual* (ESM), and TA-55 facility procedures to accomplish changes to SSC.

PEI1 will use a graded approach for design, construction, and configuration management in the application of quality requirements with the categorization of SSC. This approach has been and will continue to be conducted using LANL ESM and PD340, *Conduct of Engineering for Facility Work*.

During the design process, the assigned TA-55 CSE determines the management level (ML) designations according to AP-341-502, *Management Level Determination and Identification of Quality Assurance and Maintenance Requirements* coupled with TA-55 facility-specific practices. The CSE determines performance category (PC) levels to be applied (under DOE STD-1020, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*) to the subsystem and component replacements planned.

The ML determination is documented on an ML determination form and associated key factor sheets in accordance with AP-341-502. Individual SSCs have been graded as ML-1 to ML-4 using the same process, and is documented in PEI1 design documentation. The required management elements are documented in various project plans, reports, procedures, controls, documents, studies, analyses, and assessments based upon the ML determination.

Software-specific replacements and activities for component replacement will be identified and either included within the overall system planning or in separate software planning documents.

These requirements are implemented in accordance with P1040, *Software Quality Management*.

5.14 Document Control and Records Management

The CMRR Project records will be managed according to PSI-PLAN-00001 (*PSI Document Control Program Plan*), which was developed in accordance with AP-350-235 (*Project Document Control and Record Management*) to ensure that management of all Project files and documentation meets the objectives of 10 CFR 830, Subpart A. The document administrator will control transmittal of records to TA-55 for inclusion in their records management system.

At Project completion, specific documents will be turned over to facility operations for use in facility operations and maintenance of the facilities configuration management. These records are defined in AP-350-430, *Project Closeout*. The remaining documents are retained electronically in LANL's electronic document system. The paper records are sent to LANL's central records center for permanent retention.

USACE Engineering and Regulation No. 415-1-10, Contractor Submittal Procedures, presents the contractor submittal procedures. USACE is responsible for overall management and control of all USACE contractor submittals, and to assure that submittals are timely, appropriately reviewed, certified, and comply with the USACE contract.

The USACE PDT, with input and advice from NNSA's IPT, will be responsible for developing the list of submittals required to show proposers the minimum information that must be submitted to successfully perform work in accordance with their contract. The level of detail will be determined by the type of project, complexities, and delivery method such as design-build or design-bid-build. Submittal review and approval are important quality management functions requiring participation and input from most individual PDT members. As part of the process, the PDT will determine which contractor submittals require Government Approval and by which PDT members.

For USACE executed work, maintenance of the official contract file is the overall responsibility of the USACE Contracting Officer. The CO shall maintain all contract file documentation using the VCE Paperless Contract File (PCF). At the time of contract closeout, all contractual records shall be retired IAW standards found at FAR 4.804 and DFARS 204.8.

5.15 Systems Engineering

SD350 (*Project Management for Capital Asset Acquisition and Construction*) identifies the Laboratory systems engineering approach to be applied to capital projects.

PEI1 is using a systems engineering approach for requirement and design development in accordance with the Laboratory's *Conduct of Engineering* procedures, PEI1 requirements are captured in a project-specific RCD that describes the functions, performance, interface, and adjacency requirements, and the design criteria for structures, systems, and components (SSCs). The RCD also documents PEI1 code of record. PEI1 performance specifications define technical design, and test requirements. A two-step design evolution process, consistent with the DOE critical decision process was followed with multiple review cycles and comment resolutions formally documented.

Reliability, availability, maintainability, and inspectability (RAMI) are attributes that have been included in the LANL Engineering Standards and construction performance specifications.

PEI1 systems engineering activities are benefited by the facility Cognizant Systems Engineers (CSEs) who have day to day responsibilities for the maintenance and operability of plant

systems. The LANL CSE program is formalized using procedure AP-341-101, *Designating Vital Safety Systems and Cognizant System Engineers*. PEI1 will utilize PF-4 CSEs to help establish requirements, provide configuration control, support design reviews, and support design approvals, commissioning and design package close-out.

5.16 Quality Assurance

These requirements establish standards for nuclear safety related SSC, which are applicable to portions of the PEI1 work scopes.

SD330, *Los Alamos National Laboratory Quality Assurance Program*, meets the requirements of 10 CFR 830, Subpart A and DOE O 414.1D, *Quality Assurance*. All Laboratory organizations (including the PEI1 IPT) are required to implement this procedure. In addition to SD330, PEI1 will use ASME NQA-1-2008, with 2009 addenda, *Quality Assurance Requirements for Nuclear Facility Applications*, as the appropriate consensus standard for nuclear construction to support the development and implementation of the CMRR Project Quality Assurance (QA) program. The CMRR Project will perform work on a graded approach in accordance with SD330, the *Project Quality Management Plan* (PQMP), and PSI-PLAN-00002 (*Quality Management Plan for PSI Division Projects*). The PQMP further establishes the quality requirements and structure for the CMRR Project.

LANL organizations performing work for PEI1 are required to follow the latest approved LANL policies. This does not preclude Laboratory organizations and subcontractors, including the design agency (DA) and the construction agency, from operating under their own QMPs and associated procedures; however, they must be consistent with the LANL QMP and fulfill all the requirements stipulated therein.

Work conducted by LANL subcontractors at all tiers shall meet PEI1 QA requirements as defined in SD330 and the PSI PQMP. First-tier subcontractors performing ML-1 or ML-2 work under the requirements of their own QA program shall have been evaluated by LANL's QA Division and listed on the LANL Institutional Evaluated Suppliers List. The ASME NQA-1-2008, with 2009 addenda consensus standard shall be flowed down in a graded approach to all subcontractors performing quality-affecting work.

The level of rigor to achieve compliance with SD330 is defined by the ML for the SSC impacted by each subproject and segment. The ML and related quality levels for PEI1 SSC. Management levels range from; ML 3-4, for balance of plant systems that are not credited in the facility DSA, to ML-1-2 components of SC systems.

Given that SSC (primarily nuclear confinement enclosures) must have a reasonable assurance that they will perform their safety function, rigorous quality controls are required for design, procurement, storage, handling, installation and commissioning of these systems. Safety system attributes are considered ML-1 (SC) or ML-2 (SS). Reasonable assurance that these SSC will perform their safety function must be ensured through procurement of the items in one of two methods: (1) by NQA-1 qualified vendors/suppliers, or (2) through commercial grade dedication (CGD) of items or services in accordance with NQA-1, Part II, Subpart 2.14.

Work through USACE and their subcontractors will be performed on a graded approach through their QA plans to meet the requirements of 10 CFR 830, Subpart A and DOE O 414.1D, *Quality Assurance*.

The USACE Quality Management Plan (QMP) addresses the quality components for USACE executed work. The QMP documents the project-specific quality control (QC) and assurance (QA) procedures appropriate to the size, complexity, and nature of the project. QA refers to

those actions taken by USACE to ensure that all of its Contractors have adequate policies, processes and procedures in place to ensure the desired level of quality and that its Contractors are compliant. QC refers to those actions that ensure that the level of quality required by the Contractor statement of work and plans, drawings, and specifications is attained. USACE implements a scalable approach to QA/QC to ensure that it is cost effective and consistent with stakeholder requirements.

Design quality management procedures will be performed in accordance with Engineer Regulation (ER) 1110-1-12, Engineering and Design: Quality Management as supplemented by regional and District quality procedures.

Construction quality management procedures will be performed in accordance with ER 1180-1-6, Construction Quality Management as supplemented by regional and District quality procedures.

5.17 Communication Management

The communications strategy for the CMRR Project uses several elements to ensure effective communication. Figure 5-3 provides an illustration of the complexity of communications required for this Project.

A Communications Procedure is in development to help guide and standardize communications within the FIPT, CIPT, and key stakeholders for DOE, NNSA, and LANL. Elements of the communications strategy involve various stakeholders and include monthly Project performance assessment meetings and Project status reports, interim progress reports and corrective action plans, monthly program/Project reviews, and quarterly reviews.

The primary Project interfaces between the Laboratory and NNSA will be between the LANL PM and the FPD. Communication outside LANL to the public or to other federal agencies are coordinated through the PSI Division Director, NA-LA, NA-196 (Plutonium Program Manager), and NA-APM.

The IPTs are comprised of personnel from Project Management, Construction Management, Project Engineering, Project Controls, Quality Assurance, TTO, and others. The individuals' Project communications and responsibilities are through the FIPT and CIPT. For discipline support, the individuals maintain direct communications to their home organizations.

For subcontractors, the communication protocols for scope, schedule, budgets, contract documents, design inputs, other technical reporting, and construction documentation are through PEI1 STR and the ASM subcontract administrator. Direct interface for design deliverables within the contracted scope is through the Project Engineer (who manages the interface and communications through the Procurement Engineer, STR and ASM subcontract administrator with the subcontractors), Laboratory design engineers, systems engineers, design authority, and other SMEs for the formal design review process.

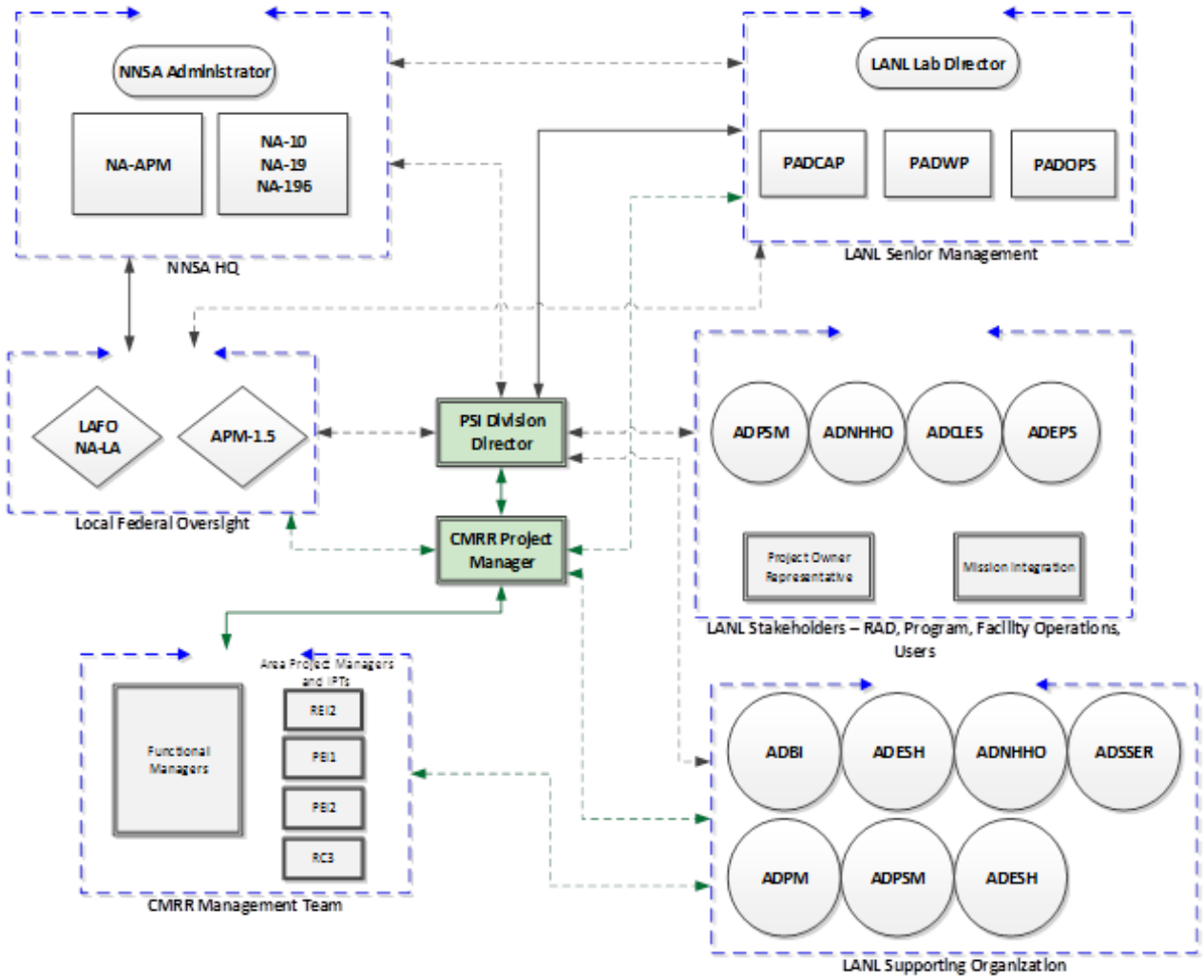

Figure 5-3 Project Communication Interfaces

For USACE executed work, frequent and effective communication at all levels will be the cornerstone for the success of the program and partnership. At the program level, communication will be proactive and frequent. Communication will include programmatic reporting (scope, schedule and cost), internal communication and external communication (media, public, elected officials, trade and industry groups). Requests for status, progress reports, briefings, or other program specific information will be submitted to respective executing District or Major Subordinate Command which will direct the preparation and release of information in coordination with USACE and NNSA Principal Representatives, as appropriate.

External communication such as justification and explanation of NNSA's programs before Congress and other departments, agencies, and offices of the Executive Branch shall be the responsibility of NNSA. USACE may provide assistance to support NNSA's justification and explanation if requested. In general, NNSA is responsible for all public information.

Internal communication is program or project related communication within USACE or between USACE and NNSA. The USACE PM shall provide the briefings on the PMP implementation and discuss issues, concerns, implementation status, progress, scope, schedule, budget as

appropriate. Each District shall report the project status each month to NNSA and the District leaders using a Project Review Board or an alternate forum.

The USACE PM will provide, the required project metrics, status and updates to NNSA on a monthly basis, in an approved format and frequency for upward reporting. At a minimum, the reports will include scope, cost, schedule, resources and associated risk mitigation and impacts.

Communication concerning USACE contracts shall be only conducted by personnel formally authorized to commit the organization to a contractually binding obligation. Further, communication with the USACE contractor will be limited to the organization that has the direct contractual relationship.

5.18 Testing and Evaluation

As applicable, an Acceptance and Test Plan is developed as part of the PEI1 final design activities and is included in the final design documentation. The plan identifies tests to safely support evaluation of the construction completion and system performance related to requirements for any impacted SSCs. The facility has established a checklist for the start-up of gloveboxes, enclosures, and programmatic equipment. This checklist will be used by PEI1 for start-up as part of the Post Modification Test Plan.

The plan delineates and identifies the test procedures, standards, and QA controls required to perform testing activities during design, procurement, and operational start-up. The overall testing program strategy is intended to provide information and verify assumptions to support design, fabrication, construction, and start-up activities. Data will be used to validate design and to verify system compliance with established criteria and requirements. Specific component test and system acceptance test procedures will be developed in coordination with the LANL Start-Up/Commissioning Organization, TA-55 systems engineers, and Safety Basis for acceptance, transition, turnover, and operational readiness. These procedures provide a means for conducting tests in a safe and orderly manner. The test procedures delineate standards and QA controls required to perform testing activities. The strategy is intended to provide baseline operating information and verify functional and technical requirements for PEI1 SSCs are met or exceeded. Subsequent to, or in conjunction with, PEI1 acceptance testing, the facility performs related technical safety requirement (TSR) surveillances to ensure upgraded systems are functioning within the DSA. Project processes and procedures for test, evaluation, start-up, and turnover are consistent with lessons learned from other TA-55 programmatic equipment installations.

5.19 Project Reviews

LANL provides internal reviews of PEI1 prior to requesting NNSA-independent reviews for CD approvals.

Reviews are used to assist upper management in confirming readiness for PEI1 to proceed. DOE O 413.3B, Change 2, mandates certain types of project reviews according to project maturity. Department policy also mandates that an annual peer review be conducted that covers PEI1's status and performance. Technical review plans are developed by the federal review leads for each review as major deliverable stages are completed. Review plans may address tailored lines of inquiry at the request of the Acquisition Executive, the Plutonium Program Office, the PSO, Project Management, or the FPD. Corrective actions are developed by the LANL PM and the FPD to respond to review comments.

Reviews to be coordinated between the CMRR team and the FIPT to achieve CD-2/3 authorization include:

- PEER review(s) of in process development of the CD-2/3 documentation
- ICE performed through the Office of Project Management Oversight and Assessments (PM)
- Performance Baseline External Independent Review (EIR) by PM
- Project Management Risk Committee (PMRC) review of performance baseline prior to presentation to ESAAB
- ESAAB review for final approval of the CD.

Annual budget requests for PEI1 subproject will include resources to fund required reviews.

5.20 Transition to Operations

The CMRR Project is responsible for the transition and consolidation of AC/MC capabilities from the CMR Building to the TA-55 site. The *CMRR REI2 and PEI1 Transition to Operations (TTO) Plan* (CMRR-PLAN-00004) provides the detailed strategy and scope for capability transfers executed by PEI1. The TTO Plan is also an agreement on the end state between PEI1, program operations, and its management.

Glovebox lines and X-ray diffraction (XRD) instruments in PF-4 Rooms 115/124, and NDA instruments will be turned over to operations in phases. For each glovebox line and equipment turnover, the threshold objective will be the following:

- Complete the preparation of operational startup;
- Conduct the management self-assessment to demonstrate the laboratory utilities, enclosures, programmatic equipment, operational procedures and maintenance plans, and training of personnel readiness for radiological operations;
- Obtain approval from the TA-55 Facility Operations Director to startup plutonium operations; and
- Complete programmatic equipment testing with plutonium (“hot testing”) for the following 11 operations shown in Table 5-1. The hot testing includes (1) deliberate startup of operations following the approved Startup Plan for introducing nuclear materials; (2) equipment testing and optimization for plutonium analysis; (3) validation of equipment and processes with plutonium to demonstrate equivalent analysis quality delineated in the established validation procedure.

Table 5-1 PEI1 Confirmations

	Operations in PEI1 Lab Requiring Hot Testing
1	XRD Instruments
2	NDA Instruments
3	GB1101
4	GB1102
5	GB197/GB198
6	GB1132/GB1133
7	GB1151/GB1152
8	GB184/XB148
9	GB261/GB262
10	GB1116/GB233
11	GB1153/GB1154

The TA-55 Facility Operations Director and the Joint Evaluation Team (JET) have determined that Management Self Assessments (MSAs) will be used to verify/validate the readiness of the AC/MC Operations within PF-4. This determination was concurred by the Los Alamos Field Office (NA-LA). The integration of Laboratory readiness activities with PEI1 start-up and turnover activities will ensure sound logic and expectations during the PEI1 readiness reviews.

Due to the range of AC/MC capabilities that will undergo hot testing in phases based on turnover and subsequent start-up, the method for validating the equivalent analysis quality will be developed during the preparation for operational startup. The method of validation will be documented in a Method Validation Plan. This plan will establish the performance parameters (e.g., precision, accuracy, bias, type and number of standards/samples, duration, etc.) and acceptance criteria that serve as the basis for the collection of data of sufficient quality and quantity to support the appropriate level of validation of the respective analytical chemistry procedure. This established protocol is based on good laboratory practices of national and international standards for measurements. Prior to execution of hot testing for each operation, the operational startup and method validation plan must be approved by the CMRR Transition to Operations Manager to ensure the plan is technical acceptable and achievable.

Once the method validation of a particular AC or MC capability is complete and the Validation Report is issued, the responsible line management for Analytical Chemistry and Materials Characterization capabilities will issue a confirmation memo to declare the completion of capability transfer. This declaration is concurred by the CMRR Transition to Operations Manager, then approved by the respective division leaders (Chemistry or Materials Science and Technology). The confirmation memos for various processes are the objective evidence (the measurable metric) for the closeout of transition to operations.

5.21 Project Closeout

PEI1 installed SSCs (including enclosures and other items) will be tested and accepted for turnover to the facility as the SSC are finished. PEI1 will request one individual CD-4 approval and not multiple individual equipment installations or rooms.

TTO activities will be completed prior to CD-4 to complete documentation of each SSC, operations and maintenance procedures, an updated technical baseline, safety basis documentation, personnel training, readiness execution, and quality records will be finalized and turned over to TA-55 facility operations. If applicable, training will be provided prior to Project

closeout. Training materials and courses will be coordinated with LANL Training and suppliers/vendors (as appropriate).

PEI1 turnover, and acceptance activities will be conducted in accordance with commissioning, turnover, and TTO plans and procedures. As required by DOE O 413.3B, Change 2, Project lessons learned will be captured through PEI1 execution and compiled as part of the closeout.

Request for CD-4 will be submitted after completion of all construction, readiness reviews, and evidence of successful TTO.

PEI1 closeout will be completed once the final cost closing statement and final cost report (which are part of PEI1 Closeout Package) are approved by NNSA.

For USACE executed work, contract closeout requirements will be described and incorporated in the design and RFPs. The USACE project closeout will adhere to the implementing guidance in the requirements of the USACE PMBP. The PM is responsible for closeout of the project (or services) work assigned to USACE and is responsible for coordination with NNSA. The FPD is responsible for closeout of the overall NNSA project. A Closeout plan for the USACE scope will be included in each project specific PMP. All data and P2 closeout requirements and procedures will also need to be addressed in the USACE Closeout Plan. USACE will prepare a final Closeout Report once all costs are incurred and invoiced and all contracts are closed.

6 REFERENCES

Project References

CMRR Project Data Sheet, 04-D-125, February 2016

CMRR Project CD-1 Package, 2014

Plutonium Infrastructure Strategy for Defense Programs, prepared by NNSA Office of Defense Programs (NA-10), Revision 0, January 10,2014

Major Modification Determination Worksheet, CMR Analytical Chemistry and Material Characterization Activity Move to TA-55, TA55-MMD-14-309-R-1.1, October 2015

Memorandum for Frank G. Klotz, Undersecretary for Nuclear Security Administrator, NNSA; from Elizabeth Sherwood Randall, November 25, 2015, Approval of Project Restructuring for the Chemistry an Metallurgy Research Replacement (CMRR) Project.

Engineer Regulation (ER) 1110-1-12, Engineering and Design: Quality Management July 2006

ER 1180-1-6, Construction Quality Management September 1195

USACE Acquisition Instruction 01 November 2014

USACE Resident Management System (RMS)

USACE Engineering and Regulation No. 415-1-10, Contractor Submittal Procedures April 2012

ER 5-1-11, U.S. Army Corps of Engineers (USACE) (PMBP), September 2008

PEP Development References	
10 CFR 830	*Nuclear Safety Management*
10 CFR 830, Subpart A	*Quality Assurance Requirements*
10 CFR 851	*Worker Safety and Health Program*
ADPM AP-350-110	*Project Controls*
ADPM AP-350-230	*Project Quality Management*
ADPM-SD350	*Project Management for Capital Asset Acquisition and Construction*
ANSI EIA 748-A	*Standard for Earned Value Management Systems*
AP-341-101	*Designating Vital Safety Systems and Cognizant System Engineers*
AP-341-502	*Management Level Determination and Identification of Quality Assurance and Maintenance Requirements*
AP-350-11	*Project Controls*
AP-350-110	*Earned Value Management System*
AP-350-152	*Trend Program*
AP-350-235	*Project Document Control and Record Management*
AP-350-430	*Project Closeout*
ASME NQA-1-2008, with 2009 addenda	*Quality Assurance Requirements for Nuclear Facility Applications*
CMRR-AP-0321	*CMRR PEI Subproject Safety Design Strategy*
Division of Responsibility (DOR)	*CMRR Interface Plan for USACE Executed Projects at Los Alamos National Laboratory (NNSA, USACE, LANL Division of Responsibility for SII)*
CMRR-HAR-46-9002	*CMRR Project Warehouse, TA-46 Building 9002*
CMRR-HAR-55-CSF	*CMRR Construction Support Facility, TA-55 Building CSF*
CMRR-PLAN-00004	*Transition to Operations Plan*
CMRR-PLAN-00005	*Project Management Plan*
CMRR-PLAN-00013	*CMRR Project Controls Plan*
CMRR-PLAN-0702	*NNSA Acquisition Strategy*
CMRR-PLAN-1902	*CMRR Risk Management Plan*
CMRR-PLAN-2505	*Safeguards and Security Plan*
CMRR-PLAN-PM-0101	*Program Requirements Document*
CMRR-RPT-00001	*PEI1 Risk Assessment Report*

PEP Development References	
DOE G 413.3-12	*Project Definition Rating Index Guide for Traditional Nuclear and Non-Nuclear Construction Projects*
DOE G 413.3-15	*Department of Energy Guide for Project Execution Plans*
DOE G 413.3-4A	*Technology Readiness Assessment Guide*
DOE G 413.3-5	*DOE Performance Baseline Guide, 9-12-08*
DOE G 413.3-7A	*Risk Management Guide*
DOE G 420.1-1A	*Nonreactor Nuclear Safety Design Guide for use with DOE O 420.1C Facility Safety*
DOE O 151.1C	*Comprehensive Emergency Management System*
DOE O 413.3B Chg. 2 (PgChg)	*Program and Project Management for the Acquisition of Capital Assets*
DOE O 414.1D	*Quality Assurance*
DOE O 420.1C	*Facility Safety*
DOE O 470.4B	*Safeguards and Security Program*
DOE O 471.6	*Information Security*
DOE O 473.3	*Protection Program Operations*
DOE O 5480.23	*Nuclear Safety Analysis Reports*
DOE STD 1027-92	*Hazard Categorization and Accident Analysis Techniques for Compliance with DOE O 5480.23, Nuclear Safety Analysis Reports*
DOE STD 3009-94	*Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses, Change Notice No. 3*
DOE STD-1020	*Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*
DOE STD-1073-2003	*Configuration Management*
DOE STD-1189-2008	*Integration of Safety into the Design Process*
DOE STD-3009-2014	*Preparation Of Nonreactor Nuclear Facility Documented Safety Analysis*

PEP Development References	
DOE/EIS-0236-S4	Record of Decision for the Complex Transformation Supplemental Programmatic Environmental Impact Statement— Operations Involving Plutonium, Uranium, and the Assembly and Disassembly of Nuclear Weapons," *Federal Register*, 73, 77655 (Dec. 19, 2008); and Final Complex Transformation Supplemental Programmatic Environmental Impact Statement, U.S. Department of Energy, DOE/EIS-0236-S4, October 2008.
EM-385-1-1	*Safety and Health Manual*
ER-5-1-11	*USACE Project Management Business Process*
FAR, Part 7	*Federal Acquisition Regulations - Acquisition planning*
NA-1 SD G 1027	Supplemental Guidance NA-1 SD G 1027, "Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE STD 1027-92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE O 5480.23, Nuclear Safety Analysis Reports, Change Notice No. 1," approved 11-28-11.
OMB Circular No. A-76	*Performance of Commercial Activities*
OSHA 1926	*Safety and Health Regulations for Construction*
P101-12	*ES&H Requirements for Subcontractors*
P1040	*Software Quality Management*
P300	*Integrated Work Management*
P313	*Roles, Responsibilities, Authorities, and Accountability*
PD1220	*Fire Protection Program*
PD340	*Conduct of Engineering for Facility Work*
PD400	*Environmental Protection*
PSI-PLAN-00001	*PSI Document Control Program Plan*
PSI-PLAN-00002	*Quality Management Plan for PSI Division Projects*
SD100	*Integrated Safety Management System Description*
SD330	*Los Alamos National Laboratory Quality Assurance Program*
SD350	*Project Management for Capital Asset Acquisition and Construction*

PEP Development References	
SD400	*Environmental Management System*
	Statement of Work and Key Performance Parameters Handbook Guidance for Capital Asset Acquisition Projects. September 30, 2014
STD-342-100	*Engineering Standards Manual*

7 APPENDICES

APPENDIX A, PEI1 NNSA Risks

APPENDIX B, PEI1 BCP Change Control Log

APPENDIX C, PEI1 WBS Dictionary

APPENDIX A, PEI1 NNSA RISKS

Item	Risk ID	Title
Active		
1	PEI10208	NNSA-002-Project Funding Delays due to Fiscal Year Appropriation Continuing Resolution
2	PEI10209	NNSA-004-Escalation Rates Exceed Those Factored Into Baseline Estimate and Schedule
3	PEI10210	NNSA-005-TA-55 Process, Operations and Physical Changes Beyond Baseline Scope
4	PEI10211	NNSA-006-Changes in External Agency Requirements
5	PEI10212	NNSA-008-External Agency Reviews, Audits, Data Calls, Evaluations, and Reports beyond the Project Baseline
6	PEI10213	NNSA-010-Federal Review and Approval of LANS Documents
7	PEI10214	NNSA-012A-NNSA/DOE Initiated Site-Wide Shut down
8	PEI10216	NNSA-014A-Change in the M&O Contractor May Impact Project Cost and Schedule
9	PEI10217	NNSA-015A-Change in LANL Direct Charging Strategies
10	PEI10218	NNSA-016A-Loss of Key Federal Project Personnel and Additional Federal IPT Support
11	PEI10219	NNSA-Weather Delays Exceed the Baseline Estimate – CMRR Warehouse, Construction Support Facility
12	PEI10220	NNSA-SII002-Unknown Underground Interferences Exceed the Baseline Estimate – CMRR Warehouse, PEI Construction Support Facility
13	PEI10221	NNSA-SII003-Archaeological Sites found at CMRR Warehouse Project (TA 46 Warehouse)
14	PEI10222	NNSA-SII004-Endangered Species at CMRR Warehouse Project (TA-46 Warehouse)
15	PEI10232	NNSA-SII005-Inadequate flow down of requirements to sub tier contractors – CMRR Warehouse, Construction Support Facility
16	PEI10231	NNSA-SII006 Late delivery and Changes in LANL Requirements – CMRR Warehouse, Construction Support Facility.
17	PEI10226	NNSA-SII007-Unplanned Safety and Environmental Issues as a Result of Construction Activities– CMRR Warehouse, PEI Construction Support Facility
18	PEI10227	NNSA-SII008 Access to Construction Support Utilities During Construction – PEI Construction Support Facility
19	PEI10228	NNSA-SII009 Discovery of Undefined Waste–Construction Support Facility (CSF), CMRR Warehouse (TA-46 Warehouse)

Item	Risk ID	Title
20	PEI10229	NNSA-SII010 Project Delays Resulting from Interferences with Other Area Construction Projects, TA-55 Operations Access, and Construction in a Congested Active Work Area – PEI Construction Support Facility
21	PEI10230	NNSA-SII011 USACE Turnover and Acceptance by Los Alamos National Laboratory – CMRR Warehouse, PEI Construction Support Facility
Retired		
22	PEI10215	NNSA-013A-Project Authorization (Critical Decision) is Delayed
23	PEI10234	NNSA-DOE EVMS Handbook Interpretations-Changes to WBS and reporting (PEI1)

APPENDIX B, PEI1 BASELINE CHANGE LOG

BCP #	BCP Title	Approved CBB	Approval Date
PEI1-2017-001	Performance Baseline Implementation	$308.6M	2/2/2017

APPENDIX C, PEI1 WBS DICTIONARY