National Nuclear Security Administration

CMRR Project - REI2 Subproject
Los Alamos National Laboratory

Project Execution Plan

Major System Acquisition Project

CMRR-PLAN-00019, R2

September 2017

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HISTORY OF REVISIONS

Document Number	Document Date	Action	Description
CMRR-PLAN-00019, 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 and is dedicated to performance measurement baseline for execution of REI2 work.
CMRR-PLAN-00019, 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-00019, R1	June 2017	Administrative Revisions	Revisions • Updated scope, cost, and schedule data throughout to reflect values and dates within the approved Performance Measurement Baseline implementation • Updated NNSA Risks • Added Baseline Change Control Log as Appendix B • Minor editorial changes
CMRR-PLAN-00019, R2	September 2017	Administrative Revisions	• Incorporated the REI Sub-CLIN 0002B funding and reporting requirements as approved in White Paper: "CMRR-REI2 Sub-CLIN 0002B Fee Funding and Payment/Reporting Processes Revision 0, July 27, 2017" • Updated PEP milestone dates included within section 4.1 to reflect the March 2017 performance measurement baseline implementation dates.

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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
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
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
ESM	Engineering Standards Manual

ACRONYMS AND ABBREVIATIONS

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
HVAC	heating, ventilation, air conditioning
HCA	Head of the Contracting Activity
ICE	independent cost estimate
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
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
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
PADWP	Principal Associate Directorate for Weapons Programs

ACRONYMS AND ABBREVIATIONS

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*
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
RPA	Request for Project Authorization

ACRONYMS AND ABBREVIATIONS

REI2	RLUOB Equipment Installation Project Phase 2
S&S	safeguards and security
SAE	Secretarial Acquisition Executive
SDD	systems design description
SII	Site Infrastructure Improvements
SME	subject matter expert
SNM	special nuclear material
SPE	senior procurement executive
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
XRF	x-ray fluorescence

PROJECT EXECUTION PLAN UPDATE AND REVISION PROCEDURES

1. **Terminology:** The following terms are used throughout this document to identify the participants of the Chemistry and Metallurgy Research Replacement (CMRR) Project and its associated subprojects.
    - The term “Project” refers to the CMRR Project and its various subprojects unless noted otherwise.
    - The term “Subproject” refers to 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 the Los Alamos National Laboratory (LANL) CMRR 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 National Nuclear Security Administration (NNSA) and FPD, or as requested by the FIPT. Changes in the approved technical scope, cost, or schedule baselines defined herein will require revision to this 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 document review and updates. Reviews and updates must be coordinated with the signatory offices. The formally appointed members of the Project Team shall review and concur with the PEP. The FPD is responsible for maintaining a complete documented history of the PEP and any 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, listed below. For each category, a summary of revisions and changes will be documented in the Revision History. 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, etc., may be identified by any member of the Project Team and brought to the attention of the FPD. Acceptance of minor administrative corrections, revisions, etc., is at the FPDs discretion. Changes will be incorporated into the appropriate sections using a track changes 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 changes to the Project. 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:* As appropriate, major changes that require a full rewrite will be processed in the same manner as described in the above categories.

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 REI2 PEP has been prepared in accordance with DOE O 413.3B, Change 2, *Program and Project Management for the Acquisition of Capital Assets*, and the associated DOE G 413.3-15, *Department of Energy Guide for Project Execution Plans*. The PEP provides the management framework to guide execution of the CMRR Radiological Laboratory/Utility/Office Building (RLUOB) Equipment Installation-Phase 2 (REI2) 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 Project 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 planning and execution of the CMRR scope under two separate subprojects:

- REI2 and
- PF-4 (Plutonium Facility-4) Equipment Installation (PEI)

Revision 1 of *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) voted to approve 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 a memorandum from 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 PPEP was developed to define subprojects within the bounds of the currently approved revised CD-1. In addition, the Sherwood-Randall memorandum requires that each subproject have a standalone PEP.

Based on restructuring 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, remaining work will be completed through the following four subprojects:

- REI2 – scope unchanged (REI2 is the focus of this PEP)
- PEI1 – PEI scope to support the programmatic milestone to cease operations in CMR
- PF-4 Equipment Installation-Phase 2 (PEI2) - remaining PEI scope to support future programmatic milestones for establishing enduring AC and MC capabilities
- Re-categorizing RLUOB to Hazard Category 3 (RC3) – scope that enables an increase in the 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 CMRR Project. This PEP is specific to REI2. It defines subproject plans and strategies to be executed following authorization of CD-2/3 remaining work as well as the complete REI2 performance measurement baseline (PMB).

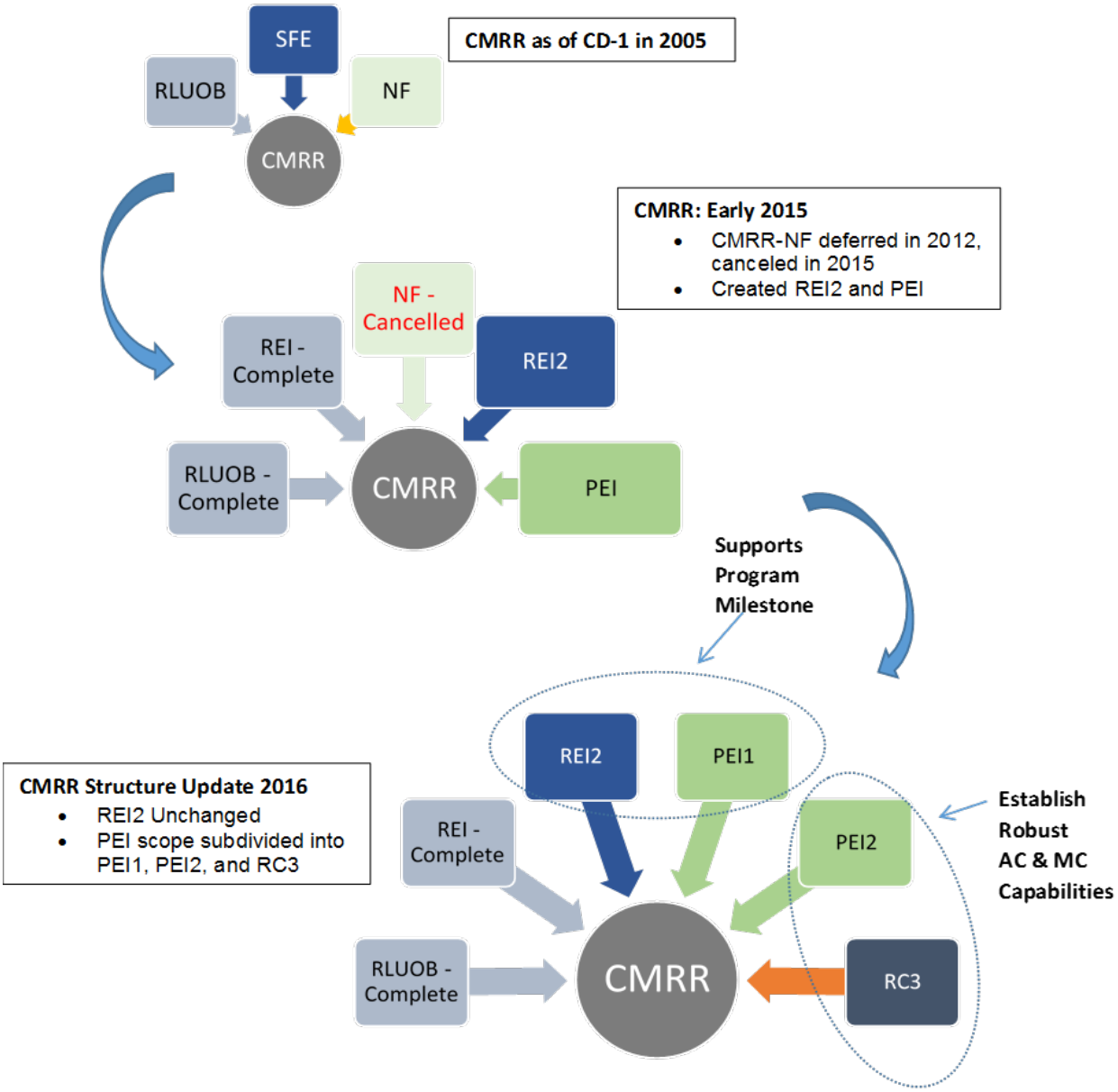


Figure 1-1 CMRR Project Structure Over Time

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 on the REI2 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 subproject, RLUOB Equipment Installation (REI), successfully completed in 2013, procured and installed programmatic equipment in RLUOB. REI outfitted some of the laboratory space in RLUOB. At the time, RLUOB

was restricted to 8.4 gPE, and a limited set of laboratories was 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) that could have contained up to six (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. 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 is supported by recent increases in the amount of plutonium allowed in a radiological facility through Supplemental Guidance NA-1 SD G 1027, G*uidance 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 11-28-11. The first two portions of the strategy to be executed under CMRR are focused on maintaining continuity in AC and MC operations. The CMRR strategy is to maximize the use of the recently constructed laboratories within the RLUOB and repurpose existing laboratories in the Security Category 1, HC-2 NF at TA-55, known as Plutonium Facility-4 (PF-4). As approved in 2014, the revised CD-1 authorized planning and design for the entire CMRR Project scope and officially cancelled the CMRR NF subproject.

The CMRR restructuring aligns 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 RLUOB and TA-55 to support NNSA actinide-based missions. While work progresses on 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 shows the changes in plans for work execution of CMRR 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. Operations in the laboratories outfitted under REI2 can be accomplished within existing material limit and facility hazard category. The RC3 subproject will establish programmatic capabilities, install equipment originally planned for PF-4, and re-categorize RLUOB to a Hazard Category 3 (HC-3) NF with an increased material limit of 400 gPE, which optimizes use of space within RLUOB and provides programmatic benefit.

The transition of existing and well-characterized AC/MC processes from the CMR Building into RLUOB 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, environmental, and security systems, structures, and components (SSC). Thus, the perspective of the NNSA safety review process may be refocused to verify that the proposed transition work is sufficiently bounded by the currently approved facility plans and

procedures. The internal reviews verify compliance with all enveloping requirements and standards, as directed through the contract between DOE/NNSA and LANL's management and operations (M&O) contractor. The RC3 Project re-categorization of RLUOB from a radiological facility to an HC-3 NF is planned based on limited facility changes as described in the approved RC3 safety design strategy. RLUOB Safety Basis documentation for the change to HC-3 will be developed through the RC3 project.

1.2 REI2 Scope Summary

The CMRR REI2 subproject will maximize use of RLUOB laboratories by reconfiguring and equipping additional, existing, unoccupied laboratories with AC/MC capabilities. RLUOB is operating at the increased radiological limit of 38.6 gPE, enabling additional AC/MC operations to move from the CMR Building. Since the revised CD-1 approval, REI2 has progressed through design and achieved authorizations to proceed with long-lead procurements and site preparations (i.e., utilities installation). Procurement actions and preparations for construction are proceeding according to the subproject plans to support the programmatic milestone to cease program operations in the CMR Building.

Subsequent to the revised CD-1 approval, REI2 has completed design and initiated long-lead procurements of the enclosures, utilities installation for preparation of laboratories, temporary facility modifications, and construction access work according to subproject plans.

Additional details of REI2's scope are provided in the following sections of this document:

- Section 3, "Acquisition Strategies provides additional details of the REI2 execution strategy;
- Section 4, "Integrated REI2 Subproject Baselines," provides additional discussion on the REI2 technical, schedule, and cost baselines;
- Appendix C presents the REI2 work breakdown structure (WBS) dictionary.

Site infrastructure activities executed through REI2 subproject provide for temporary construction support facilities which include a construction break and comfort station (restrooms) trailers and new activities for glovebox and equipment staging, and warehouse facilities. The construction break and comfort station trailers are provided by the M&O contractor.

The NNSA acquisition strategy includes using the U.S. Army Corp of Engineers (USACE) via an Interagency Agreement (IA) process for design, construction, and commissioning of the construction staging, glovebox and equipment staging, and warehouse facilities. See Sections 2 and 3 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 REI2 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 the RLUOB and complete transition to operations (i.e., preparation of operational startup, management self-assessments and hot testing) of AC/MC capabilities in eight (8) RLUOB laboratory rooms as referenced in the CMRR REI2

and PEI1 Transition to Operations (TTO) Plan (CMRR-PLAN-00004) and PEP section 5.19 Transition to Operations.

1.4 Document Hierarchy

The CMRR Project will support the current MNS and the PRD. The PPEP serves as the execution plan agreement for subprojects under the CMRR that do not yet have an approved PEP and associated performance baseline (PB). The CMRR PPEP and this REI2 PEP are subordinate to the MNS and the PRD, and are used as 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.

The project 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 a complex nuclear project. As shown in Figure 1-2 the document hierarchy flows down from Program documents through the PPEP, the REI2 PEP, the CMRR *Project Management Plan* (PMP, CMRR-PLAN-00005), and the project functional execution plans. See the CMRR PMP (CMRR-PLAN-00005) for more details on the implementation plans and processes.

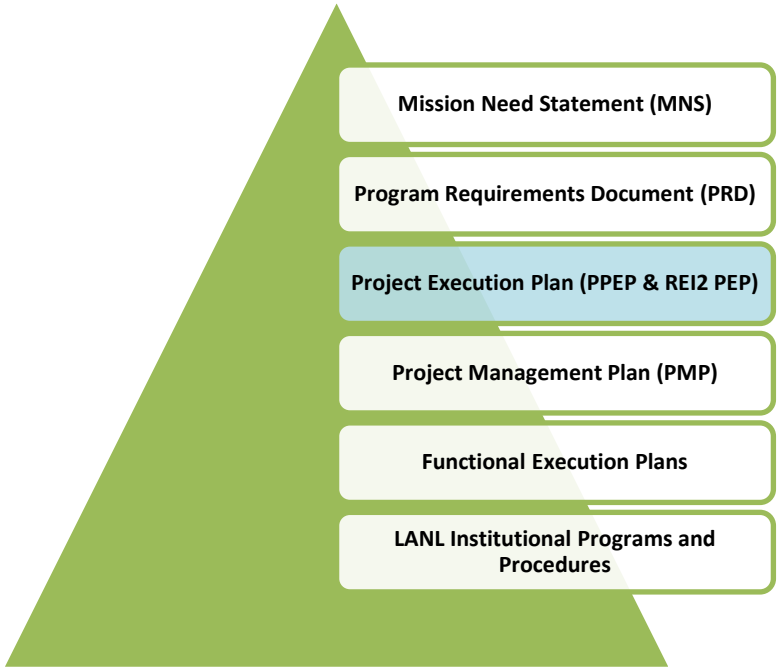


Figure 1-2 CMRR/REI2 Document Hierarchy

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 M&O contractor has formed a CIPT and developed appointment letters to identify the members. The CMRR and REI2 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 compact management structure that focuses on key personnel for each organization. The FIPT team includes the management shown in Figures 2-1 and 2-2. 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).

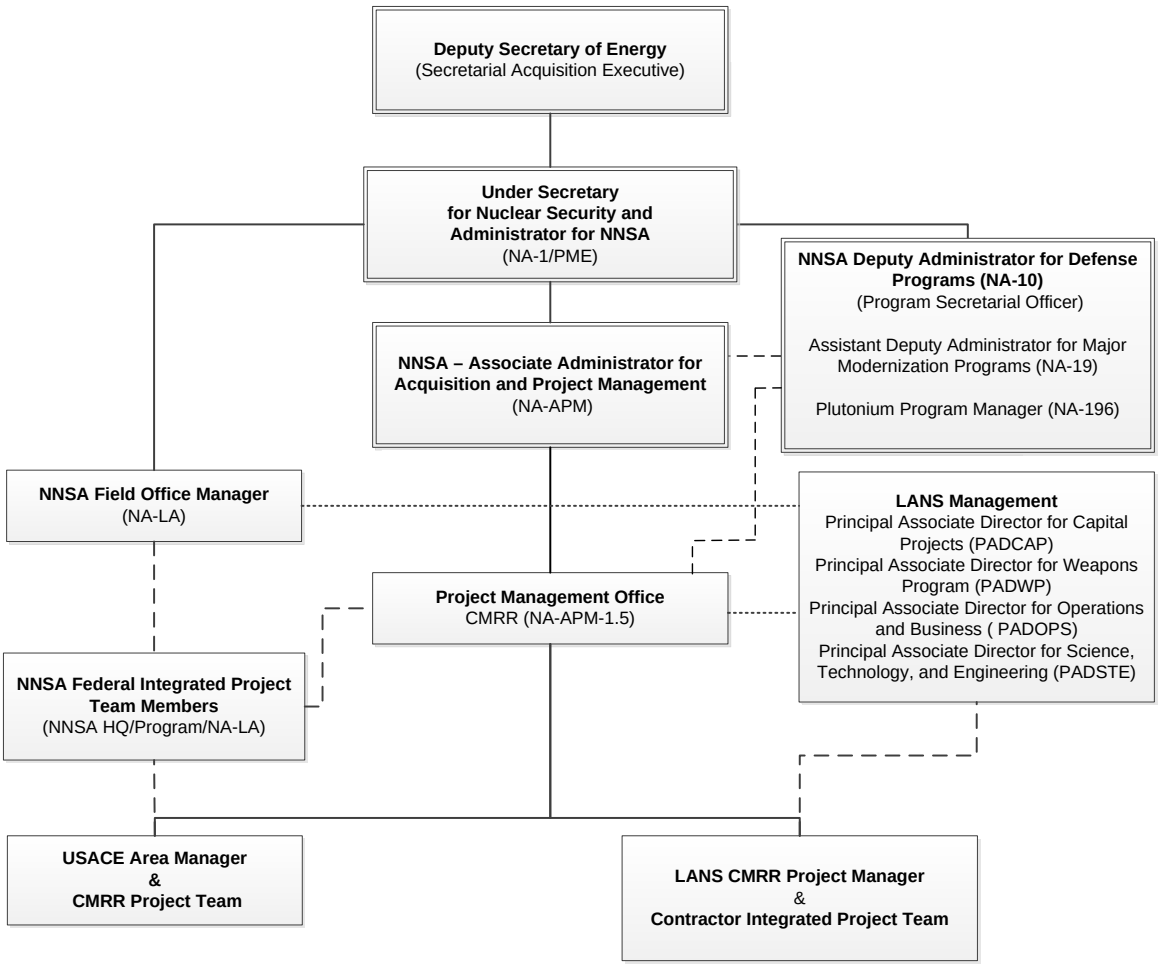


Figure 2-1 NNSA and LANL CMRR Management Structure

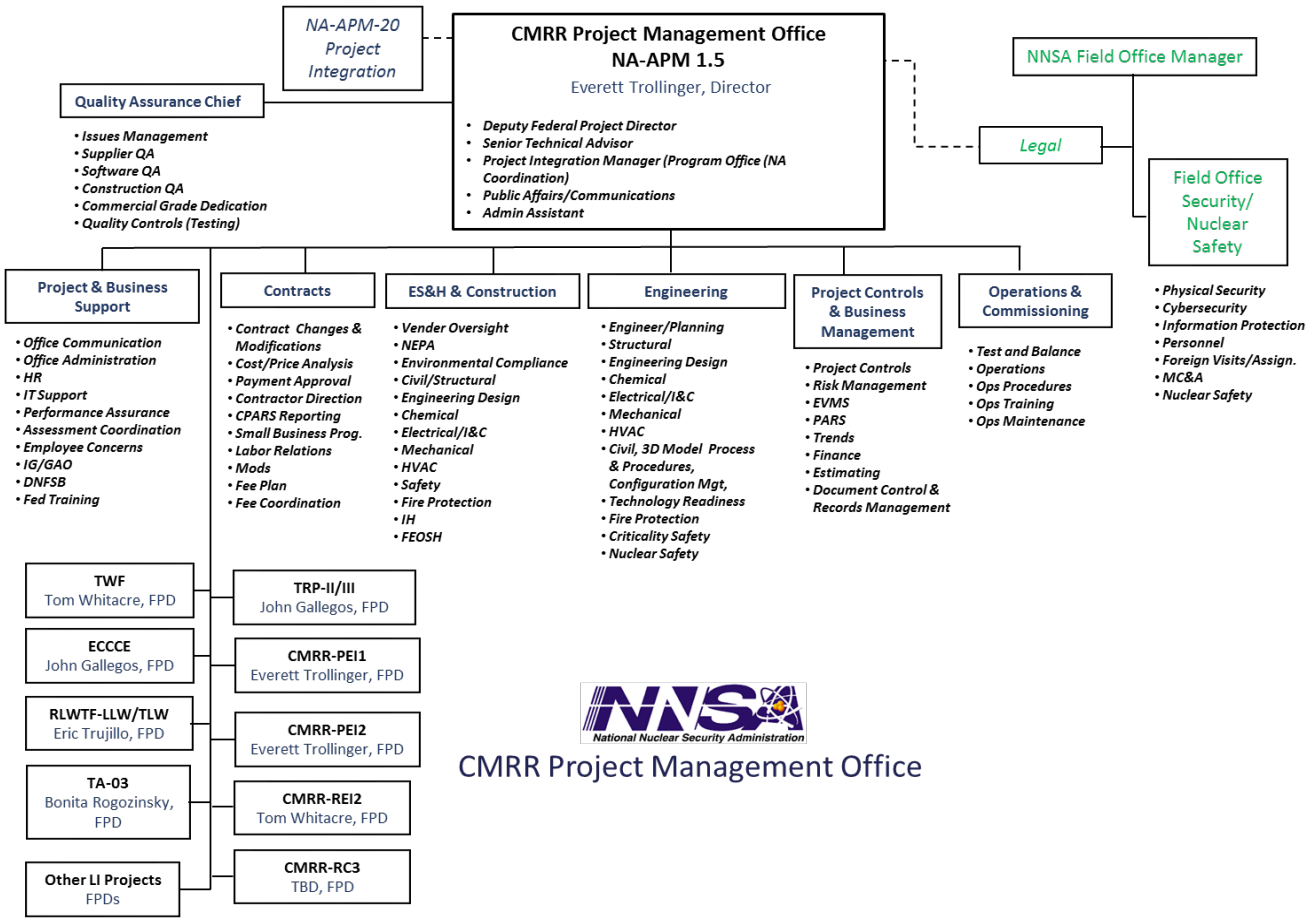


Figure 2-2 NNSA CMRR PMO Structure

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*, and the special challenges for subproject work inside an operating nonreactor defense NF. Additional discussion on the CIPT is included in Section 2.4 ("Roles and Responsibilities of LANL M&O Project Team").

2.2 Roles and Responsibilities of the DOE/NNSA Organization

The 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 all Critical Decisions
- Approves the Preliminary Project Execution Plan
- In coordination with NA-APM-1, ensures that the FPD is qualified to manage and lead the project.

- Approves disposition of anticipated Performance Baseline changes (see Table 4-4 for thresholds)
- Serves as the Chair for the Energy Systems Acquisition Advisory Board (ESAAB)
- Conducts quarterly performance reviews
- Approves exemptions to Orders and other DOE/NNSA Directives
- Approves Critical Decisions unless delegated to the Undersecretary
- In accordance with the size and scope of each subproject following restructuring, the Chief Executive for Project Management is delegating Project Management Executive (PME) authority for the REI2 subproject to the Undersecretary for Nuclear Security, NA-1. As Chief Executive (CE) for Project Management, approves Critical Decisions

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 review plans and receives debriefs from Independent Peer Reviews
- Receives briefs on Independent Cost Estimates (ICEs) and External Independent Reviews (EIRs)

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 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, responsible for acquisition and critical decisions as needed
- Concurs with the PPEP
- Approves 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 PB 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 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 project disposition and PB changes below the Secretarial Acquisition Executive (SAE) approval level, following PB deviations
- Approves with the 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 the project elements of 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 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 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 the Project Assessment and Reporting System (PARSII)
- Evaluates and verifies reported progress; makes projections of progress and identifies trends 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

2.2.12 Federal Integrated Project Team

- Includes members from NNSA headquarters elements and NA-LA
- Ensures that all project interfaces are identified, completely defined, and manage interfaces through project completion
- 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 performance parameters, 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, as requested
- 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 and the USACE to execute the REI2 scope. LANL and USACE will perform as independent contractors to NNSA. Accomplishment of the USACE scope for the combo shop 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 work with USACE via the IA to execute work for the construction staging and warehouse facilities for construction support. USACE will provide planning, design, estimating, construction, construction management, and commissioning services directly or through their qualified subcontractors.

NNSA will use the LANL M&O contractor for REI2 work related to existing facilities. LANL will use a blend of self-performance and subcontract services for project management, planning, design, estimating, construction, construction management, commissioning, TTO, and technical specialties. 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 acquires 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; ADPSM 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 a blend of 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 TA-55 and LANL operations. A key lesson learned is that the REI2 subproject must be managed with strong interfaces to the facility, program, and support management organizations, as shown in Figure 2-3 ("REI2 Integrated Project Team"). The Laboratory senior management team will focus on project strategic directions through the Integrated Nuclear Planning 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 2-2 ("Contractor Integrated Project Team") in the form of a team table. A separate subproject-specific CIPT has been developed for REI2. The REI2 IPT is shown in Figure 2-3 ("REI2 Integrated Project Team"), also in the form of a team table. REI2 IPT roles and responsibilities are addressed in the REI2 IPT assignment letter and in the CMRR PMP.

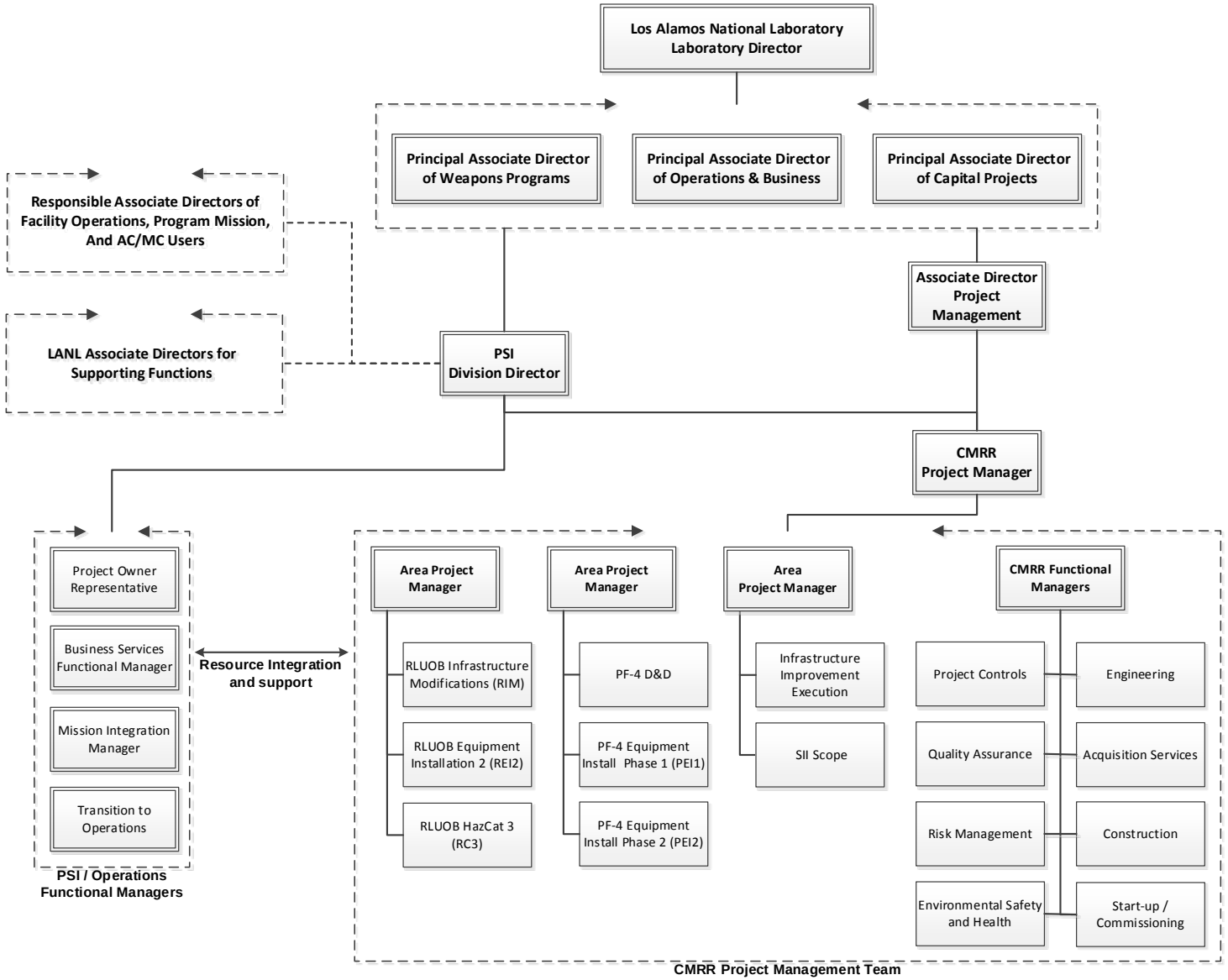


Figure 2-3 LANL CMRR Project Team and Senior Management Interface

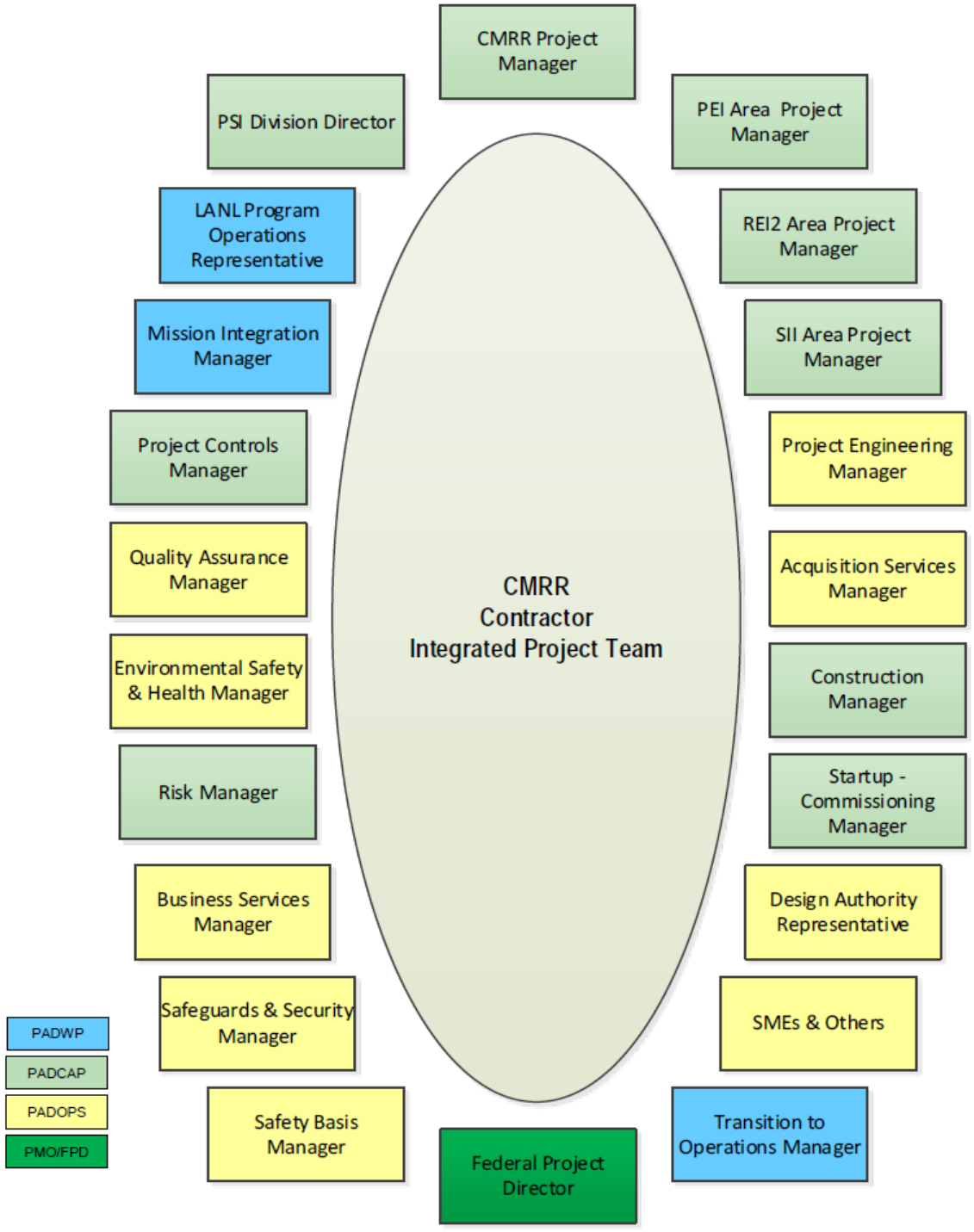


Figure 2-4 CMRR Contractor Integrated Project Team

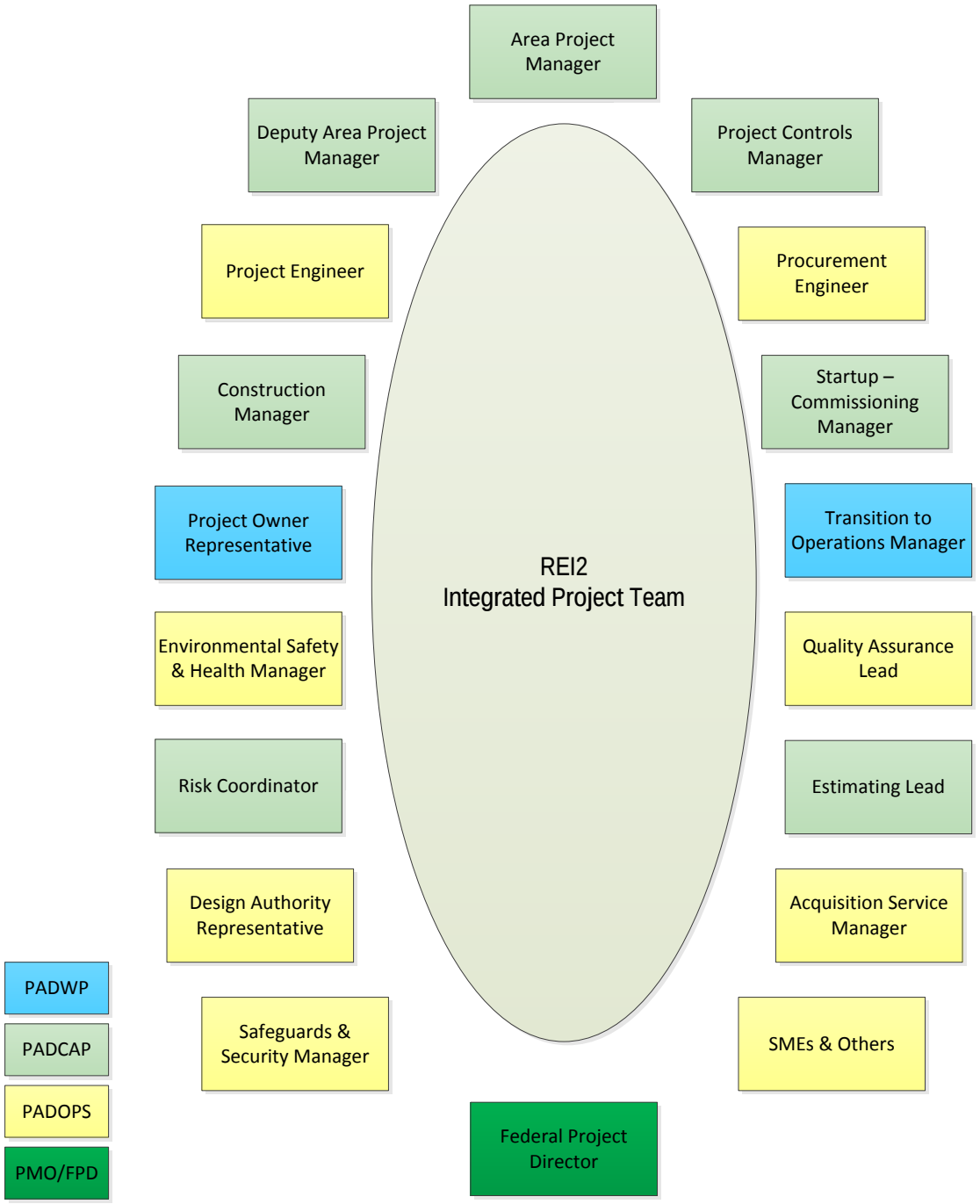


Figure 2-5 REI2 Integrated Project Team

2.4.1 LANL CMRR Project Manager

The LANL PM is assigned by ADPM to lead the multi-disciplinary project management team. The PM's responsibilities are outlined in P313. The PM's duties focus on the project scope, cost, and schedule performance of the project.

Responsibilities include the following:

- Asses project scope, developing 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 cost and schedule management reserve and contingency plans 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 the approved work authorities
- Approve proposed changes (within authority limits defined in the PEP) and endorse other changes affecting 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 accountability from the CIPT

Accountability includes:

- Accountable to 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 provide CIPT leadership and day-to-day direction

2.4.2 LANL Area Project Manager

The LANL CMRR PM has assigned an area project manager (APM) to manage execution of REI2 scope elements. REI2 is led by a dedicated APM who reports to the CMRR PM and is responsible for day-to-day management of REI2 execution. The APM chairs the REI2 IPT that includes support by RLUOB facility and operations personnel to help integrate and interface the Project activities within the priorities of the operating facility. Additional discussion of the REI2 IPT, including responsibilities of the APM, are provided in the CMRR PMP.

2.4.3 LANL Facility and Mission Integration

Because the REI2 subproject will be executed in an operating radiological facility (RLUOB) with multiple competing facility and program mission priorities, all work must be planned, designed, and constructed within the strict security, safety, configuration management, conduct of operations, and work coordination processes used by TA-55. This PEP is focused only on approaches used for the REI2 work in RLUOB.

2.4.4 Integration within RLUOB

The REI2 subproject interactions with the facility begin prior to design in assignment of Engineering Service Requests, and coordination/prioritization of activities through the RLUOB procedures and change control processes. The early and continuing coordination actions are part of the strategy to ensure successful integration of activities within the operating facility.

The completed designs are based on scope, requirements and criteria documents (RCDs), and design criteria developed in coordination with RLUOB cognizant systems engineers (CSE) and design authority representative (DAR). Design and construction documentation uses RLUOB design change form (DCF) work process for work inside the facility including direct interface with the existing facility systems (i.e., tie-ins to the headers of these systems). The DCF process includes review/approval by Safety, CSEs, DAR, and other key subject matter experts (SMEs). The DCF is controlled and is the tool for integration of Project activities into facility processes for conduct of operations and configuration management. Balance of design work will follow LANL AP-341-519, *Design Revision Control Process*.

In addition to the procedurally driven integration, the REI2 subproject has several high-level managerial integration activities.

- The subproject has representation on the TA-55 Change Control Board
- The subproject obtains coordination through participation in ADPSM manager meetings
- The subproject coordinates with the Program Management Board to ensure appropriate prioritization of Project work efforts and craft coordination
- The subproject coordinates installation and construction activities within Facility Operations through the Integrated Plan of the Week and Plan of the Day processes.

As necessary, the subproject will establish and obtain approval of interface agreements to ensure that the facility interfaces are formally documented and approved.

Additional integration with the REI2 subproject is established through facility and operations personnel participation in the REI2 IPT. Higher level integration is attained through the 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 document (DOR) published through NNSA (CMRR-EIP, *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 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 may include submittal reviews, 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, NNSA will use the LANL M&O contractor to execute the bulk of the CMRR Project and USACE for select, federally directed work scope. A line-item method and DOE O 413.3B, Change 2, execution process will be used. REI2, PEI1, PEI2, and RC3 will be subprojects within the overall CMRR Project.

In regard to the M&O contract for the LANL NNSA contract (contract no. DE-AC52-06NA25396), the PEI1, PEI2, RC3, and REI2 (FY2016 and prior years included) subprojects performed by the LANL M&O contractor, the associated fee will be determined using the LANL M&O contract's Strategic Performance Evaluation Plan process including both fixed-fee through the LANL M&O's negotiated fee structure, and a Target Cost fee incentive contract for FY 2017 and 2018 specifically for REI2, as included in Modification Number 305 to the LANS Prime Contract identified as Sub-CLIN 0002B.

The REI2 Sub-CLIN 0002B fee will be performance based, utilizing a target cost which was negotiated and implemented in Modification Number 384. The fee associated with the Sub-CLIN 0002B scope is payable based on cost performance with a 1% Minimum Incentive Fee, a 5% Target Incentive Fee, and a 12% Maximum Incentive Fee. The REI2 incentive fee arrangement is provisional with Cost Underrun/Overrun Share ratio of 60% government and 40% contractor. For the REI2 FY2019 and beyond work scope, the fee will be determined using the future M&O contract terms and conditions.

The tailoring strategies presented below involve a combination of long-lead procurements, laboratory preparation, site preparation activities (approved through CD-3A and CD-3B), and the remaining CD-2/3 scope defined in this PEP to define the M&O contractor scope for the REI2 subproject.

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

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

3.2 Critical Decisions

As defined in Section 1 of this REI2 PEP, the CMRR Project is proceeding with planning and execution of four separate subprojects to achieve remaining programmatic AC/MC capabilities. The REI2 subproject is presented in this PEP in part to facilitate the phased approval and execution for the work to be performed in RLUOB in support of the programmatic milestone for AC/MC capabilities. Execution of the REI2 subproject, as a standalone subproject also supports separation of costs from other subprojects and enables better ability to evaluate and manage

performance of REI2. CD-3A/3B scopes were requested in advance of CD-2/3 as long lead risk reduction measures.

REI2 subproject status reporting will be developed through the CMRR Project Management and Project Controls team in a “standalone” manner. For reporting and change control, the baseline CD-4 date will include contingency.

Table 3-1 provides a breakdown of the completed and planned future CDs and the required level of Acquisition Executive (AE) approval for REI2.

Table 3-1 Critical Decision Strategy for REI2 Subproject

Critical Decision	Scope Summary	Forecast or Actual Date	AE Level
Revised CD-1	Approved to define REI2 scopes and overall CMRR funding levels; authorization for minor work	August 21, 2014A	S-2
REI2 CD-3A	Approved to execute RLUOB Infrastructure Modification (RIM) work and released long-lead procurement for enclosures	December 18, 2014A	NA-1
REI2 CD-3B	Approved release of long-lead procurement for balance of enclosures Site preparation of laboratory utilities	December 22, 2015A	NA-1
REI2 CD-2/3	Remaining REI2 scope	October 31 2016A	NA-1
REI2 CD-4	Completion of REI2 scope	January 2022F*	NA-1

* Includes MR and Federal Contingency.

3.3 REI2 Subproject Tailoring Strategy

The REI2 subproject is one of four subprojects to be executed within the current tailored execution strategy to complete the program requirements of the overall CMRR Project. The scope of the CMRR Project includes the installation of AC/MC equipment within existing facilities at LANL through four subprojects in accordance with the overall CMRR Project mission need.

The REI2 subproject will maximize the use of RLUOB laboratories by reconfiguring some existing and equipping additional, currently unoccupied, laboratories with AC/MC capabilities.

The REI2 subproject is executed with a separate DOE-authorized baseline from PEI1. Nevertheless, a significant amount of integration and commonality exists between the two subprojects, their installed equipment, and ultimate AC/MC operations. The CMRR Project team is led by the CMRR PM, who will maintain a coordinated approach for both the PEI1 and REI2

subprojects intended to provide team stability through subproject approvals and transitions between phases. Additionally, the CMRR team, will allow use of a common set of implementing plans and procedures (where possible) for both REI2 and PEI1 subprojects.

An APM is dedicated to managing REI2. The APM reports to the CMRR Project Manager and has an IPT that includes RLUOB facility and operations personnel to help integrate and interface the REI2 activities within the priorities of the operating facility.

The REI2 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:

- Developing and maintaining the subproject requirements database and all Project execution documents
- Engineering designs for; enclosure fabrication, in room utility distribution, installations of new enclosures and process equipment, and facility interfaces. Engineering will also support the fabrication, installation, start-up and TTO phases of work.
- Procurement of equipment, materials, and services
- Reconfiguration of existing module walls
- Installation of new enclosures and programmatic equipment, and installation of in room distribution of supporting utility services
- Start-up and TTO of new and reconfigured equipment.

To minimize the construction impacts to the ongoing program and facility operations, several program and project integration site preparations including isolation of radioactive liquid waste lines, construction access, and security boundary modification are included in the RIM scope. In addition, CD-3A and CD-3B have authorized early procurement of long lead items and additional site preparation activities. The authorized work will help reduce congestion for construction activities, which could have significant impacts to RLUOB operations. These integration activities provide construction access and reduce the amount of “hot jobs” that would otherwise be required in REI2 lab rooms.

Long-lead procurement and site preparation activities approved through the CD-3A/3B process of DOE O413.3B, Change 2, allow for the above site preparation activities and provide for early procurement of key programmatic equipment and for the large number of new enclosures.

The REI2 subproject major services for design and installation will be as follows:

- REI2 Design will use an experienced subcontract architect and engineering firm for enclosure fabrication and installation designs
- REI2 Construction will subcontract select scope of work including HVAC installation, enclosure installation, HVAC utility tie-ins, HVAC test and balance, and fire suppression installation
- REI2, with support from LANL’s SMEs, will complete the performance specifications and procurements for direct purchase of such equipment by LANL
- REI2, with support of LANL commissioning and operations SMEs, will perform commissioning, readiness, and TTO activities

Tailoring of the overall CMRR execution into multiple smaller subprojects allows separation of Acquisition Executive levels and oversight for lower valued subprojects and allows focus on REI2’s more critical near-term activities in support of the programmatic milestones for termination of programmatic operations in the CMR Building.

The execution strategy for REI2 subproject is summarized in Figure 3-1.

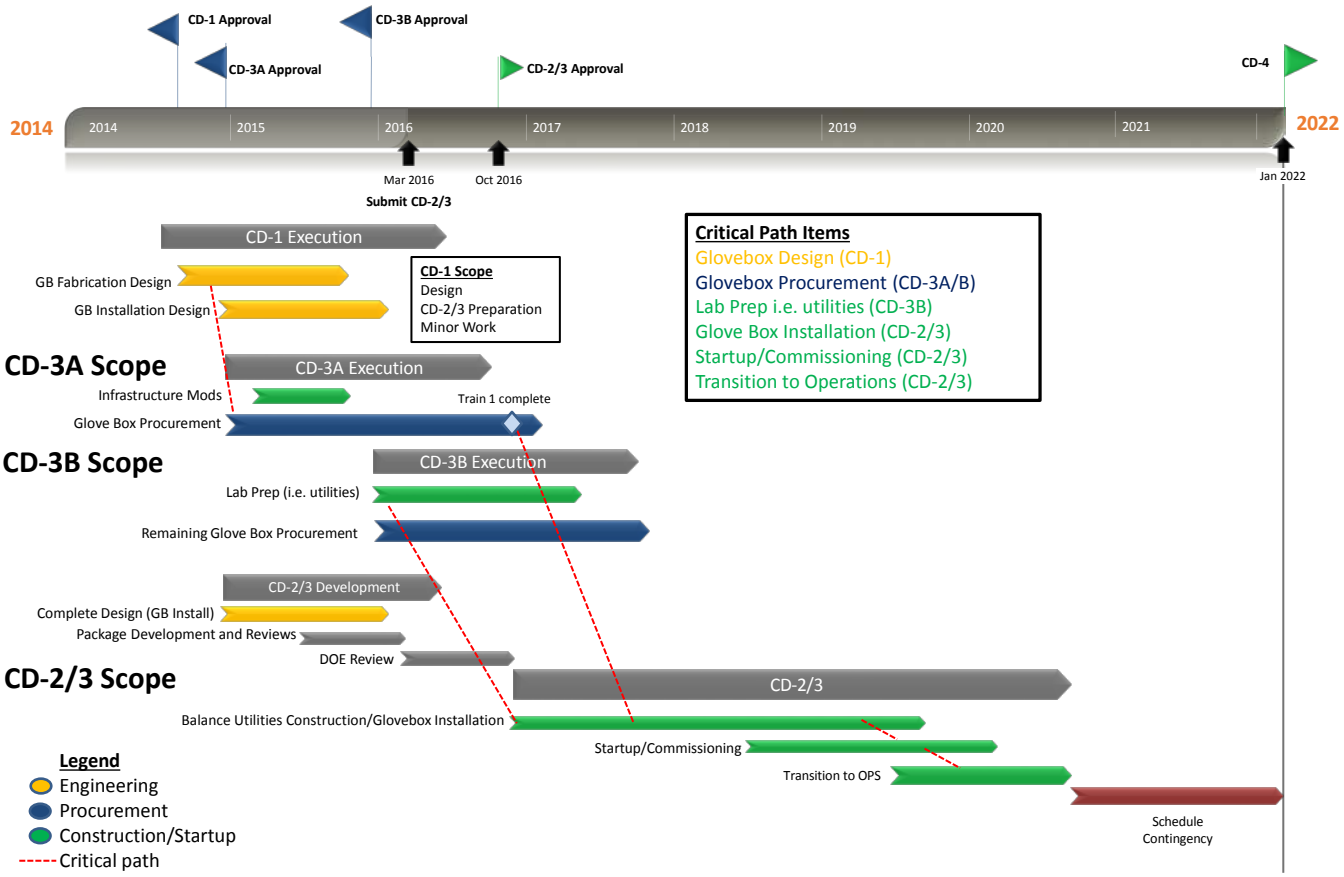


Figure 3-1: REI2 Execution Strategy

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

The tailoring strategy is structured to support accelerated activities to achieve the timeline to support the programmatic milestone to cease program operations in the CMR Building, reducing overall construction congestion and improving resource leveling during construction, including reducing programmatic work interferences.

To implement the strategy, the Project has achieved approval of CD-3A and CD-3B packages. The DOE O 413.3B, Change 2, CD-3A/3B process has been used with long-lead procurements and site preparation activities to minimize schedule delays as well as improving opportunities for potential schedule accelerations.

Table 3-1 (previously presented) provides the CD approvals issued to date and the planned future CDs.

3.4.1 RLUOB Long-Lead Procurements

REI2 CD-3A and CD-3B approvals allowed for early procurement of the enclosures. This approval was required to support the aggressive schedule of the project and the capacity limitations of qualified enclosure manufacturers, requiring release of long-lead procurements early in the project life cycle. The design and procurement specifications developed for REI provided the design basis for the new REI2 enclosures. Using this design basis along with incorporating lessons learned from the first REI installation

resulted in repeatable fabrication packages for standard enclosures that minimized the design efforts.

In addition to the enclosures, procurement of bulk construction materials was approved at CD-3B.

3.4.2 RLUOB Facility Support and Site Preparation

The RLUOB laboratory area contains several empty laboratory modules to be used for this project. Specific laboratory equipment and installation will be defined in the development of final designs for construction. However, based on previous REI design or limited modification to existing designs, adjustment of basic infrastructure items to support future laboratories use can readily be accomplished before equipment installation can begin. These adjustments include the following:

- Extend standard laboratory support gasses and services from the current RLUOB module floor penetrations to a standard laboratory distribution grid;
- Adjust laboratory partition walls to match required module sizes developed for the preferred alternative arrangement;
- Reconfigure security boundary elements to maintain the classified boundary for RLUOB office residents while allowing the laboratory floor area to be a modified security area to facilitate future construction activities;
- Reconfigure the radiological boundary and isolate the potential contaminated systems to facilitate REI2 construction;
- Open the existing RLUOB tunnel stub to provide construction access;
- Decontamination and decommissioning (D&D) and relocation of equipment to the Radiochemistry Count Room;
- Complete installation of facility support space in the Hazardous Material Management room; and
- Install above-ceiling ductwork for Zone 2 ventilation supply and exhaust.

3.4.3 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 of the major facility work. Project execution pre-planning efforts have identified several areas of support that are required to complete the Project, but do not directly link to a specific design solution. To support these early actions, NNSA has preapproved execution as minor work for several key infrastructure activities. This work is in execution to have capabilities in place to support the construction efforts in FY2016 and 2017. The REI2 authorized support scope managed as part of SII is limited to facilities for material and equipment storage/staging, preassembly and preparation, and other logistical support for construction, as well as a standalone temporary relief station and break area to minimize workforce transition delays.

3.5 Project Cost Strategy

Cost strategies for the CMRR Project address the overall PB at the total project cost (TPC) level while separating USACE work from LANL M&O work.

For the REI2 subproject, 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

REI2 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 EVMS on NNSA and USACE activities, CMRR monthly reports uploaded to PARS II by LANL will include data integration provided by NNSA and USACE.

Figure 3-2 presents a simple block diagram for the REI2 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 ("Contractor Management Reserve and Federal Contingency Management") and the scope breakdown for the REI2 subproject is provided in the description of the technical baseline in Section 4.1 and the WBS (see Appendix C). The interfaces and DOR between NNSA, USACE, and LANL are addressed in CMRR-EIP, *CMRR Interface Plan for USACE Executed Projects at Los Alamos National Laboratory*.

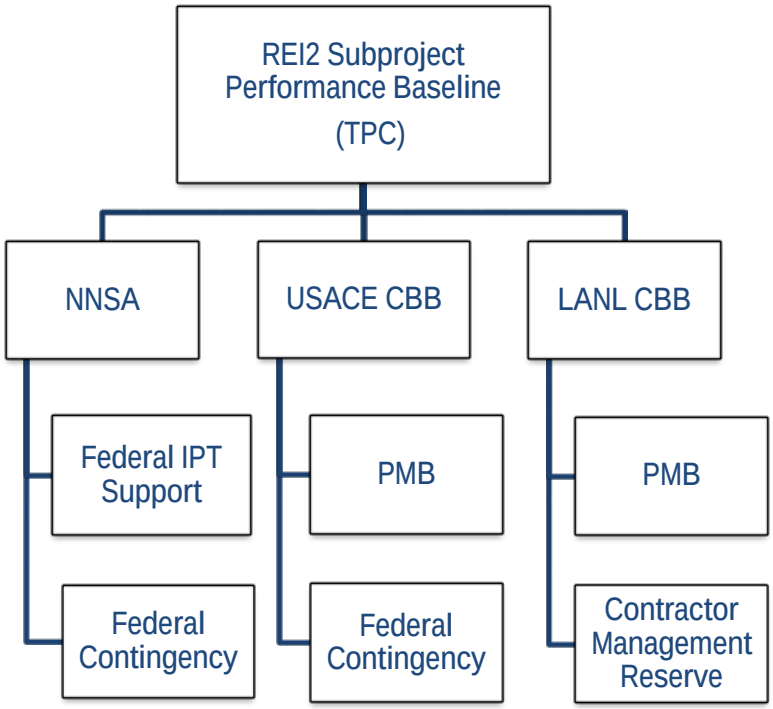


Figure 3-2 REI2 Subproject Performance Baseline Cost Structure

4 INTEGRATED REI2 SUBPROJECT BASELINES

The PMB technical, cost, and schedule baselines for the REI2 subproject provide the basis for proposed future changes to be measured. The WBS is shown in Figures 4-1 ("CMRR WBS"), and 4-2 ("REI2 Level 4 WBS"). The REI2 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. Scope Baseline

The REI2 technical baseline for CD-2/3 is based on the REI2 WBS dictionary and the final design deliverables. The technical baseline will be implemented through construction and TTO. The REI2 subproject technical baseline for CD-2/3 is documented in the *REI2 Final Design Report* (CMRR-RPT-00004), which includes the following:

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

The REI2 technical baseline documentation will include design change documentation, as-built/record drawings/specifications after completion of construction; as well as verification and validation documentation showing that designs were properly implemented through construction. Systems and equipment installed by REI2 will complete readiness and turnover to operations to ensure that systems and program operations performed within them are bounded within the existing RLUOB Hazards Analysis.

REI2 scope includes work assigned by NNSA to the USACE. The USACE scope includes design, construction, start-up, commissioning of a new glovebox and equipment staging facility (Combo Shop), and the installation and commissioning of office trailer complexes. The REI2 M&O baseline includes staffing and equipment necessary for LANL to provide support to the USACE from engineering, utilities, surveying, security, Project Management, ES&H, operations, the FOD, the LBO, authorities having jurisdiction (AHJs), and others as defined in the approved DOR.

The CMRR and REI2 WBS are shown in Figures 4-1 and 4-2, respectively.

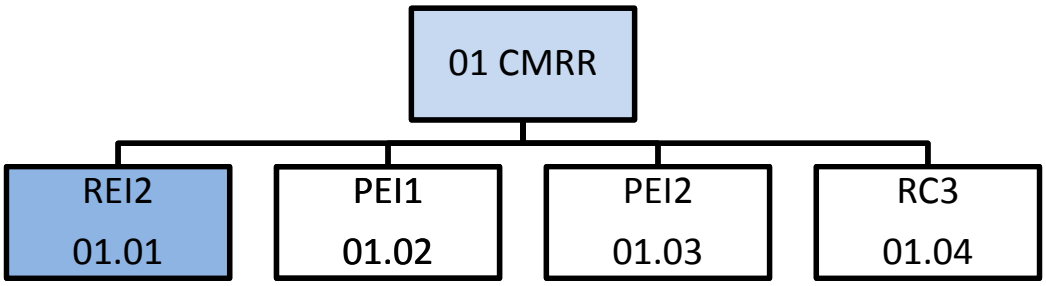


Figure 4-1 CMRR Work Breakdown Structure

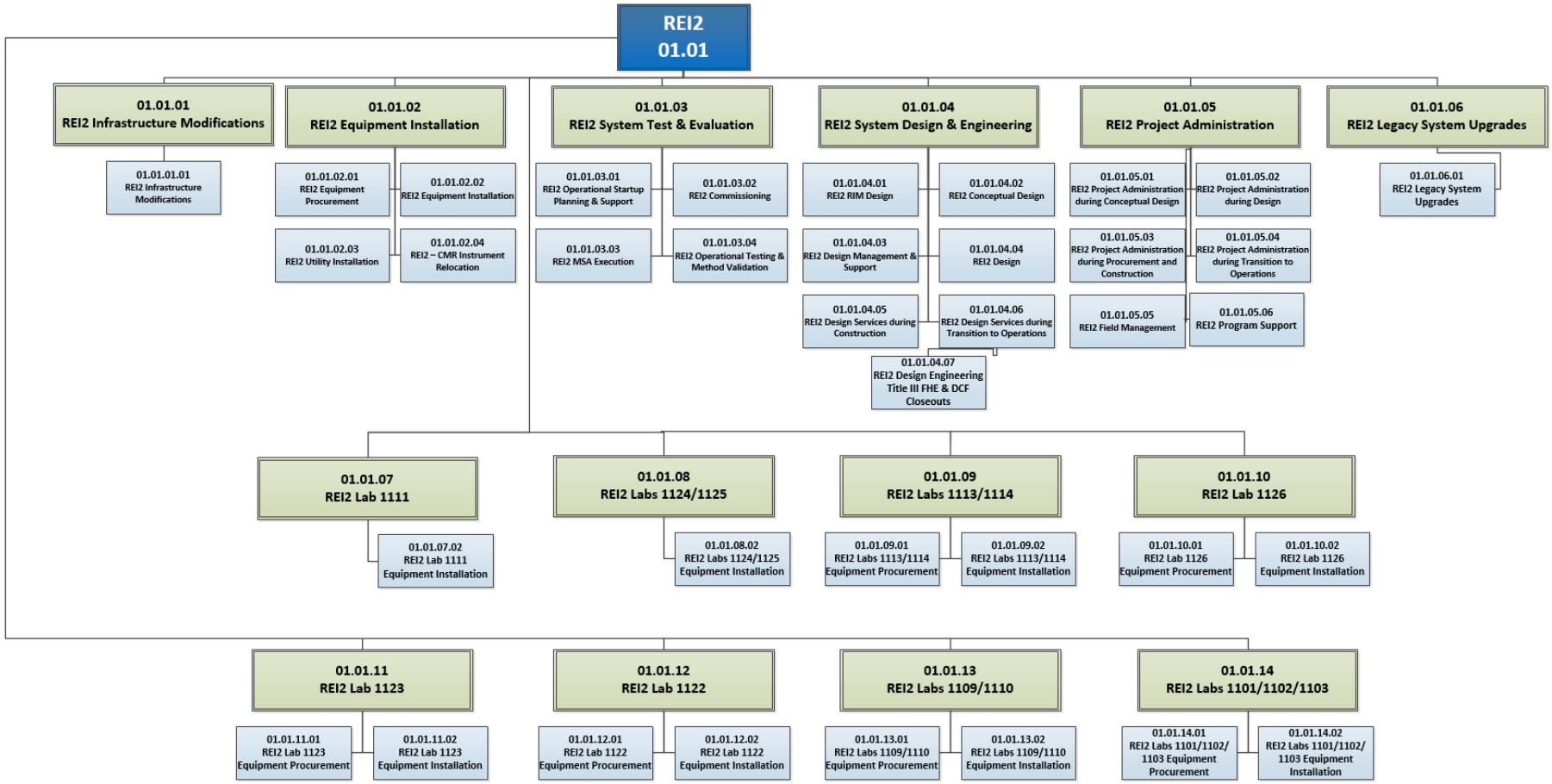


Figure 4-2 REI2 Level 4 WBS

4.1 Schedule Baseline

The schedule subproject completion dates are consistent with the integrated master schedule (IMS) as implemented in March 2017. Key milestones for REI2 are provided in Table 4-1 below. As noted, the dates presented are baseline dates with the exception of CD-4 which includes schedule contingency.

Table 4-1 REI2 Key Schedule Milestones

Level	Description	Date
1	Revised CD-1	08/14/14
1	CD-3A Approved	12/18/14
1	CD-3B Package Approved	12/22/15
3	LANS Submit CD-2/3 Package	03/30/16
1	CD-2/3 Authorization for REI2	10/31/16
3	Room 1111, RC Counting Laboratory Complete *	03/23/18
3	Room 1124/1125, Hazard Material Management Room Complete *	11/17/17
3	Room 1113/1114, RC Sample Preparation Laboratory Complete *	11/06/19
3	Room 1123, Coulometry and Oxide Distribution Laboratory Complete *	02/26/20
3	Room 1122, Mass Spec Sample Preparation Laboratory Complete *	2/13/20
3	Room 1126, Metal Sample Distribution Laboratory Complete *	02/28/20
3	Room 1101/1102/1103, X-Ray Fluorescence (XRF) and Material Characterization Laboratory Complete *	01/13/20
3	Room 1109/1110, Transmission Electron Microscope/Scanning Electron Microscope and Uranium Laboratory Complete *	03/10/20
1	CD-4 Complete**	1/05/22

** Laboratory completion milestones do not include M&O Schedule Margin nor Federal Contingency*
*** CD-4 schedule milestone date includes M&O Schedule Margin and Federal Contingency*

REI2 work must coordinate with ongoing operations in RLUOB to prioritize activities in support of programmatic milestone to cease AC/MC operations in the CMR Building. As part of the prioritization, the Project will work with the programmatic customers to develop alternatives for providing AC/MC analyses if there are gaps in AC/MC capabilities between ceasing operations in the CMR Building and completion of TTO in RLUOB.

4.2 Cost Baseline

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

The cost baseline for the REI2 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 REI2 subproject includes the following:

- CD-1: Authorization for management, planning, design, and minor work
- CD-3A: Authorization for RIM work and release long-lead procurement for enclosures
- CD-3B: Authorization for long-lead procurement for balance of enclosures, bulk construction materials, and preparation of laboratories (early utilities installation)
- CD-2/3: Title III engineering and as built drawings, procurement of programmatic equipment, enclosure installation and final connections, commissioning, and readiness/TTO activities

The estimate includes traditional cost and schedule uncertainties as well as risk based contingency. Table 4-2 provides a summary of the REI2 CD-2/3 estimate.

Subsequent to approval of the CD-2/3 Performance Measurement Baseline, the REI2 subproject completed the baseline Implementation as documented in the approved of the Baseline Change Proposal BCP-2017-001.

Table 4-2 REI2 Subproject TPC Performance Summary ($M)

	CD-2/3 Baseline at ESSAB	CD-2/3 Baseline Implementation
Total Estimated Cost (TEC)	$307.20	$357.18
Other Project Cost (OPC)	$99.10	$83.48
Performance Measurement Baseline (PMB)	**$406.31**	**$440.66**
M&O Management Reserve (MR)	$100.90	$92.00
Contract Budget Base (CBB)	**$507.21**	**$532.67** [2]
DOE Fee	$19.90 [1]	$7.07 [2]
Total Contract Price	**$527.11**	**$539.73** [2]
USACE CBB (TEC)[3]	$6.80	$6.80
NNSA Contingency	$60.10	$48.25
NNSA Project Management Oversight (ODC)	$39.24	$38.47
Total Project Cost (TPC)	**$633.25**	**$633.25**

1. DOE Fee was applied to the CBB at 5% for FY2017 through FY2021 at $19.9M
2. Based on the final Sub-CLIN 0002B negotiated value at $215M, DOE Fee is applied as follows:
   - REI2 SUB-CLIN 0002B fee was applied at 5% of the Target Cost of $215M ($10.75M); $5.9M will be generated through the LANS tax model at 2.75% of the Target Cost; the balance of $4.8M is funded through the DOE Fee, and included in the Total Contract Price.
   - The balance of the fee for non-CLIN scope at $9.2M is included within the CBB at $6.9M and within the Contractor Price at $2.3M for future Sub-CLIN options.
   - DOE Fee of $7.1M includes Sub-CLIN 0002B Fee at $4.8M, and $2.3M for scope outside Sub-CLIN 0002B (REI2 scope outside the Sub-CLIN 0002B will continue to be evaluated by NNSA for additional Sub-CLIN terms and conditions)
3. TA-55 Combination Shop, office trailer complex

The estimate basis for the REI2 M&O cost baseline is a Class 2 bottom-up estimate, which was completed based on 100% design for construction, detailed staffing plans, vendor quotes for equipment procurements, commissioning, TTO activities, and performing work in an operating Security Category-IV radiological facility. Lessons learned from previous PF-4 work has 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.

4.3 Spending Profile

An REI2 subproject spending profile has been updated to reflect the CD-2/3 approved Performance Baseline. The summary-level spend profile, as shown in Table 4-3, "REI2 Subproject Spending Profile" includes M&O contractor costs, M&O contractor MR, USACE costs, NNSA project management oversight costs, and NNSA Federal Contingency.

Table 4-3 REI2 Subproject Spending Profile ($M)

	Prior Years	FY2017	FY2018	FY2019	FY2020	FY2021	Total
REI2 TEC	$68.78	$96.40	$104.56	$68.75	$18.69		$357.18
REI2 OPC	$5.95	$11.14	$17.90	$33.10	$15.39		$83.48
Subtotal	**$74.73**	**$107.54**	**$122.46**	**$101.85**	**$34.08**	**$0.00**	**$440.66**
Management Reserve	$0.00	$6.94	$5.75	$13.49	$45.36	$20.46	$92.00
CBB Total	**$74.73**	**$114.48**	**$128.21**	**$115.34**	**$79.44**	**$20.46**	**$532.66**
DOE Fee*		$2.42	$2.42	$1.11	$1.11	$0.01	$7.07
Total	**$74.73**	**$116.89**	**$130.62**	**$116.45**	**$80.55**	**$20.49**	**$539.73**
USACE TEC	$3.70	$3.10					$6.80
Federal Contingency	$0.00	$2.97	$5.80	$6.26	$14.46	$18.76	$48.25
Federal IPT Support	$3.87	$8.92	$7.48	$7.64	$6.00	$4.56	$38.47
Total Project Cost	**$82.30**	**$131.88**	**$143.90**	**$130.35**	**$101.01**	**$43.81**	**$633.25**
Total Project Funding	**$170.63**	**$75.00**	**$127.03**	**$149.26**	**$90.27**	**$21.06**	**$633.25**
Forecasted Carryover	**$88.33**	**$31.45**	**$14.58**	**$33.49**	**$22.75**	**$0.00**	

*Reconciliation to $19.9M in original approved PEP for DOE Fee is applied as follows:

- REI2 SUB-CLIN 0002B fee was applied at 5% of the Target Cost of $215M ($10.75M)
  - $5.9M will be funded through the LANS tax model at 2.75% of the Target Cost in FY17 and FY18
  - $4.8M is funded through the DOE Fee, and included in the Total Contract Price ($4.8M equates to $2.42M in FY17, and $2.42M in FY18).
- The LANS fee for non-CLIN scope within the CBB is funded at $6.9M (FY17 $0.05M; FY18 $0.74M; FY19 $3.28M; FY20 $2.26; FY21 $0.58).
- The balance of $2.2M of DOE fee for scope outside Sub-CLIN 0002B, is applied at the Contract Price from FY19-21 which aligns with the REI2 completion date (FY19 $1.11M; FY20 $1.11M; FY21 $0.03M).

4.4 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. Therefore, only changes to use contingency 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 under a formal baseline change control process. At that time, no change may be made to PB 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 REI2 subproject, the BCCB is chaired as outlined below:

- Level 0 BCCB - Deputy Secretary of Energy
- Level 1 BCCB - Undersecretary for Nuclear Security
- Level 2 BCCB - Federal Project Director (FPD, NA-APM-1.5
- Level 3 BCCB - LANL CMRR PM or USACE PM

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 (“Baseline Change Control Thresholds”). At each level, the designee who serves as the BCCB chair approves baseline changes with the concurrence and recommendation of the BCCB members. As appropriate, the threshold table will be revised and updated 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., BCP) or contingency allocation (CA). Back-up 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 BCCB, the USACE BCCB, or the NNSA BCCB, as appropriate to their levels of authority. The BCCB meets to consider and deliberate each request, which may then be (1) approved or disapproved if it is 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 REI2 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 REI2 PEP has incorporated the approved Baseline Change Proposal 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.

4.5 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.

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 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 project's critical path to accommodate unknowns and delays that may arise during work performance. Risk-based contingency will be determined for each subproject and presented in the Appendices with the baseline information for each subproject. The schedule contingency durations by subprojects 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 project has an EAC below the TPC, additional scope may be added; or vice versa, if the project 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

4.6 Contractor Management – Work Authorization

In accordance with DOE O 412.1A, the REI2 FPD (within their respective contracting officer representative [COR] delegated authority) will concur in 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 REI2 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 REI2 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, when added to all costs previously incurred, the costs that are expected to be incurred under the approved RPA in the next ninety (90) days 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

REI2 will be managed by NNSA, consistent with DOE O 413.3B, Change 2, NNSA will control the REI2 baseline and oversee Laboratory personnel, who will manage 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 processes to be used by the CIPT. The interfaces and DOR between NNSA, USACE, and LANL are addressed in CMRR-EIP*, 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 (including contingency management), project status meetings, project status reporting, and the various parameters of the change control process.

The NNSA management process 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 REI2 FPD is responsible for ensuring integration of the M&O contractor and USACE reporting activities for the project scope. The M&O Contractor is responsible for maintaining Baseline documentation and provides baseline reports to the FPD. USACE will provide performance and schedule status to the M&O contractor per the approved DOR. The FPD will establish the specific project reporting requirements for the M&O and USACE. The FPD is responsible for communications to NNSA PMO Manager for performance issues and impacts to the overall CMRR Project. The REI2 FPD, LANL APM, and USACE will also produce REI2 subproject reports for incorporation into the overall CMRR monthly report. The M&O contractor is responsible for ensuring performance is reported in the PARSII. The REI2 FPD approves the subproject performance data reported in PARSII.

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, once a month. The budgeted cost of work performed (BCWP) from this updated schedule and actual cost of work performed (ACWP) are recorded in the cost processor from the Laboratory's ORACLE Project Accounting System. CAMs are responsible for managing work scope based on evaluation of EVMS information. The Project Manager is responsible for project scope, performance, change control, risk 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

All potential changes are first identified in the subproject 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 REI2 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 the following:

- 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, REI2 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 procedure 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 into 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
- Reconciliations to the Chief Financial Officer's (CFO) 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. The EAC (per AP-350-

155, *Estimate at Completion*) 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 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 integrity of the baseline, identification of potential problems, and appropriate corrective action. Several measures of performance are managed, including cost and schedule variances from the baselines, schedule progress, and EACs.

5.2 Project Performance

The 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 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 overall REI2 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. As appropriate, the EAC at the control account levels will be reviewed with revisions made to the forecast 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 authorized purpose. 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 will ensure that costs are posted accurately in their control accounts.

5.2.3 Program Codes/Control Accounts

The REI2 control accounts are based on the REI2 WBS to ensure that costs for every product and service that will be provided are captured. The Project Controls team maintains

the code of accounts. Prior to starting work, program code/control account/work package must be activated or opened, by notifying the assigned CFO 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 prior 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 by the responsible manager, Project Controls engineer or Project Manager.

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 subcontractors' costs with Laboratory costs to verify invoices to confirm that the work was performed and that contractor costs are accurate. This verification must be performed prior to approving the invoice. If incurred costs are not properly posted in the financial system then an accrual will be posted using one of three methods noted below.

1. Performance-Based Accruals System (PBAS) — a CFO-maintained Access database is 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 the CFO require notification with justification to the Cost-Schedule Division Office (CD-DO) group leader or designee. Manual accruals for year-end closing are required.
3. Estimated ACWP (accruals) posted directly into the cost tool (as necessary) for ensuring ACWP is directly related to BCWP. Estimated ACWP requires the approval of the 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 the *REI2 Risk Assessment Report* (RAR, CMRR-RPT-00002).

The risk management process includes a Technical and Programmatic Risk Assessment (TPRA), which is a summary of events which can have dramatic effect on the successful completion of the Project. The RMP and RAR describe the risk management strategy. The RMP defines 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 risk-based cost and schedule uncertainties. Risk management considerations have been used throughout Project development to allow 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.

Risk and opportunity assessment forms were developed using Laboratory guidelines and checklists and to detail each risk element in detail. For each risk, the cost and schedule impacts as well as mitigation actions, control features and residual values and/or impacts are documented. The residual risk values are used to help establish the management reserve (MR) and federal contingency. The established MR confidence level used in the cost estimate for the revised CD-1 for TPRA is 85%.

The role of Project risk assessment and management within project management is shown in Figure 5-1 ("Project Risk Analysis"). The Project risk assessment team worked with the Project team and SMEs to identify potential sources of unwanted performance and opportunities, their likelihood of occurrence, and their predicted effect on the performance.

Risks and impacts that are outside the Project's control are transferred to the federal team.

5.3.1 Risk-Based Contingencies

The Project has defined contingencies for unplanned events within the current project scope. These contingencies will be incorporated into the Project baselines as required by DOE G 413.3-7A, *Risk Management Guide*, the contingencies are in the areas of cost and schedule.

MR and Federal Contingency will be included in the TPC to establish 85% confidence of Project completion within estimated cost and schedule.

Some risks associated with REI2 subproject that are determined through the REI2 Risk Management Board to be transferred to NNSA are presented in Appendix A (*NNSA Risks*). The LANL risk management team will support NNSA in statistical analysis of the transferred and federally-owned risks to establish a risk-based federal contingency.

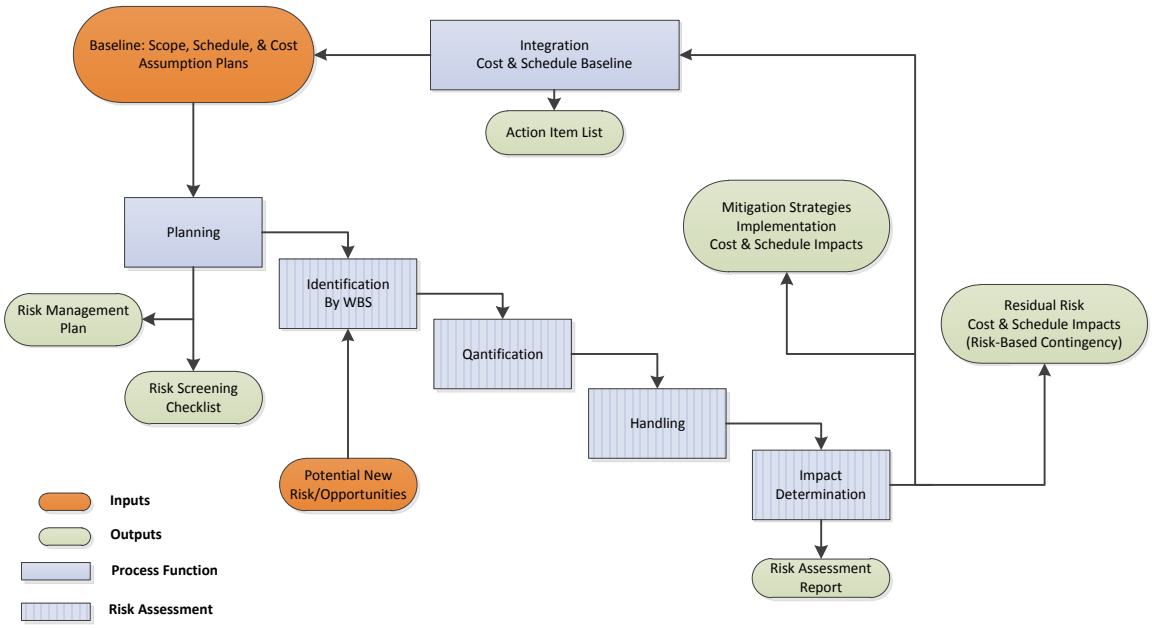


Figure 5-1 Project Risk Analysis

Risk-based schedule margin will be added to the REI2 subproject completion dates to establish the CD-4 milestones. Cost of schedule margin will address the confidence-based schedule uncertainty as well as the risk-based schedule margin. This hotel load is added to the resulting MR. The risk-based cost of schedule MR is primarily based on hotel loads for delays or additional work.

Note that the Risk Analysis transfer some risks to NNSA. For example, all design and construction risks for the USACE performed activities are transferred to NNSA. Risks for the NNSA and contractor are managed in a combined database per the RMP. The REI2

subproject RAR was developed to include separate analysis of contractor and NNSA owned risks.

Contractor management reserve (MR) is the portion of the Project budget that is available to the Project Manager to respond to risks that impact the Project. MR amounts and thresholds are identified to provide flexibility in dealing with uncertainties and risks associated with the Project elements (cost and schedule uncertainties, scope definition, omissions, etc.). Risks identified as transferred outside the Project are not covered by the MR or any part of the Project TPC.

MR amounts (as a result of scope, cost, and schedule uncertainty) 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 4.6 ("Contractor Management Reserve and Federal Contingency Management").

Risk-based contingency determined by the federal TPRA will be managed at the NNSA level as a REI2 Federal Contingency for the subproject and included in the PB.

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 into RLUOB and PF-4 facilities, which were designed to support similar equipment and processes. Much of the same equipment is currently operating in the old CMR Building, PF-4, and RLUOB. No new critical technologies or first-of-a-kind engineering endeavors are being developed or installed by the CMRR Project.

The Project will install cutting edge technologies for analytical processes. The equipment is commercially available catalog items, not developmental. Systems such as enclosure fire protection are all commercially available, code compliant systems. No new unproven technologies will be used by the Project.

As design is completed for construction/installation, all of the technologies are at a minimum of TRL-7 and more likely score at a TRL-9.

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

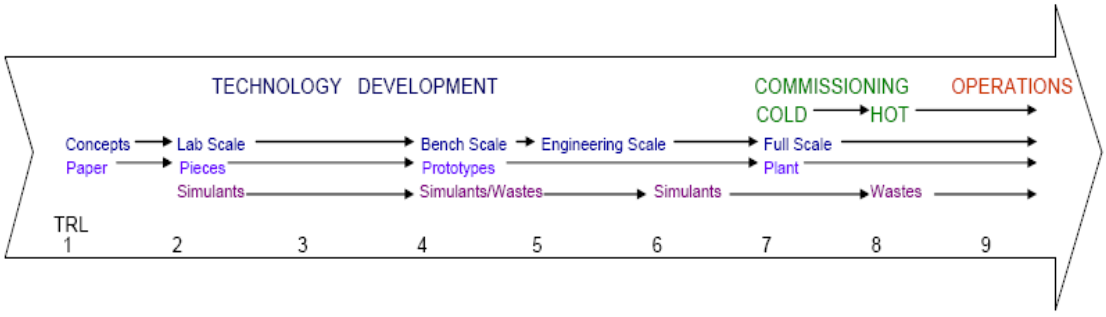


Figure 5-2 Technology Readiness Level

5.5 Alternatives Analysis and Selection

The presentation of alternatives and the selection of preferred alternatives for the REI2 subproject is 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 ES&H requirements and processes for subcontractor health and safety plans, integrated work documents (IWDs), permit requirements identification (PR-ID) documentation, radiological worker permits, 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 self-performed work, 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 nonhazardous industrial waste). The Project will coordinate with TA-55 and LANL Waste Management Services as part of construction planning and will endeavor to minimize the 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, 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*. The existing approved Laboratory procedures provide a proven procedure set for self-performed work and a basis for managing subcontractor safety and health performance.

For subcontracted work, P101-12 is flowed down to the subcontractor through the 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 design criteria and the 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 the 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 to ensure that the 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 concerning 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) provides for 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 Hazard Analysis

REI2 work is performed within RLUOB, a less than HC-3 Radiological Facility. The required hazard analysis is documented in the RLUOB Hazard Analysis Report (HAR, RLUOB-HAR-13-001). The HAR defines the facility safety controls that are in place to ensure that radiological limits are not exceeded. TA-55 has successfully proven that operations, safeguards, security, safety, and management processes and procedures are in place to ensure that work is executed safely and AC/MC operations will not challenge the approved safety envelopes. The RLUOB HAR has been updated to ensure that REI2 work is addressed within the safety analysis. Equipment to be installed includes gloveboxes and other laboratory enclosures, as well as new programmatic equipment. The rooms were purpose built and configured to support new equipment installations with only minor modifications needed to tie in to facility interfaces.

The nuclear safety requirements defined in Subpart B of 10 CFR 830, *Nuclear Safety Management*, do not apply to work at RLUOB.

5.8 Fire Protection

The Fire Protection and suppression program required by DOE 420.1C, *Facility Safety*, is defined by 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. The Project implements the LANL Fire Protection Program to ensure the fire protection and fire suppression capabilities are not impacted. The design process includes input and review by Laboratory Fire Protection and approval by the Fire Marshall when required by code or the LANL Fire Protection Program. 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.

5.9 Value Engineering/Value Management

REI2 is establishing systems and processes with new equipment that perform the same, or nearly the same, functions as existing AC/MC operations hence value options and alternatives are limited; i.e., implementation of traditional value engineering (VE) is not appropriate for this effort. Plant standard designs and lessons learned have been incorporated in enclosure design to achieve better value over time and improved ease of installation. However, these value added practices were not derived from formal VE studies. Detailed VE studies will be documented for the new facilities designed through USACE.

5.10 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 using the 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. Detailed life cycle cost analysis will be developed for the REI2 subproject based on the 100% final designs post CD-2/3 authorization.

5.11 Safeguards and Security

The Safeguards and Security (S&S) requirements established for the Project are integrated into design construction and operation in accordance with NNSA policies for ISSM. The *Safeguards*

and Security Plan (CMRR-PLAN-2505) was developed and is closely integrated with the established S&S requirements at the TA-55 site.

5.12 Configuration Management

For work in RLUOB, Configuration Management will use the existing and approved processes required by the TA-55 facility owner and operator. The TA-55 and RLUOB Configuration Management systems 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 DCF and the unreviewed safety question determination (USQD) processes to ensure coordination and compliance with the approved configuration. The Project will submit DCFs to accomplish work in the same manner and use the same procedures as used by the FOD and operations to accomplish changes to SSC.

The Project 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 *Engineering Standards Manual* and PD340, *Conduct of Engineering for Facility Work*.

During the design process, the assigned RLUOB CSEs determine 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 planned subsystem and component replacements.

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 the REI2 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*.

5.13 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 the 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 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. USACE will follow Engineering and Regulation No. 415-1-10, Contractor Submittal Procedures, the subcontractor submittal procedures.

The USACE PDT, with input and advice from the FIPT, will be responsible for developing the list of submittals required to show the minimum information that must be submitted by subcontractors 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. Following completion of the subcontracted work, all pertained project files, drawings, submittals etc. will be officially transmitted to LANS for documentation purposes.

5.14 Systems Engineering

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

The Project is using a systems engineering approach to design development in accordance with the Laboratory's *Conduct of Engineering* procedures. The Requirements and Criteria Document (RCD) is a project-specific document that describes the functions, performance, interface, and adjacency requirements, and the design criteria for structures, systems, and components (SSCs). The RCD also documents the project code of record. The Project 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 LANL Engineering Standards and construction performance specifications.

Plant system engineers provide system engineering support to RLUOB. The Project will use RLUOB plant system engineers to provide configuration control, establish system requirements, review design packages, and approve and closeout design change packages.

5.15 Quality Assurance

SD330, *Los Alamos National Laboratory Quality Assurance Program*, meets requirements of 10 CFR 830, Subpart A and DOE O 414.1D, *Quality Assurance*. All Laboratory organizations, (including the REI2 IPT) are required to implement this procedure. In addition to SD330, the Project 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 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, *Project Quality Management Plan* (PQMP), and PSI-PLAN-00002 (*Quality Management Plan for PSI Division Projects*). The PQMP further establishes quality requirements and structure for the CMRR Project.

LANL organizations performing work for the Project are required to follow the latest approved LANL policy. This policy does not preclude Laboratory organizations and subcontractors

(including design agency and construction agency) from operating under their own Quality Management Plans (QMPs) and associated procedures; however, they must be consistent with LANL QMP and fulfill all requirements stipulated therein.

The level of rigor to achieve compliance with SD330 is defined by ML for the SSC. The ML and related quality levels for segments of each subproject will vary. MLs range from ML 3-4 (for balance of plant systems that are not credited in the Facility HAR) to ML-1-2 components of safety-related systems.

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

Given that systems, structures, and components (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. The quality of new enclosures must be assured through procurement of the items either by NQA-1 qualified vendors/suppliers or through 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 Quality Assurance Plans to meet requirements of 10 CFR 830, Subpart A and DOE O 414.1D, *Quality Assurance*.

For USACE executed work, the Quality Management Plan addresses the quality component of the USACE PMP. The QMP documents the project-specific quality control (QC) and assurance (QA) procedures appropriate for 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.

5.16 Communication Management

The communications strategy for the CMRR Project and its subprojects uses several elements to ensure effective communication. Figure 5-3 ("Project Communication Interfaces") provides an illustration of the complexity of communications required for REI2.

A Communications Procedure is in development to help guide and standardize communications through 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 LANL PM and the FPD. Communication outside LANL to the public or to other federal agencies is 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 other functions. 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, and other technical reporting as well as construction documentation are through the project STR and the ASM subcontract administrator. Direct interface for design deliverables within the subcontracted scope is through the Project Engineer, (who manages the interface and communications through the Procurement Engineer, STR and ASM subcontract administrator with the subcontractor), Laboratory design engineers, systems engineers, design authority, and other SMEs for the formal design review process.

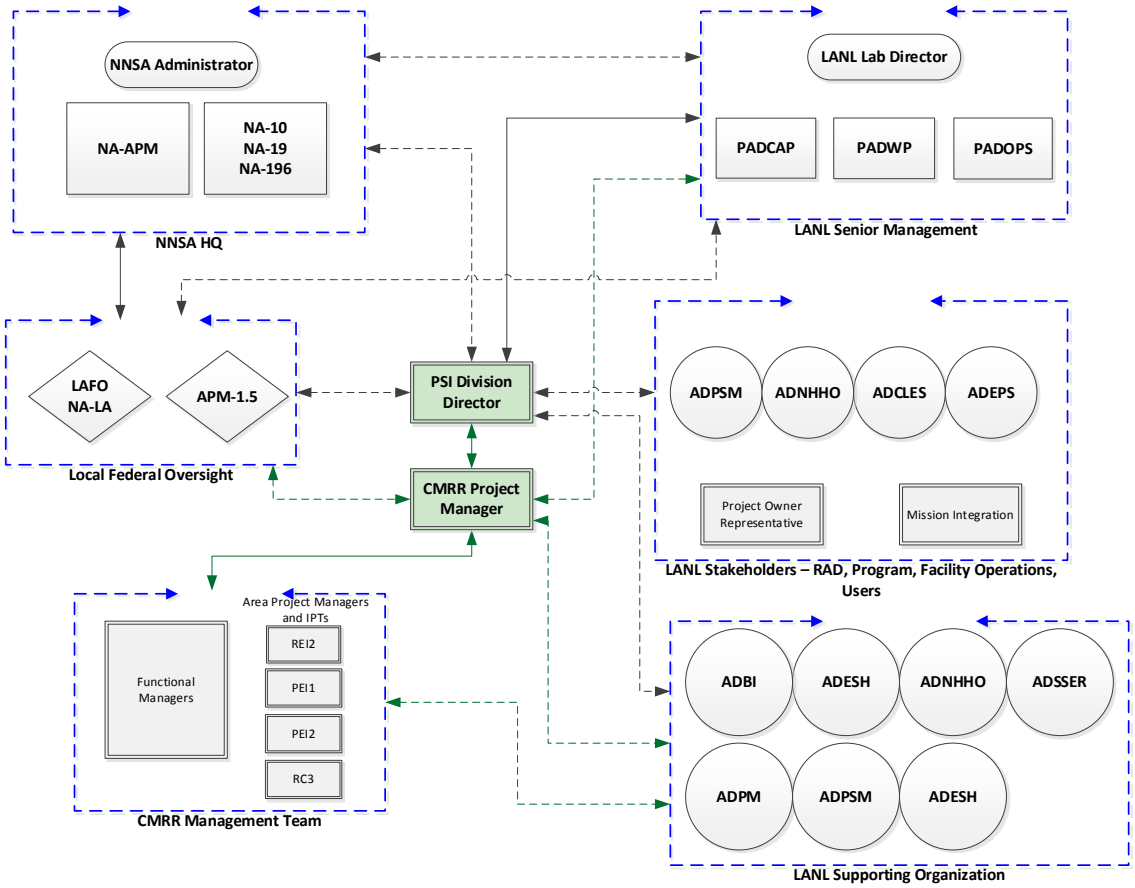


Figure 5-3 Project Communication Interfaces

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). Requests for status, progress reports, briefings, or other program specific information will be submitted to the respective executing district, which will direct the preparation and release of information in coordination with the appropriate USACE and NNSA representatives

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 and 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 contractor will be limited to the organization that has the direct contractual relationship.

5.17 Testing and Evaluation

As applicable, commissioning, turnover, and TTO plans will be developed to control testing and documentation required to transition SSC from construction through readiness into TTO. Acceptance and Test Plans will be developed as part of the final design activities to summarize testing required to document construction is completed in compliance with the design. The plan identifies tests to safely support evaluation of the construction completion and system performance related to requirements for any impacted SSC. The facility has established a checklist for the start-up of gloveboxes, enclosures, and programmatic equipment. This checklist will be used by the Project for start-up as part of the Post Modification Test Plan.

The commissioning, turnover, and TTO plans will identify 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 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 and TA-55 system engineers 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 and that SSC requirements are met or exceeded. Project processes and procedures for test, evaluation start-up, and turnover are consistent with lessons learned from other TA-55 programmatic equipment installations.

5.18 Project Reviews

LANL provides internal reviews of the Project prior to requesting NNSA independent reviews for CD approvals.

Reviews are used to assist upper management in confirming readiness for the Project 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 the Project'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 the following:

- Peer review(s) of in process development of the CD-2/3 documentation
- ICE, performed through the Office of Project Management Oversight and Assessments (PMOA)
- PB EIR by PMOA
- PMRC review of performance baseline prior to presentation to ESAAB
- ESAAB review for final approval of the CD

Annual budget requests for the REI2 subproject will include resources to fund required reviews.

5.19 Transition to Operations

The CMRR Project is responsible for the transition and consolidation of AC/MC capabilities from CMR 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 REI2. The TTO Plan is also an agreement on the end state between the project and program operations and its management.

The REI2 laboratory rooms will be turned over to operations in phases. For each REI2 laboratory room, the threshold objective will be the following:

- Complete the preparation of operational startup
- Conduct the management self-assessment to demonstrate facility and laboratory utilities, enclosures, programmatic equipment, operational procedures and maintenance plans, and training of personnel readiness for radiological operations
- Obtain approval to startup plutonium operations
- Complete programmatic equipment testing with plutonium ("hot testing") for the following 8 laboratory rooms 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 REI2 Confirmations

	REI2 Laboratory Room
1	Room 1111, RC Counting Laboratory

2	Room 1124/1125, Hazard Material Management Room
3	Room 1113/1114, RC Sample Preparation Laboratory
4	Room 1123, Coulometry and Oxide Distribution Laboratory
5	Room 1122, Mass Spec Sample Preparation Laboratory
6	Room 1126, Metal Sample Distribution Laboratory
7	Room 1101/1102/1103, X-Ray Fluorescence (XRF) and Material Characterization Laboratory
8	Room 1109/1110, Transmission Electron Microscope/Scanning Electron Microscope and Uranium Laboratory

*for Hazard Material Management room, complete equipment testing only

RLUOB is a less than hazard category-3 nuclear facility (i.e., radiological facility). Consistent with requirements in DOE O 425.1D, Verification of Readiness to Start-Up or Restart Nuclear Facilities, the startup of REI2 laboratory rooms is not subject to operational readiness review (ORR). Management Self Assessments (MSA) will be conducted for starting activities in these 8 laboratory rooms. The integration of Laboratory readiness activities with start-up and turnover activities will ensure sound logic and expectations during the REI2 MSAs.

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.

5.20 Project Closeout

Project-installed SSC (including enclosures and other items) will be tested and accepted for turnover to the facility as the SSCs are finished. REI2 will request one CD-4 approval at the end of all work and not by multiple individual equipment installations or rooms.

REI2 readiness activities will be completed prior to CD-4 to complete documentation , 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).

REI2, turnover, and acceptance activities will be conducted in accordance with commissioning, turnover, and TTO plans/procedures. As required by DOE O 413.3B, Change 2, lessons learned will be captured through the project life 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.

REI2 closeout will be completed once the final cost closing statement and final cost report (part of the Project Closeout Package) are approved by the 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 USACE 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

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-341-519	*Design Revision Control Process*
AP-350-109	*Project Controls*
AP-350-110	*Earned Value Management System*
AP-350-152	*Trend Program*
AP-350-155	*Estimate at Completion*
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-EIP	*CMRR Interface Plan for USACE Executed Projects at Los Alamos National Laboratory (NNSA, USACE, LANL Division of Responsibility for SII)*
CMRR-MNS-008-R2	*CMRR Project MNS*
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-1901	*Project Execution Plan*
CMRR-PLAN-1902	*Risk Management Plan*
CMRR-PLAN-2505	*Safeguards and Security Plan*
CMRR-PLAN-PM-0101	*Program Requirements Document*
CMRR-RPT-00004	*REI2 Final Design Report*
DOE G 413.3-12	*Project Definition Rating Index Guide for Traditional Nuclear and Non-Nuclear Construction Projects*

PEP Development References

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, Draft Page change*
DOE O 414.1D	*Quality Assurance*
DOE O 420.1C	*Facility Safety*
DOE O 425.1D	*Verification of Readiness to Start-Up or Restart Nuclear Facilities*
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*
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.
ER-5-1-11	*USACE Project Management Business Process*

PEP Development References

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*
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*
RLUOB-HAR-13-001	*RLUOB Hazard Analysis Report*
SD100	*Integrated Safety Management System Description*
SD330	*Los Alamos National Laboratory Quality Assurance Program*
SD350	*Project Management for Capital Asset Acquisition and Construction*
SD400	*Environmental Management System*
STD-342-100	*Engineering Standards Manual*

7 APPENDICES

APPENDIX A, REI2 NNSA RISKS

APPENDIX B, REI2 Change Control Log

APPENDIX C, REI2 WBS DICTIONARY

APPENDIX A, REI2 NNSA RISKS

Item	RISK ID	Title
Active		
1	REI20113	NNSA-001-Project Funding Delays due to Fiscal Year Appropriation Continuing Resolution
2	REI20114	NNSA-003-Escalation Rates Exceed Those Factored Into Baseline Estimate and Schedule
3	REI20115	NNSA-007-Changes in External Agency Requirements
4	REI20116	NNSA-009-External Agency Reviews, Audits, Data Calls, Evaluations, and Reports beyond the Project Baseline
5	REI20118	NNSA-011-Federal Review and Approval of LANS Documents
6	REI20119	NNSA-012B-NNSA/DOE Initiated Site-Wide Shut down
7	REI20121	NNSA-014B-Change in the M&O Contractor May Impact Project Cost and Schedule
8	REI20122	NNSA-015B-Change in LANL Direct Charging Strategies
9	REI20123	NNSA-016B-Loss of Key Federal Project Personnel and Additional Federal IPT Support
10	REI20133	NNSA-SII011 USACE Turnover and Acceptance by Los Alamos National Laboratory – REI2 Combo Shop
Retired		
11	REI20139	NNSA-DOE EVMS Handbook Interpretations Changes to WBS and reporting (REI2)
12	REI20120	NNSA-013B-Project Authorization (Critical Decision) is Delayed
13	REI20124	NNSA-SII005-Inadequate flow down of requirements to sub tier contractors – Combo Shop
14	REI20125	NNSA-SII006-Late delivery and Changes in LANL Requirements – Combo Shop
15	REI20131	NNSA-SII007 Unplanned Safety and Environmental Issues as a Result of Construction Activities– Combo Shop
16	REI20132	NNSA-SII008 Access to Construction Support Utilities During Construction -- REI2 Combo Shop
17	REI20134	NNSA-SII001-Weather Delays Exceed the Baseline Estimate – Combo Shop

APPENDIX B, REI2 CHANGE CONTROL LOG

BCP #	BCP Title	Approved CBB	Approval Date
REI2-2017-001	Performance Baseline Implementation – REI2	$532.7M	2/2/2017

APPENDIX C, REI2 WBS DICTIONARY

National Nuclear Security Administration

CMRR Project
REI2 Subproject
Los Alamos National Laboratory

WORK BREAKDOWN STRUCTURE (WBS) DICTIONARY

CMRR-WBS-00005, Rev. 1

(Authorized Work - Baseline Implementation)

February 2017

Approved by: _____ 2/21/17

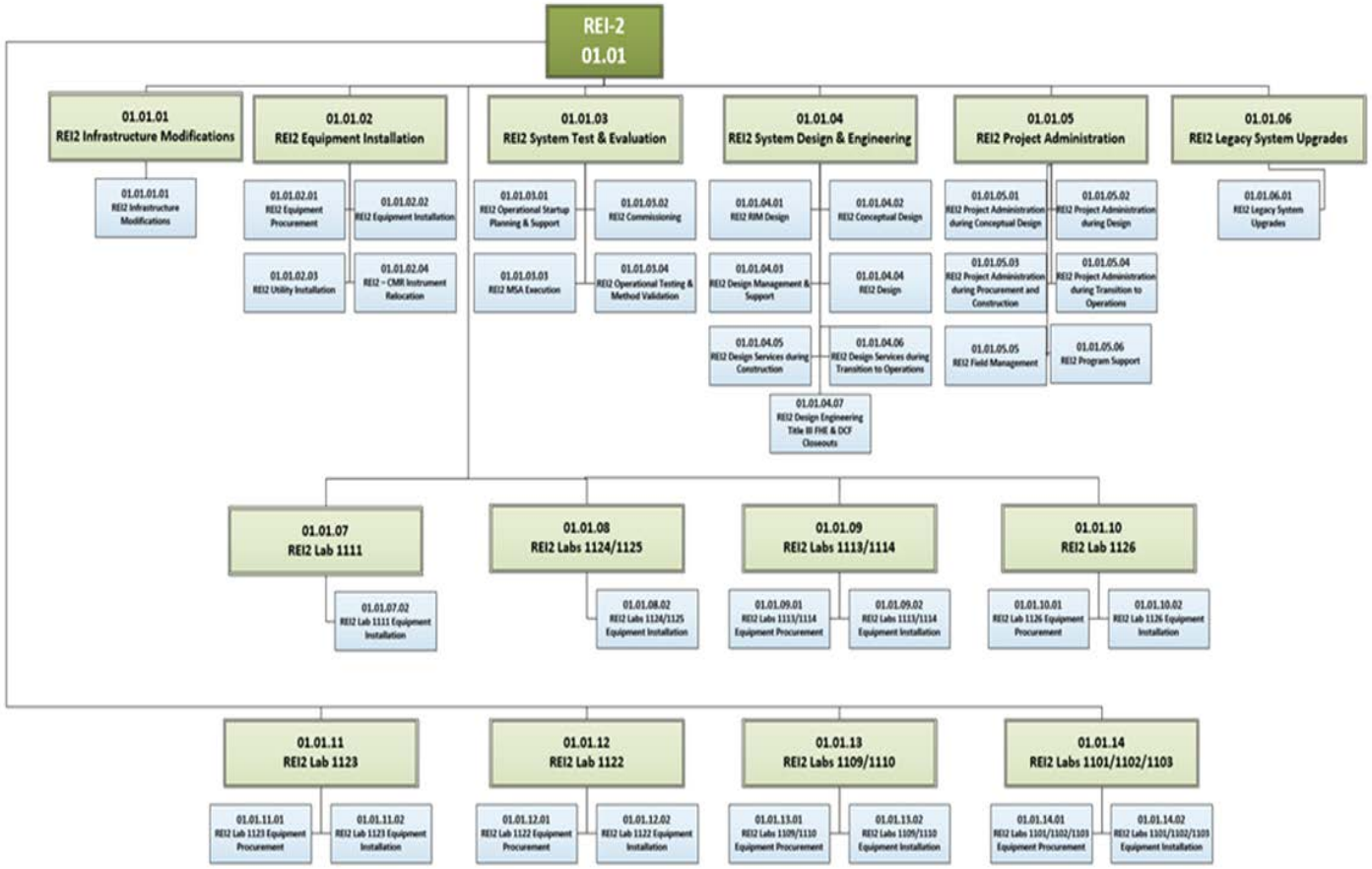
Rayford Patterson — Date

CMRR Project Manager

Los Alamos National Laboratory

Derivative Classification Review			
☒ UNCLASSIFIED ☐ Export Controlled Information ☐ Official Use Only ☐ Unclassified Controlled Nuclear Information Guidance Used: CG-SS-5, July 2016, DOE-OC			
DC/RO Name/Z Number: Amy S Wong, 115174	Organization: C-DO/PSI	Signature:	Date: 2-21-2017

WBS Structure



Acronyms

Term	Definition
A/E	architect/engineer
AC	analytical chemistry
ADNHHO	Associate Directorate for Nuclear and High-Hazard Operations
ALARA	as low as reasonably achievable
BAS	Building Automation System
CAM	continuous air monitor
CAM	control account manager
CBB	control budget base
CIPT	Contractor Integrated Project Team
CMR	Chemistry and Metallurgy Research
CMRR	Chemistry and Metallurgy Research Replacement
COE	Conduct of Engineering
CSA	civil/structural/architectural
CSE	Cognizant System Engineering
D&D	decontamination and decommissioning
DPR	designated procurement representative
DRN	design review notifications
ES&H	Environment, Safety, and Health
EVMS	Earned Value Management System
FAS	fire alarm system
FAS	fixed air sampler (for radiation monitoring)
FCR	field change request

FOD	facility operations director
FTE	full-time equivalent
HFM	hand and foot monitor
HPV	health physics vacuum
HRP	Human Reliability Program
HVAC	heating, ventilation, air conditioning
IPT	integrated project team
LANL	Los Alamos National Laboratory
LBO	LANL Building Official
LCCE	life cycle cost estimate
LIDAR	light detection and ranging
LOE	level of effort
M&S	materials and supplies
MC	materials characterization
ML	management level
MSA	management self-assessment
NCR	nonconformance report
NEPA	National Environmental Policy Act
NIE	Network and Infrastructure Engineering Group
NQA	Nuclear Quality Assurance
ODC	other direct costs
ORTEC	Oak Ridge Technical Enterprises Corp.
PCM	personnel contamination monitor
PFITS	Performance Feedback and Improvement Tracking System

PMP	Project Management Plan
PS-2	Physical Security Group
QA	quality assurance
QC	quality control
RC	radiochemistry
RCT	radiation control technician
REI2	RLUOB Equipment Installation-Phase 2
RFI	request for information
RIM	RLUOB Infrastructure Modifications
RLUOB	Radiological Laboratory/Utility/Office Building
RLW	radioactive liquid waste
SDDR	supplier deviation disposition request
SDIT	Safety Design Integration Team
SEM	scanning electron microscopy
SME	subject matter expert
SOW	scope of work
TEM	transmission electron microscopy
TIMS	thermal ionization mass spectrometry
TTO	transition to operations
WBS	work breakdown structure
XRF	x-ray fluorescence

References

Document Number	Title
CMRR-PLAN-00004	*CMRR REI2 and PEI1 Transition to Operations Plan*
CMRR-PLAN-00006	*REI2 Project Commissioning Plan*
CMRR-PLAN-00010	*Construction Execution Plan*
CMRR-PLAN-00015	*CMRR REI2 and PEI1 Turnover Plan*
CMRR-PLAN-PM-0101	*Program Requirements Document*
CMRR-PLAN-PM-1901	*Preliminary Project Execution Plan*
CMRR-PLAN-00019	*CMRR REI2 Project Execution Plan*
FSD-115-002	*Process for Management Self-Assessment (MSA) of Startup and Restart of LANL Nuclear Facilities, Activities, and Operations*
PD115	*LANL Readiness Program*

Level 2 - Control Account
WBS Number: 01.01
WBS Description: REI2 Subproject
Work Description (Scope) The mission of the CMRR Project is to ensure continuity in enduring analytical chemistry (AC) and materials characterization (MC) capabilities for NNSA's actinide-based missions in support of stockpile stewardship and other defense-related missions. REI2 will maximize use of RLUOB laboratories by reconfiguring and equipping 10,000 sq. ft. of existing laboratories with 74 enclosures to enable additional AC/MC capabilities, which will be moved from the Chemistry and Metallurgy Research (CMR) Building.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.01
WBS Description: REI2 Infrastructure Modifications
Work Description (Scope) The RLUOB Infrastructure Modifications (RIM) scope primarily reflects removal of temporary power and data drops, minor drywall demolition, PCM relocations, and minor work. Primarily the work scope for demolition consists of demolition of Combo Shop, Remove Tunnel Access Door and Close-out Opening, Tunnel Outside Canopy Demolition and Trailers and Storage Facilities Demolition.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.01.01
WBS Description: REI2 Infrastructure Modifications
Work Description (Scope) The Scope of Work reflects primarily demolition work, backfill and grading, and closing the Access Tunnel Door Opening. The scope is as follow: 1) Combo Shop Demolition: This scope includes disconnecting the utilities tie-in systems, removing 3,100 LF of cable/wire, 800 LF of conduit, 50 LF of fire water piping, demolishing combo shop (including 388 CY of concrete slab on grade), demolish 2,425 SY of asphalt paving, 465 CY of backfill under slab and 3,600 SY of fine grading. 2) Access Tunnel Demolition: This scope includes demolishing 2,125 SF redi-rock reinforced retaining wall, 311 LF of chain link fence, demolishing 950 SY of asphalt paving, 5,000 CY of back-fill, 750 SY of fine grading, and removing 26 security vehicle barriers. 3) Remove Tunnel Access Door and Close-out Opening: The scope of work includes removing double door, removing 7,800 LF of cable and 200 LF of conduit, and closing door opening (2.76 CY of concrete). 4) Tunnel Outside Canopy Demolition: The scope of work includes removing 2,400 LF of cable, removing 5 light poles, demolishing 48 LF of structural steel, demolishing 31 SY of metal roof decking, demolishing 40 LF of fire sprinkle piping with 3 sprinkler heads. 5) Trailers and Storage Facilities Demolition: This scope includes disconnecting the utilities tie-in systems, removing 4,320LF of cable/wire, 30 LF of conduit, demolishing two (2) construction trailers, and 304 CY of fine grading.

The RLUOB Infrastructure Modifications (RIM) scope primarily reflects removal of temporary power and data drops, minor drywall demolition, Personnel Contamination Monitor (PCM) relocations, and minor work. The scope is as follows:

1) Modification in Lobbies 1000 and 1001

2) Demolition and modification in Room E100

3) Removal of temporary construction power for twelve (12) labs

4) Relocate PCMs

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.02
WBS Description: REI2 Equipment Installation
Work Description (Scope) Scope consists of procurement of materials for final connection and installation of enclosures and programmatic equipment, installation of equipment in labs 1111 and 1124/1125 (including relocation of equipment from CMR to RLUOB), installation of utilities by direct hire and subcontract (HVAC and NIE), and installation of safety showers. Scope also consists of procurement of programmatic equipment, 8 fume hood enclosures, a 1-ton crane, enclosure accessories and RAD monitoring equipment that support multiple laboratories.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.02.01
WBS Description: REI2 Equipment Procurement
Work Description (Scope): Scope consists of procurement of 8 fume hood enclosures, a 1-ton crane, programmatic equipment, lab furniture, lab instruments and accessories, and radiation monitoring equipment (Procurement Groups: 01, 02, 03, 04, 05, 06, 07, 08, 11, 20, 22, 23, 29, 31 33, 34 35, 36 and enclosure accessories). The enclosure accessories/appurtenances includes items such as fabricated glovebox enclosure spares, gloveport ring assemblies and accessories, gloves, lights, filters and gaskets. Scope also consists of enclosure fabricator support in the areas of storage, shipping and technical onsite services for all 16 trains.
Applicable SOW Reference: CMRR-MAS-00001 (REI2 Material Assignment Schedule) Additional details on scope and quantities can be found in SQDP 15-00173-REI2-PRO-01 Common. CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.02.02
WBS Description: REI2 Equipment Installation
Work Description (Scope) Mechanical Scope • Installation of CMR Shielding in REI2 Laboratory Room 1111. • Installation of overhead crane, 8’ fume hood, Continuous Air Monitors, Fixed Air Samplers, Hand and Foot Monitors, and associated piping and electrical in REI2 Laboratory Rooms 1124/1125. Material • All material for final connection and installation of enclosures and programmatic equipment for labs 1111, 1124/1125, 1113/1114, 1126, 1123, 1122, 1101/1102/1103, and 1109/1110.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.02.03
WBS Description: REI2 Utility Installation
Work Description (Scope) The self-perform scope includes the following: • Installation rough-in (excludes final connections) of utilities, including supports, piping, electrical, data and phone, heating, ventilation, and air conditioning (HVAC), removal and reinstallation of ceilings, and fire protection piping modifications (REI2 Laboratory Rooms 1111, 1124/1125, 1113/1114, 1126, 1123, 1122, 1101/1102/1103, and 1109/1110). • Direct hire scope includes the following tasks: • Removal and installation of ceilings as needed • Completion of architectural touch up finishes in all laboratories listed above • Installation of above ceiling electrical raceway, supports, data, and electrical wire in all laboratories listed above • Installation of below ceiling electrical raceway, supports, data, and electrical wire rough-in in all laboratories listed above • Installation of below ceiling trellis supports in all laboratories listed above • Installation of below ceiling piping system(s) rough-in and testing in all laboratories listed above • Completion of piping and electrical labeling • Demolition of existing wall between REI2 Laboratory Rooms 1109 and 1110. Installation of new wall running north to south in 1109 and 1110. • Installation of grounding for supports and required electrical panels in all laboratories listed above • Procurement of materials The subcontract scope includes the following: <u>HVAC</u>

- Installation of overhead and below ceiling heating, ventilation, air conditioning (HVAC, Zone 2 duct) in Laboratory 1124/1125.
- Installation of above ceiling Zone 2 supply air and Zone 2 HVAC and supports in all laboratories listed above.
- Installation of below ceiling Zone 1 HVAC and supports in all laboratories listed above
- Testing of HVAC systems per Specification 100925-23-3101 HVAC Ductwork – Installation Packages in all laboratories listed above.
- Installation of new cabling outlets structure back to Telecommunications Room 1020 and 1027.
- Terminate, label, and testing.
- Terminations of data cable in Laboratories 1113/1114, 1126, 1123, 1122, 1109/1110 and 1101/1102/1103.
- Procurement of materials

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.02.04
WBS Description: REI2 CMR Instrument Relocation
Work Description (Scope) Scope includes the following: Equipment list to include the following with associated devices and parts such as stands, brackets, tables and minor accessories. 1) Relocate Micro XRF: This scope includes developing the work package, purging, deacon, packing, transporting from CMR to RLUOB's Lab 1101-1103, unpacking, re-installing, and test/calibrate. This will be oversight by Vendor's Rep. 2) Relocate Polarized XRF: This scope includes developing the work package, disconnecting gas services, deacon, packing, transporting from CMR to RLUOB's Lab 1101-1103, unpacking, re-installing, and test/calibrate. This will be oversight by Vendor's Rep. 3) Relocate Graded Shield and Gamma Spec System: This scope includes developing the work package, disconnecting electrical ground cable, deacon, packing, transporting from CMR to RLUOB's Lab 1113-1114, unpacking, re-installing, and test/calibrate. This will be oversight by Vendor's Rep. 4) Relocate TIMS MASS Spectrometer: This scope includes developing the work package, disconnecting air and liquid nitrogen, disconnecting and removing electrical transformer, purging, deacon, packing, transporting from CMR to RLUOB's Lab 1122, unpacking, re-installing, and test/calibrate. This will be oversight by Vendor's Rep. 5) Remove and decontaminate package instruments from CMR and deliver to RLUOB 6) Install instruments in the designated REI2 laboratory.

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.03
WBS Description: REI2 System Test & Evaluation
Work Description (Scope) Discrete activities for Operational Start-up plan, providing commissioning services for testing utility and ventilation systems. Management Self -Assessment (MSA), and closeout of findings.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.03.01
WBS Description: REI2 Operational Start-Up Planning and Support
Work Description (Scope) This discrete activity control account includes operational planning and support during the transition to operations (TTO) phases of REI2 in the following labs: [1] Room 1111, Radiochemistry Counting Lab [2] Room 1124/1125, Hazard Materials Management Lab [3] Room 1126, Metal Sample Distribution Lab [4] Room 1123, Oxide Sample Distribution and Coulometry Lab [5] Room 1113/1114, Radiochemistry Sample Preparation Lab [6] Room 1122, Mass Spectrometry Sample Preparation Lab [7] Room 1101/1102/1103, XRF and MC Lab [8] Room 1109/1110, TEM/SEM and Uranium Lab. This control account contains discrete activities for the operational start-up planning and support scope including, but is not limited to: • Detail planning of TTO execution. • Preparing process descriptions, process flow, and logistical determination. • Performing new activity reviews and approvals. • Performing training development. • Performing new activity ALARA review. • Performing material control and accountability review and approval (MC&A). • Updating material-at-risk tracking system/procedures. • Performing worker exposure assessment. • Preparing, reviewing, and approving analytical chemistry/operations procedures. • Preparing, reviewing, and approving programmatic maintenance plans. • Preparing, reviewing, and approving facility system operating and maintenance procedures.

- Preparing, developing, reviewing, and implementing operational training curriculum.
- Setting up the laboratory for operations.
- Conducting training and evolution prior to MSA.
- Conducting turnover reviews.
- Conducting a validation walk-down prior to MSA.
- Preparing and reviewing objective evidence files.
- Preparing the MSA Plan, Start-Up Plan, Method Validation Plan, and other necessary paperwork to execute the MSA and operational testing/method validation.

The selected discrete operational support staff includes the following:

- Training Development support
- TA-55 Waste Management support
- TA-55 Readiness Coordinator
- RLUOB Technical Writer
- RLUOB System Operator
- RLUOB Maintenance
- AC Quality Assurance Specialist
- AC Document Control and Record Management
- AC/MC Operations SME
- AC/MC Operations Tech support.

Applicable SOW Reference:

- CMRR-PLAN-PM-0101, Rev.3, Program Requirements Document
- CMRR-PLAN-00019, Rev. 0, CMRR REI2 Project Execution Plan
- CMRR-PLAN-00004, CMRR REI2 and PEI1 Transition to Operations Plan
- TA55-AP-122, TA-55 New/Revised/Restarted Activity Approval Process.

Level 4 - Control Account
WBS Number: 01.01.03.02
WBS Description: REI2 Commissioning
Work Description (Scope) The LANL Commissioning Organization will: • Provide commissioning services to test electrical power distribution and lighting to the equipment interface in the new lab spaces. • Commission RLUOB utility systems, as defined in the *REI2 Project Commissioning Plan*, CMRR-PLAN-00006, Rev 2. • Conduct a test and balance, face velocity and acceptance test of the laboratory ventilation control, which include the Phoenix Valves and BAS graphics, along with interlocks and alarms. • Complete commissioning acceptance testing for process chilled water (PCW) and bulk storage liquid argon and liquid nitrogen systems up to the REI2 end user interface point at each of the individual lab floor plates. The scope does not include the following: • Life safety systems and equipment • Gloveboxes, fume hoods, and other laboratory equipment • Airborne radiation detection • Public address and communications • Security systems.
Applicable SOW Reference: • CMRR-PLAN-00006, Rev. 2, *REI2 Project Commissioning Plan*

Level 4 - Control Account
WBS Number: 01.01.03.03
WBS Description: REI2 MSA Execution
Work Description (Scope) This control account includes the conduct of management self-assessment (MSA) and closeout of MSA findings for the processes and operations in the following labs: [1] Room 1111, Radiochemistry Counting Lab [2] Room 1124/1125, Hazard Materials Management Lab [3] Room 1126, Metal Sample Distribution Lab [4] Room 1123, Oxide Sample Distribution and Coulometry Lab [5] Room 1113/1114, Radiochemistry Sample Preparation Lab [6] Room 1122, Mass Spectrometry Sample Preparation Lab [7] Room 1101/1102/1103, X-Ray Fluorescence (XRF) and Materials Characterization (MC) Lab [8] Room 1109/1110, TEM/SEM and Uranium Lab. For the start-up of REI2 operations, a phased approach is assumed, individual management self-assessment or validation will be conducted for each lab room after the construction and commissioning is completed and the appropriate design change form (DCF)/documents are closed. TA55 Facility Operations Director determined the complexity of readiness for the operational startup per *TA55-AP-122, TA-55 New/Revised/Restarted Activity Approval Process*. Some lab would be a simple "checklist" assessment; some may require the conduct of full MSA. The conduct of a full MSA typically includes the following tasks. [1] Hold a kickoff meeting [2] Perform field work [3] Review evidence package [4] Conduct interviews [5] Hold periodic outbrief to the facility [6] Final outbrief [7] Issue a draft MSA report

[8] Factual accuracy review

[9] Issue and MSA report

[10] Enter MSA findings to PFITS.

Prior to the MSA report being issued, the CMRR Project must work with the MSA or assessment team and FOD to determine the findings as pre- or post-start. Prior to the start of operations, the team must complete the following tasks:

[1] Address pre-start findings (major and minor)

[2] Provide an objective evidence package to FOD for closeout

[3] Have the FOD issue a declaration of readiness to ADNHHO.

After the start of operations, the CMRR Project will address post-start findings belonging to
the CMRR project.

Included in this scope is support from the following functions:

- MSA/assessment team members
- AC/MC/waste management SMEs and management for MSA execution
- Operational support staff for MSA execution
- Craft hours for supporting the closure of pre-/post-start findings.

Applicable SOW Reference:

- CMRR-PLAN-PM-0101, Rev. 3, *Program Requirements Document*
- CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*
- PD115, *LANL Readiness Program* and FSD-115-002, *Process for Management Self-Assessment (MSA) of Startup and Restart of LANL Nuclear Facilities, Activities, and Operations*.
- CMRR-PLAN-00004, *CMRR REI2 and PEI1 Transition to Operations Plan*
- TA55-AP-122, *TA-55 New/Revised/Restarted Activity Approval Process*

Level 4 - Control Account
WBS Number: 01.01.03.04
WBS Description: REI2 Operational Testing and Method Validation

Work Description (Scope)

This control account includes equipment testing and method validation (i.e., operational hot testing) for the processes and operations in the following labs:

[1] Room 1111, Radiochemistry Counting Lab

[2] Room 1124/1125, Hazard Materials Management Lab

[3] Room 1126, Metal Sample Distribution Lab

[4] Room 1123, Oxide Sample Distribution and Coulometry Lab

[5] Room 1113/1114, Radiochemistry Sample Preparation Lab

[6] Room 1122, Mass Spectrometry Sample Preparation Lab

[7] Room 1101/1102/1103, XRF and MC Lab

[8] Room 1109/1110, TEM/SEM and Uranium Lab.

The operations testing and validation scope include the following:

[1] Perform Operational Testing

Once operations are approved to proceed with radiological and nuclear activities, the AC/MC SMEs will follow the startup plan and perform testing of new equipment and instrumentation in the newly outfitted laboratory space. Once the workers have sufficient confidence that the new equipment will produce quality analysis data, then the workers will proceed to the method validation/qualification steps.

[2] Conduct of Method Validation

Workers will perform the method validation/qualification process according to the approved Start-Up/Method Validation Plan. Once the method validation is completed, a validation report will be issued to ensure that the acceptance criteria are met.

[3] Declaration of Capability Transfer

Once the Method Validation Report is issued, the responsible line management for AC or MC will issue a confirmation to declare the completion of capability transfer. It needs to be concurred by the Project

Owner Representative and the Mission & Facility Integration Manager. Once this report is complete, the CMRR Project has completed the milestone for transferring capabilities in the tested and validated lab rooms.

To minimize the schedule risk for equipment installation, equipment testing/validation, and to enhance the workers' training and qualification prior to the MSA, advanced cold/hot testing and qualification for various processes may take place in the CMR building, RLUOB, or other locations as a risk mitigation/opportunity.

Applicable SOW Reference:

- CMRR-PLAN-PM-0101, Rev. 3, *Program Requirement Document*
- CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*
- CMRR-PLAN-00004, *CMRR REI2 and PEI1 Transition to Operations Plan*

Level 3 - Control Account
WBS Number: 01.01.04
WBS Description: REI2 System Design & Engineering
Work Description (Scope) Engineering and Design support for all phases of the project; and including Procurement Engineering Support.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.04.01 - **CLOSED**
WBS Description: REI2 RIM Design
Work Description (Scope) The REI2 RIM Design scope consists of the work required to prepare designs for the following work: • Modifications of emergency entry door – Modify existing door (C41B) to allow ingress and egress of construction personnel as well as materials, equipment, supplies, waste, etc. Equipment door will have security door hardware and a badge reader. Provide an interlock or indicator to control Door C41B from being opened when interior Door C41A is open. • Development of a construction staging area, work stations, and craft support area – Provide construction staging and craft support area in RLUOB, 1st floor, Room E100. Utilize the Room E100 area and tunnel access area. Provide sufficient lighting, electrical, and network capability, etc. to facilitate use of the space by craft and craft supervision. Installation will include controlled caging and shelving. • Rework of the existing lobby to segregate cleared and un-cleared security access – Provide a new wall to segregate the existing lobby area near the elevators into cleared and un-cleared areas. Additionally, add an access opening from the un-cleared side of the 1st floor to the new lobby area to provide an egress path through the un-cleared laboratory area. • Installation of gas cylinder staging area – Multi-bottle gas cylinder racks to be installed in the non-radiological area near the laboratories. Installation to include cold storage cabinets. • Utilization of Network Room (Room 1018) – Reconfigure portions of the main laboratory corridor on the uncleared side to allow for computer workstations and storage cabinets. Installation to include telephones, yellow network, power, work station furnishings, and storage cabinets. • Modifications necessary to provide subcontractor and craft access through the existing RLUOB tunnel – Modify the existing tunnel stub, which currently dead ends west of the existing RLUOB to allow controlled access into the laboratory floor. Install an exterior access door at the east end of the tunnel. Lighting, power, badge reader, phone, space heater at access area, and HVAC to be extended to the end of the tunnel. Site improvements include an asphalt drive lane with storm water catch basin. Design to

include excavation and grading plans, retaining wall, door canopy, exterior lighting, controlled access (e.g., badge reader) and extension of dry pipe fire suppression system.

- Utility modifications for radiation isolation (RLW and floor penetration mods) – Floor penetration plate at the utility entrance into Laboratory Module 1114. Installation of blind flanges on piping assembly at RLW line locations and installation of filters at ventilation ductwork in all new and existing laboratories.
- Installation of construction trailers/laydown areas to support RLUOB work – Installation of construction trailers (comfort station and lunch room) and staging areas on the west side of RLUOB.

Preliminary and final designs will be created to support the above listed work. Designs will undergo design reviews and receive approval from the LANL Building Official (LBO) prior to field execution. The following work packages will be created to support this control account:

- Management Design-LANL RIM – Included in the Design Management work package will be the engineering support necessary peer reviews, ES&H reviews, and LBO reviews of the design.
- Emergency Door Design – Provide design support for the modification of the existing door (C41B) to allow ingress and egress of construction personnel and materials, equipment, supplies, waste, etc. Door will be equipped with security door hardware, a badge reader, and an interlock or warning light configured with Door C41B.
- Construction Staging and Craft Support Areas – Design for installation of transportables to provide temporary office and staging space for craft and construction support personnel. Transportables to be located in the excavated area west of the existing RLUOB.

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.04.02 - **CLOSED**
WBS Description: REI2 Conceptual Design
Work Description (Scope) The REI2 Conceptual Design scope consists of the work required to provide conceptual designs for the RLUOB laboratory build-outs. This work includes the following activities: • Preparation of LIDAR surveys of the existing laboratory rooms • Preparation of general arrangement layouts • Developments of requirements definition documents • Development of Proof of Concept Drawings for each laboratory • REI1 lessons learned • Code of Record review • Laboratory ventilation study. The following work packages will be created to support this Control Account: • Conceptual Design LANL – A/E LANL – Included in this work package will be the A/E subcontractor's conceptual design work necessary to validate existing laboratory sizes, layouts, utility availability, etc. The A/E will provide general arrangement layouts and drawings and ensure process enclosures will fit into the available space. • Conceptual Design – LANL – Included in this work package is the LANL engineering management, engineering support, and design reviews.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.04.03
WBS Description: REI2 Design Management and Support
Work Description (Scope) Title III engineering services and A/E subcontract oversight from LANL during enclosure installation. This scope includes the following: <u>Enclosure Fabrication</u> • Review submittals from awarded enclosure fabricators. • Review and disposition requests for information (RFIs) from awarded enclosure fabricators. • Review and disposition supplier deviation disposition requests (SDDRs) from awarded enclosure fabricators. • Review and disposition nonconformance reports (NCRs) from awarded enclosure fabricators. • Develop engineering design review notifications (DRNs) to communicate design-initiated changes associated with enclosure fabrication designs. <u>Enclosure/Laboratory Utilities Installation</u> • Review submittals from awarded construction subcontractors and LANL direct hire workforce. • Review and disposition RFIs from awarded construction subcontractors and LANL direct hire workforce. • Review and disposition SDDRs from awarded construction subcontractors. • Review and disposition NCRs from awarded construction subcontractors and LANL direct hire workforce. • Review and disposition field change requests (FCRs) generated by the REI2 Field Engineering group, which is associated with the REI2 A/E subcontractor's design. • Develop engineering DRNs to communicate design-initiated changes associated with the enclosure and laboratory utility installation designs.

REI2 is a subproject of the CMRR Project and will be performed within the 1st floor of RLUOB. This subproject has been determined to be management level (ML)-4 except for the following systems which have been determined to be ML-3:

- Zones 1 and 2 laboratory ventilation
- Building Automaton System (BAS)
- Laboratory enclosures (gloveboxes and open fronts).

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.04.04
WBS Description: REI2 Design

Work Description (Scope)

The REI2 Design scope consists of the work required to provide preliminary and final designs for the RLUOB laboratory build-outs. This work includes the following activities:

- Preparation of preliminary and final designs for above-ceiling work, including ventilation, fire suppression, lighting, and electrical power work in each of the laboratory rooms.
- Preparation of preliminary and final designs for laboratory enclosures, including gloveboxes, open front hoods, and fume hoods.
- Preparation of preliminary and final designs for final laboratory build-outs. Included is the installation of programmatic equipment, work tables, cabinetry, enclosure installation and tie-ins, etc.
- Preparation of preliminary and final designs for any required laboratory demolition work.
- Procurement engineering support.

The following work will support this control account:

- Preliminary Design LANL – Included in this work package will be the work required to produce preliminary designs for the RLUOB laboratory build-outs. This includes layouts, enclosure fabrication design packages, and preliminary designs for above-ceiling services. This work includes the A/E subcontractor effort, LANL ES-DE design engineering, and LANL design reviews.
- Final Design LANL – Included in this work package for the A/E subcontractor's final design that is necessary for developing laboratory layouts are a completed enclosure fabrication design package and the final designs for above-ceiling services. In addition, this work includes the LANL ES-DE design engineering and LANL design reviews.
- Glovebox fire suppression design package.

The following is a list of the design scope:

- Standardized Enclosure Fabrication Design Package – Sixty one (61) standard enclosures are needed for the REI2 laboratory build-outs. These enclosures consist of gloveboxes and open fronts. There are eight (8) basic detailed designs which will be produced. The following eight (8) designs for standardized enclosures will support procurement of all of the enclosures except the fume hoods:
  - 1 x 1 glovebox
  - 1 x 2 glovebox
  - 1 x 3 glovebox
  - 1 x 4 glovebox
  - 1 x 1 open front enclosure
  - 1 x 2 open front enclosure
  - 1 x 3 open front enclosure
  - 1 x 4 open front enclosure.
- Unique Enclosure Fabrication Designs – Currently five (5) unique enclosures are needed for the REI2 laboratory build-outs. These enclosures consist of only gloveboxes. The following unique designs will be produced:
  - 2 x 2 glovebox
  - 2 x 1 ½ glovebox
  - 2 x 2 flush inert glovebox
  - 2 x 3 flush inert glovebox
  - 2 x 3 (52” tall) flush inert glovebox.
- All above referenced standardized designs will contain the service panel designs. The service panel designs will be prepared as part of the installation design packages.
- No fume hood designs are included in this scope.

<u>Rooms 1101/1102/1103 – XRF and Materials Characterization Laboratory</u>

- Glovebox/Open Front Enclosure Design - Final design to support procurement of the enclosure service panels. This scope includes service panels for the following enclosures:
  - 4 ea. 1 x 1 open front enclosures
  - 3 ea. 1 x 2 open front enclosures
  - 3 ea. 1 x 3 open front enclosures
  - 1 ea. 1 x 2 gloveboxes
  - 1 ea. 1 x 3 glovebox
  - 1 ea. 1 x 4 glovebox
  - 1 ea. 2 x 2 glovebox
  - 1 ea. 2 x 2 flush inert glovebox
  - 1 ea. 2 x 3 flush inert glovebox
  - 1 ea. 2 x 3 (52” tall) flush inert glovebox
  - 1 ea. 4’ fume hood

- 1 ea. 6’ fume hood.

- Above-Ceiling Utility Design – Final design for all above-ceiling work in XRF and MC Laboratory. Design to include ventilation modifications and electrical power.
- Laboratory Installation Design – Final design for laboratory fixtures and equipment. Included is the design for the installation of enclosures, anchorage of the enclosures to the structure, installation of utility service hookups to each enclosure, installation of programmatic instruments and equipment (including necessary utilities), and installation of workbenches, workstations, casework, and other laboratory equipment.

<u>Rooms 1110/1109 – TEM/SEM and Uranium Laboratory</u>

- Partition Wall Demolition Design –The demolition package includes removal of the existing partition wall separating Rooms 1109 and 1110. Also included is securing the single door into Rooms 1109 and 1110 from the corridor and removing the in-floor incline.
- Glovebox/Open Front Enclosure Design - Final design to support procurement of the enclosure service panels. This scope includes service panels for the following enclosures:
  - 3 ea. 1 x 2 open front enclosures
  - 1 ea. 1 x 3 open front enclosures
  - 1 ea. 1 x 1 glovebox
  - 2 ea. 1 x 2 gloveboxes
  - 1 ea. 1 x 3 glovebox
  - 1 ea. 2 x 1 ½ glovebox
  - 1 ea. 1 x 2 dri train gloveboxes
  - 1 ea.4’ fume hood
  - 2 ea. 6’ fume hood.
- Above-Ceiling Utility Design – Final design for all above-ceiling work in TEM/SEM and Uranium Laboratory, including include ventilation modifications and electrical power.
- Laboratory Installation Design – Final design for laboratory fixtures and equipment. Included is the design for the installation of the enclosures, anchorage of the enclosures to the structure, installation of utility service hookups to each enclosure, installation of programmatic instruments and equipment (including necessary utilities), and installation of workbenches, workstations, casework, and other laboratory equipment.

<u>Room 1111 – RC Counting Room</u>

- Existing Equipment Removal Demolition Design – The demolition package design includes removal of existing workbenches, upper wall cabinets, refrigerator, dewars, and tall storage cabinets.
- Laboratory Installation Design – Final design for laboratory fixtures and equipment. Included is the design for installation of new programmatic instruments and equipment, including anchorage. Also included is final design for laboratory instruments relocated from the existing CMR facility, including anchorage.
- 3 x 5 shielding.
- 2 x 2 shielding.

Rooms 1113/1114 – Radiochemistry (RC) Sample Prep Laboratory

- Glovebox/Open Front Enclosure Design - Final design to support procurement of the enclosure service panels. This scope includes service panels for the following enclosures:
  - 4 ea. 1 x 2 open front enclosures
  - 2 ea. 1 x 3 open front enclosures
  - 1 ea. 1 x 2 glovebox
  - 3 ea. 1 x 3 gloveboxes
  - 1 ea. 6’ fume hood double sided.
- Demolition/Removal Design – Final design to include relocation of three (3) high purity germanium units and associated instrument table, two (2) liquid nitrogen dewers, and a gross gamma unit. Also includes the removal of section workbenches, gas cylinder rack, utility poles, and associated utilities.
- Above-Ceiling Utility Design – Final design for all above-ceiling work in the Radiochemistry (RC) Sample Prep Laboratory will include ventilation modifications and electrical power.
- Laboratory Installation Design – Final design for laboratory fixtures and equipment; includes the installation of enclosures, anchorage of the enclosures to the structure, installation of utility service hookups to each enclosure, installation of programmatic instruments and equipment (including necessary utilities), installation of workbenches, workstations, casework, and other laboratory equipment.

Room 1122 – Mass Spectrometer Sample Prep Room

- Glovebox/Open Front Enclosure Design - Final design to support procurement of the enclosure service panels. This scope includes service panels for the following enclosures:
  - 1 ea. 1 x 1 open front enclosures
  - 5 ea. 1 x 2 open front enclosures

- 4 ea. 1 x 1 gloveboxes
- 1 ea. 1 x 2 gloveboxes.

- Above-Ceiling Utility Design – Final design for all above-ceiling work in the Mass Spectrometer Sample Room. Design will include ventilation modifications and
electrical power.
- Laboratory Installation Design – Final design for laboratory fixtures and equipment. Included is the design for the installation of the enclosures, anchorage of the enclosures to the structure, installation of utility service hookups to each enclosure, installation of programmatic instruments and equipment (including necessary utilities), installation of workbenches, workstations, casework, and other laboratory equipment.

Room 1123 – Coulometry/Oxide Distribution Laboratory

- Glovebox/Open Front Enclosure Design – Final design to support procurement of the enclosure service panels. This scope includes service panels for the following enclosures:
  - 2 ea. 1 x 3 open front enclosures
  - 1 ea. 1 x 4 open front enclosures
  - 1 ea. 1 x 1 gloveboxes
  - 2 ea. 1 x 2 gloveboxes
  - 3 ea. 1 x 3 gloveboxes.
- Above-Ceiling Utility Design – Final design for all above-ceiling work in the Coulometry/Oxide Distribution Laboratory. Design to include ventilation modifications and electrical power.
- Laboratory Installation Design – Final design for laboratory fixtures and equipment. Included is the design for the installation of the enclosures, anchorage of the enclosures to the structure, installation of utility service hookups to each enclosure, installation of programmatic instruments and equipment (including necessary utilities), installation of workbenches, workstations, casework, and other laboratory equipment.

Rooms 1124/1125 – Hazardous Materials Management Room

- 1 ea. 8’ walk-in fume hood
- 1 ea. overhead crane/hoist (1/2 ton)
- Laboratory Installation Design – Final design for the fume hood and hoist, including anchorage and required services/utilities.

Room 1126 – Metal Sample Distribution Laboratory

- Glovebox/Open Front Enclosure Design - Final design to support procurement of the enclosure service panels. This scope includes service panels for the following enclosures:
  - 1 ea. 1 x 2 open front enclosures
  - 2 ea. 1 x 3 open front enclosures
  - 1 ea. 1 x 2 gloveboxes
  - 4 ea. 1 x 2 dri-train gloveboxes
  - 1 ea. 1 x 3 gloveboxes
  - 1 ea. 4’ fume hood.
- Above-Ceiling Utility Design – Final design for all above-ceiling work in the Metal Sample Distribution Laboratory. Design to include ventilation modifications and electrical power.
- Laboratory Installation Design – Final design for laboratory fixtures and equipment. Included are the design for the installation of the enclosures, anchorage of the enclosures to the structure, installation of utility service hookups to each enclosure, installation of programmatic instruments and equipment (including necessary utilities), installation of workbenches, workstations, casework, and other laboratory equipment.
- Final LANL Design Reviews – Included in this work package are the LANL engineering management, engineering support, and design reviews.

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.04.05
WBS Description: REI2 Design Services During Construction
Work Description (Scope) The Design Services During Construction work scope consists of A/E and LANL support for the following: • Title II design services for D&D of RIM scope and Title III engineering services to support construction performance of D&D scope to support REI2 closeout and demobilization. Scope includes PMP and design reviews for D&D design, as required by the LANL COE. • A/E subcontract oversight and design management. • LANS Engineering Support and reviews for the design of a glovebox fire suppression system. This design will use fire suppression by an external A/E, including design reviews and design management. • Provide LANS engineering support for glovebox procurement and installation. • Provide LANS engineering support to procure programmatic equipment. • Provide a Work Package Manager to support the programmatic equipment procurements. • Provide LANS Project Engineering support to the USACoE combo shop design and installation. • Review submittals from awarded construction subcontractors and LANL direct hire workforce. • Review and disposition RFIs from awarded construction subcontractors and LANL direct hire force. • Review and disposition SDDRs from awarded construction subcontractors. • Review and disposition NCRs from awarded construction subcontractors and LANL direct hire workforce. • Review and disposition FCRs and FCNs generated by the REI2 Field Engineering group associated with the REI2 A/E subcontractor’s design. • Develop engineering DRNs to communicate design-initiated changes associated with the enclosure and laboratory utility installation designs.

- Provide A/E in shop support to one of three enclosure fabricators to help with interpretation, guidance and clarification of the issued REI2 enclosure design(s).
- Provide a compiled listing of electrical feed-thru associated with the REI2 enclosure design.
- Provide Title III service for the glovebox enclosure fire suppression design.
- Support the As-built and Record Drawing process, including the following:
    - Develop As-Built drawings for the specific types of design drawings identified in the following listing and agreed to with the RLUOB FDAR. These drawings will be walked-down and field verified.

Typical Technical Baseline Documents	Suggested CM Category		
	Priority	Support	
Architectural			
Emergency Evacuation Diagram (map)	X		
Floor Plan of Record		X	
Penetration Seals		X	
Radiological Zone Drawings		X	
Electrical			
Area Classification Drawings		X	
Communication Drawings		X	
Grounding Drawings		X	
Heat Tracing Drawings		X	
Emergency Light Location Drawings		X	
Panel Schedules		X	
Single Line Diagrams (support when required to comply with lockout and tag out requirements for worker safety)		X	
Instrumentation & Controls			
Control Room Layout		X	
Input/output Summary		X	
Logic Diagram		X	
Loop Diagram		X	
Set point Index		X	
Mechanical/Process			
Equipment Details		X	
Process Flow Diagrams		X	
Piping & Instrumentation Diagrams (P&ID) (required for lockout, tag out, and venting requirements for worker safety)		X	
Other P&IDs		X	
Piping Details		X	
Process Flow Sheets		X	
Plant Design			
Equipment & Duct Work Arrangement		X	
HVAC Layout Drawings		X	
Structural			
Miscellaneous Steel, Plans, Sections, Details		X	
Structural Steel Drawings		X	

    - Develop Record drawings for the balance of the design document associated with the REI2 design. These drawings will incorporate all outstanding change paper, however, they will not be walked down and field verified.
    - Provide FTE support during development of as-built drawings.
    - Review and incorporate all outstanding design changes (FCNs, FCRs, DRNs, etc.) incorporated into the As-built and Record drawings.

- Review the revised As-built and Record drawings and provide comments(s) back to the A/E subcontractor for inclusion into the final As-built and Record drawings.
- Coordinate LANL Building Official review.
- Oversee subcontractor during “as-built” drawing development through issuance of these drawings.

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.04.06
WBS Description: REI2 Design Services During Transition to Operations

Work Description (Scope)

The Design Services During Transition to Operations and Commissioning work scope consists of the following:

A/E Subcontract Support During TTO and Commissioning

- Review and disposition RFIs from commissioning.
- Review and disposition NCRs generated during commissioning.
- Review and disposition FCRs generated by commissioning.
- Develop engineering DRNs to communicate design-initiated changes associated with enclosure and laboratory utility installation designs from commissioning activities.
- Disposition of Test Deficiency Reports generated by commissioning.
- Communicate designs associated with utility design installation and commissioning activities.

LANL Support During TTO and Commissioning

Includes LANL Engineering design services during TTO for Laboratories/Rooms 1101/1102/1103/1109/1110, 1111, 1113/1114, 1122, 1123, 1124/1125, and 1126. Scope includes the following:

- Support the MSA process for every lab and CSE participation during MSA execution.
- Complete “child” DCF as required to support lab MSAs.
- Provide Master Equipment List.
- Provide Master Drawing List.
- Provide operations/maintenance manuals.
- Support late changes.
- Participate in meetings/walk-downs

Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.04.07
WBS Description: REI2 Design Engineering Title III FHE & DCF Closeouts

Work Description (Scope)

The Design Services During Transition to Operations and Commissioning work scope consists of the following:

Fire Hazards Evaluations (FHEs)

- Develop FHEs by laboratory and each operational process within the laboratory.
- Review FHEs for completeness.
- Sign and process the FHEs for use.

Design Change Form (DCF) closeout

- Identify documents required for DCF closeout in support of laboratory MSAs.
- Verify documents have been updated and issued in support of DCF closeout.
- Close the DCF either by use of “daughter” or the “parent” DCFs within the SharePoint system.

Temporary modification(s) and Minor work demolition

- Closure of Temporary modification(s) put in place to support REI2 construction.

Legacy Systems

- Produce Pressure System Certification for the following legacy systems:
  - Argon
  - Nitrogen
- Process Chill Water (Glycol) – only for the ~200 installed as part of the issued DCF.

Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.05
WBS Description: REI2 Project Administration
Work Description (Scope) Level of Effort scope for Project Administration services during all phases of REI2, Field Management, Construction distributables, Program Support to REI2 Transition to Operations scope, project training, travel and office materials.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.05.01 - **CLOSED**
WBS Description: REI2 Project Administration During Conceptual Design
Work Description (Scope) Provide Project Management During Conceptual Design for REI2. Included in this scope is support from the following functions: • Project Management • Project Controls • Project Administrative Support • Estimating and scheduling support • Quality Assurance support for graded NQA-1 • ES&H support • Project Records and Document Control support • Construction Management (for planning support) • Subcontract Technical Representative support (for planning support) during pre-award period only • AC/MC SMEs • Project Owners Representative • Operations Support SME • Other support as needed (i.e., Performance Assurance, IT, training coordinator and specialist, writer/editor, work planner, security escorts, Safety Basis support). • Project Management staff and the integrated project team (IPT) will be responsible for ensuring that REI2 conceptual design work is defined, procured, and completed satisfactorily. The Project Management team will establish the cost and schedule baseline and measure and report the performance for conceptual design work. Cost estimates and preliminary schedules will be produced as designs progress. • Scope will include: trending, risk analysis, schedule statusing, and change documentation development for scope changes within the CBB. Project team preparation and attendance at Contractor Integrated Project Team

	(CIPT) and Safety Design Integration Team (SDIT) meetings on a periodic basis.
	Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project – REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.05.02
WBS Description: REI2 Project Administration during Design
Work Description (Scope) Provide Project Management during Design of RIM and REI-2. Included in this scope is support from the following functions: • Project Management • Project Controls • Project administrative support • Estimating and Scheduling support • Quality Assurance support for graded NQA-1 • ES&H support • Project Records and Document Control support • Construction Management (for planning support) • Subcontract Technical Representative support (for planning support) during pre-award period only • AC/MC SMEs • Project Owners Representative • Operations Support SME • Other support as needed (i.e., Performance Assurance, IT, training coordinator and specialist, writer/editor, work planner, security escorts, Safety Basis support). • Activities required to support the CMRR NEPA and environmental compliance include data call and analysis for input to NEPA or environmental compliance actions; public review and comment communications (as required); permit preparation/fees, etc. The Project Management staff and IPT will be responsible to see that REI2 design work is defined, procured, and completed satisfactorily. The Project Management team will work with the CORE team to establish cost and schedule baseline and measure and report performance for design work. Cost estimates and preliminary schedules will be produced as designs progress.

In summary, this control account scope provides the following:

- Oversight of Project Management services during the design phase.
- Performance of control account manager (CAM) duties.
- Performance of risk analysis updates throughout the project.
- Manage effective communications, trending, cost and schedule performance, reporting and variance analysis, and appropriate corrective actions affecting the performance.
- Initiate corrective actions; monitor and analyze project hazards, safety and quality of performance; and provide corrective actions or recommendations as needed.
- Manage assigned resources to include reviewers, oversight by SMEs, etc.
- Respond to QA surveillance and self-assessment findings and observations.
- Maintain required project training matrix.
- REI2 travel during design.
- REI2 material and ODC during design.

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.05.03
WBS Description: REI2 Project Administration during Procurement and Construction
Work Description (Scope) Provide Project Management support during the procurement and construction phase of REI2. The Project Management staff and Integrated Project Team will be responsible to see construction work is procured and completed satisfactorily. The Project Management Team will establish cost and schedule baselines and measure and report performance for this work. Included in this scope are the following functions: • Project Management: Oversight of the overall REI2 project, PM services, Performance of Control Account Manager (CAM) duties. Lead, direct, coordinate, and manage the Project team • Project Controls: Staffing resources needed for trending, cost and schedule performance, reporting, estimating, variance analysis, EVMS implementation and appropriate corrective actions affecting the performance. • Risk: Performance of risk analysis updates throughout the project. • Quality Assurance: Initiate surveillances; monitor and analyze project quality of performance; and, provide corrective actions or recommendations as needed. Respond to QA surveillance and Self-Assessment findings and observations. • Environmental Safety and Health support: Initiate corrective actions; monitor and analyze project hazards, safety of performance; and provide corrective actions or recommendations as needed. • Project Records, Document Control and project administration support: Staffing resources needed for records management, document control, project administration, performance assurance, IT support, training, technical writing/editing, and other support as needed. • Construction Management (for planning support). • Subcontract Technical Representative support (for planning), during pre-award period only. • Maintain required project training.

- Activities required to support the CMRR NEPA and environmental compliance include data call and analysis for input to NEPA or environmental compliance actions, public review and comment communications as required, permit preparation/fees, etc.
- Manage assigned resources to include reviewers, oversight by SMEs, etc.

In summary, this control account scope provides:

- Oversight of Project Management services during the design phase.
- Performance of control account manager (CAM) duties.
- Performance of risk analysis updates throughout the project.
- Manage effective communications, trending, cost and schedule performance, reporting and variance analysis, and appropriate corrective actions affecting the performance.
- Initiate corrective actions; monitor and analyze project hazards, safety and quality of performance; and, provide corrective actions or recommendations as needed.
- Manage assigned resources to include reviewers, oversight by SMEs, etc.
- Respond to QA surveillance and self-assessment findings and observations.
- Maintain required project training matrix.
- Lead, direct, coordinate, and manage the Project team.
- Maintain a close liaison with the client, stakeholders, local citizen committees, and elected officials.
- Directly manage the overall Project performance.
- Submit all management plans and programs and comply with cost and schedule requirements.
- Support LCCE development and review.
- EVMS support for recertification from Humphreys & Associates.
- REI2 travel during procurement and construction.
- REI2 material and ODC during procurement and construction (excluding software costs).

- Support to NNSA contractors (as captured in "Division of Responsibility NNSA/USACE/LANS") for SSI oversight of REI2 related scope

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.05.04
WBS Description: REI2 Project Administration During Transition to Operations
Work Description (Scope) Provide Project Management during the Start-Up, Turnover, and Transition to Operations (Readiness Preparation, Readiness Assessment, Equipment Testing and Method Qualification). The Project Management staff and IPT will be responsible to ensure that the Start-Up, Turnover, and Transition to Operations work is executed and completed satisfactorily. The Project Management team will establish cost and schedule baselines and measure and report performance for this work. Included in this scope are the following functions: • Project Management • Project Controls • Project Administrative Support • Estimating and scheduling support • Quality Assurance support for graded NQA-1 • ES&H support • Project Records and Document Control support • Construction Management (for planning support) • Subcontract Technical Representative support (for planning support) during pre-award period only • Other support as needed (i.e., Performance Assurance, IT, training coordinator and specialist, writer/editor, work planner, security escorts, Safety Basis support). This scope does not cover LOE support for Program Support and TTO – this is included in the Program Support control accounts. In summary, this control account scope provides: • Oversight of Project Management services during the design phase. • Performance of control account manager (CAM) duties.

- Performance of risk analysis updates throughout the project.
- Manage effective communications, trending, cost and schedule performance, reporting and variance analysis, and appropriate corrective actions affecting the performance.
- Initiate corrective actions; monitor and analyze project hazards, safety and quality of performance; and, provide corrective actions or recommendations as needed.
- Manage assigned resources to include reviewers, oversight by SMEs, etc.
- Respond to QA surveillance and self-assessment findings and observations.
- Maintain required project training matrix.
- Lead, direct, coordinate, and manage the Project team.
- Submit all management plans and programs, comply with cost and schedule requirements, and, coordinate all public involvement activities.
- REI2 travel during TTO.
- REI2 material and ODC during TTO, including HRP costs and bioassay kits that are required for TTO executions.

Applicable SOW Reference:

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.05.05
WBS Description: REI2 Field Management
Work Description (Scope) Non-manual labor required for management of LANL self-perform work, including but not limited to Construction Management, Construction Support, RCT and Operations Support, and Procurement support for: • TTO and MSA • Commissioning Efforts include, but are not limited to planning, constructability, material procurement (self-perform work), inspections and closeout for self-perform and subcontract work per the *Construction Execution Plan,* CMRR-PLAN-00010 and Commissioning per CMRR-PLAN-00006 Rev2 for the scheduled duration of the project for the scheduled duration of the Project. Construction distributables include the following: [1] Break room and comfort trailers rental [2] Cleaning and trash handling and removal [3] Maintenance of temporary power, light, water, fire protection, etc. [4] Craft training and testing [5] Material handling [6] Watch guards and escorts [7] Small tools and consumables [8] Equipment rentals [9] Weather safety meeting and labor craft for cleaning of construction areas [10] Weekly safety meeting and site-specific training [11] Craft safety advocates and QC craft advocate [12] General Foreman and non-working Foreman

Applicable SOW Reference:

Construction Execution Plan, CMRR-PLAN-00010

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.05.06
WBS Description: REI2 Program Support
Work Description (Scope) This CA includes program support during the REI2 Procurement and Construction, and Transition to Operations (TTO) phases of the project in the following rooms: [1] Room 1111, Radiochemistry Counting Lab [2] Room 1124/1125, Hazardous Materials Management Lab [3] Room 1126, Metal Sample Distribution Lab [4] Room 1123, Oxide Sample Distribution and Coulometry Lab [5] Room 1113/1114, Radiochemistry Sample Preparation Lab [6] Room 1122, Mass Spectrometry Sample Preparation Lab [7] Room 1101/1102/1103, XRF and MC Lab [8] Room 1109/1110, TEM/SEM and Uranium Lab This CA includes the level of effort (LOE) for Project Owner Representative (POR) team and subject matter experts (SMEs) during design, development of fire hazard evaluations, procurement, construction, startup and turnover; and for TTO core team, selected operational support staff, and staffing/training of new analytical chemistry and materials characterization (AC/MC) SMEs during TTO phase. The TTO core team provides the management and coordination of the TTO scope and CA, which includes the CMRR TTO manager, deputy TTO manager, control account manager, Project Owner Representative/coordinators, TTO coordinators/lead, TTO SMEs, readiness specialist, and AC/MC point of contacts. Under this control account, the LOE efforts include, but not limited to • Managing TTO control accounts • Providing the overall execution strategy, planning, coordination and integration for executing the transition to operations scope (planning and preparation, management self-assessment and hot testing)

- Detailing scope and requirements; developing schedule and cost estimate; identifying and mitigating risks
- Developing Critical Decision packages; participating internal/external reviews; preparing implementation of authorized work
- Staffing & training of new AC/MC SMEs
- Management oversight of TTO scope
- Low-dollar value material cost (e.g., laboratory apparatus, consumables, chemicals, standards, supplies, etc.) in support of TTO activities.

The selected LOE operational support staff includes:

- TA-55 security
- Facility operations support
- Radiological control technician – management
- Radiological control technicians
- Training coordinator
- TA-55 readiness coordinator
- Waste service staff
- TA-55 procurement-warehousing
- AC management – oversight TTO tasks
- MC management – oversight TTO tasks
- Document control and record management
- AC quality assurance specialist
- Designated procurement representative (DPR) for TTO materials and supplies (M&S) procurement

Applicable SOW Reference:

- CMRR-PLAN-00004, *CMRR REI2 and PEI1 Transition to Operations Plan*

Level 3 - Control Account
WBS Number: 01.01.06
WBS Description: REI2 Legacy System Upgrades
Work Description (Scope) Scope of work includes Construction support during commissioning of three RLUOB Legacy systems, which includes testing, repairs and necessary modifications.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.06.01
WBS Description: REI2 Legacy System Upgrades
Work Description (Scope) The Scope of Work reflects construction support during commissioning of three RLUOB Legacy systems that currently are not fully operational. 1) Liquid Argon: This scope includes test and repairs to the Argon piping from the holding tank / evaporator south of RLUOB exterior to the facility to the interior laboratory penetration plates. 2) Liquid Nitrogen: This scope includes test and repairs to the Nitrogen piping from the holding tank / evaporator south of RLUOB exterior to the facility to the interior laboratory penetration plates. 3) Process Chilled Water (PCW): The scope of work includes piping modifications of Glycol-PCW piping to support the PCW system and partial commissioning of the PCW system to include verification.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.07
WBS Description: REI2 Lab 1111
Work Description (Scope) Scope includes Continuous Air Monitoring (CAM) and Hand and Foot Monitoring (HFM) systems in Lab 1111, RLUOB facility. Includes instrument materials and installation.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.07.02
WBS Description: REI2 Lab 1111 Equipment Installation
Work Description (Scope) The Scope of Work reflects installing the Continuous Air Monitoring (CAM) and Hand and Foot Monitor (HFM) system in Lab 1111, RLUOB facility. The scope includes instrument material and installation. The majority of the instrumentation is Rad Monitoring Instrumentation. Instrumentation to support lab operations, i.e. fire alarm detection and notification equipment and small bore tubing, has been conceptually estimated based on anticipated locations of instrumentation devices. NIE Yellow Net - Place 3 CAT6a cable to each location in Labs 1111. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system. Red Net - Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.
Applicable SOW Reference: *Construction Execution Plan,* CMRR-PLAN-00010 CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.08
WBS Description: REI2 Lab 1124/1125
Work Description (Scope) Installing Continuous Air Monitoring (CAM) and Hand and Foot Monitoring (HFM) equipment in Lab 1124/1125 of RLUOB facility.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.08.02
WBS Description: REI2 Labs 1124/1125 Equipment Installation
Work Description (Scope) The Scope of Work reflects installing the Continuous Air Monitoring (CAM), Hand and Foot Monitor (HFM) and lab equipment in Lab 1124/1125, RLUOB facility. The scope is as follows: Install storage cabinets, tables, benches, safety shower, eyewash, LLW trash receptacles and fire extinguishers. NIE Yellow Net - Place 3 CAT6a cable to each location in Labs 1124/1125. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system. Red Net - Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.
Applicable SOW Reference: *Construction Execution Plan,* CMRR-PLAN-00010 CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.09
WBS Description: REI2 Lab 1113/1114
Work Description (Scope) Scope includes procurement and receipt of enclosure trains (1, 2 and 3), and labor to install gloveboxes, programmatic equipment, final utility connections and testing and inspection of utilities.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account

WBS Number: 01.01.09.01

WBS Description: REI2 Labs 1113/1114 Equipment Procurement

Work Description (Scope)

Scope consists of procurement and receipt of 10 enclosures, 3 trains (Train 1, Train 2, and Train 3). Enclosure assemblies include stands, shelves, service panels, power feedthroughs, HEPA filter houses, door assemblies, and window glass.

Train/ Item	Types	Number
1	1x3 GB with Cup Sink	GB-GB-1114-04
	1x2 OF	GB-OF-1114-05
	1x3 OF	GB-OF-1114-06
2	1x3 GB with Cup Sink	GB-GB-1114-01
	1x2 OF	GB-OF-1114-02
	1x2 OF	GB-OF-1114-03
3	1x2 GB with Cup Sink	GB-GB-1113-01
	1x3 OF	GB-OF-1113-02
	1x2 OF	GB-OF-1113-03
	1x3 GB	GB-GB-1113-04

Applicable SOW Reference:

CMRR-MAS-00001 (REI2 Material Assignment Schedule)

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.09.02
WBS Description: REI2 Labs 1113/1114 Equipment Installation
Work Description (Scope) **(CSA)** -The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes CSA material installation. Six lab rooms will be outfitted and begin operations. CSA materials and related installation requirements are required in each of the proposed lab rooms. The scope of work reflects the material, installation, and testing requirements necessary to fit out each lab. Prior construction included header install which included structural supports for header piping and electrical/data structural supports. Additional structural supports are included in this phase of the project. CSA scope of work (with major mechanical equipment noted) includes the following: Install Package #1: 1) RC Sample Prep Laboratory - Rooms 1113-1114; (Equipment - 11 gloveboxes, 1 new fume hood (1 existing fume hood), misc. lab apparatus equipment and instruments/programmatic equipment). CSA scope of work includes furnishing, installing, and anchoring of 2 storage cabinets, 2 wall cabinets, and 20 linear feet of casework. Approx. 3,000 sq. ft. of cleaning, scraping, and painting of the lab, as spaced. Installation of smoke seals and fire stops and installation of NU-Clad base mold for the casework and storage cabinets. Self-perform and/or subcontractor is to furnish and install room signage. Approx. 18 prefabbed structural stainless steel HVAC duct supports will be furnished and installed by the subcontractor. Also approx. 68 misc. supports, connections, and clamps furnished and installed for the small bore piping at the gloveboxes and fume hoods. This excludes the procurement of the equipment installed in this scope (gloveboxes, fume hoods, and programmatic equipment). **(Electrical)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Electrical Bulks installation. Electrical Bulk materials include lab lighting fixtures, glovebox lighting fixtures, conduit, receptacles, gaskets, covers, switches, breakers, wire, and bonding. Wiring harnesses were also included in the Electrical Bulks, as necessary. Six lab rooms will be outfitted and begin operations. Electrical requirements for supplying power to the proposed lab equipment and

instrumentation in each of the rooms is necessary. The six lab rooms are not currently fitted out and the scope of work reflects the material, installation, testing, bonding, and labelling requirements necessary to provide power and lighting in each of the labs. In general, the electrical headers (conduit, wireway, and outlet boxes) are furnished and installed in a prior construction phase and this phase finalizes the install from the electrical headers and terminal boxes to individual pieces of equipment and instruments. Installation (along with major mechanical equipment) includes the following:

Install Package #1:

1) RC Sample Prep Laboratory - Rooms 1113-1114; Electrical Bulks installed to support 11 gloveboxes, 2 fume hoods (1 new/1 existing), misc. lab apparatus equipment, instruments and programmatic equipment. Scope of work includes installation of light fixtures, receptacles or pigtails, switches, breakers, wire, test and label terminations, and install glovebox lights.

(HVAC)

Install Package #1:

1) RC Sample Prep Laboratory - Rooms 1113-1114

This scope covers the HVAC scope of work for the Equipment Install Packages include the final Zone 1 and Zone 2 exhaust air connections and appurtenances from the "In-Lab Header Install Package" to the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, filter housings associated with exhaust duct and other miscellaneous service equipment as required.

(Instrumentation)

The Scope of Work reflects the Merrick Design "REI2 Project - Equipment Install Packages #1 and #2" which includes Instrumentation installation. The majority of the instrumentation is Rad Monitoring Instrumentation and Programmatic Instruments. Instrumentation includes computers, radiation monitoring equipment, fire detection and alarm devices, analyzers, recorders, laboratory and programmatic instruments, and instrument and control valves. Six lab rooms will be outfitted. Instrumentation requirements for each proposed lab have been defined by LANL Programmatic REI2 SMEs. Instrumentation to support lab operations, i.e. fire alarm detection and notification equipment and small bore tubing, has been conceptually estimated based on anticipated locations of instrumentation devices. The six labs are not currently fitted out and the scope of work reflects the equipment, material, installation, and testing necessary to provide instrumentation in each of the labs. Instrumentation requirements (along with major mechanical equipment) includes the following:

Install Package #1:

1) RC Sample Prep Laboratory - Rooms 1113-1114; Instrumentation to support 11 gloveboxes, 1 fume hoods (1 fume hood existing), and misc. lab apparatus equipment. Scope of work includes furnishing, installing, and calibrating of Canberra Net Cams, Glovebox Hand Probe Monitors, and Fixed Air Head Samplers. Other instrumentation includes laboratory apparatus such as balances, printers, DI units, and hotplates.

(Mechanical)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Mechanical Equipment install and fit-out of six Lab Rooms located in the existing RLUOB Facility. The six lab rooms are not currently fitted out and the scope of work reflects installation and testing of mechanical equipment in the lab rooms and extending the existing utilities from the headers to individual pieces of equipment. Install packages (along with major mechanical equipment) includes the following:

Install Package #1:

1) RC Sample Prep Laboratory - Rooms 1113-1114; includes 11 gloveboxes, 1 fume hood (1 fume hood existing), misc. lab apparatus equipment. The Mechanical Equipment scope of work for the Equipment Install Package includes the installation of the proposed fume hoods, gloveboxes, and the lab apparatus equipment.

Mechanical equipment scope of work includes all tasks from initial receipt at the RLUOB loading dock through mechanical completion, and includes unloading and inspection, staging from loading dock to final location, assembly, leveling, aligning, and setting of equipment, construction testing. Anchoring of equipment, leak testing and other glovebox / fume hood testing requirements have been included in the mechanical equipment scope.

(Piping)

This covers piping bulk commodities. The Piping scope of work for the Equipment Install Packages include the final Laboratory Gas Piping, Process Piping, and Facility Water Distribution Piping system connections and appurtenances. The scope includes piping branches from the "In-Lab Header Install Package" point-of-connection (POC) to the final connection points at the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, and other miscellaneous service equipment as required. The project drawings and specifications provide a detailed list of the piping services required (e.g., compressed air, deionized water, RLW, etc.)

(Argon, Nitrogen systems and GB Fire Suppression)

The Scope of Work reflects primarily changes to existing Argon and Nitrogen systems and installing the new glovebox fire suppression system in RLUOB facility. The scope is as follow:

1) Modification to the Argon, Nitrogen, Regen, and P10 systems to add restrictive orifices:

This scope includes installing one (1) restrictive orifice for each system. This work will be performed in RC Sample Prep Lab-1113-1114.

2) Install new glovebox fire suppression system:

The scope of work is applicable to Labs: RC Sample Prep Lab-1113-1114. This scope includes installing (62) fire suppression aerosol generators, (7) Potter Convectional Panels, (62) J. boxes, 3,290 LF of 3/4" EMT conduits and 2/#16 AWG wire, including terminations. Included allowance for interface with existing RLUOB Fire Alarm Panel.

NIE

Yellow Net -

Place 3 CAT6a cable to each location in Labs 1113/1114. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system.

Red Net -

Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.

Applicable SOW Reference:

Construction Execution Plan, CMRR-PLAN-00010

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.10
WBS Description: REI2 Lab 1126
Work Description (Scope) Scope includes the procurement and receipt of programmatic equipment and enclosure trains (4 and 5). Includes install of gloveboxes, programmatic equipment, final utility connection and testing and inspection of utilities.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account

WBS Number: 01.01.10.01

WBS Description: REI2 Lab 1126 Equipment Procurement

Work Description (Scope)

Scope consists of procurement and receipt of programmatic equipment PR Group 12 (Dri-Train) and 9 enclosures between train 4 and train 5. Enclosure assemblies include stands, shelves, service panels, power feedthroughs, HEPA filter houses, door assemblies, and window glass.

Train/ Item	Types	Number
4	1x2 GB Inert	GB-GB-1126-02
	1x2 GB Inert with Spool	GB-GB-1126-03
	1x2 OF	GB-GB-1126-04
	1x2 GB Inert with Spool	GB-GB-1126-05
	1x2 GB Inert	GB-GB-1126-06
5	1x3 GB with Cup Sink	GB-GB-1126-07
	1x3 OF with Large Sink	GB-GB-1126-08
	1x3 OF	GB-GB-1126-09
	1x2 GB First Article	GB-GB-1126-10

Applicable SOW Reference:

CMRR-MAS-00001 (REI2 Material Assignment Schedule)

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.10.02
WBS Description: REI2 Lab 1126 Equipment Installation
Work Description (Scope) **(CSA)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes CSA material installation. Six lab rooms will be outfitted and begin operations. CSA materials and related installation requirements are required in each of the proposed lab rooms. The scope of work reflects the material, installation, and testing requirements necessary to fit out each lab. Prior construction included header install which included structural supports for header piping and electrical/data structural supports. Additional structural supports are included in this phase of the project. CSA scope of work (with major mechanical equipment noted) includes the following: 4) Metal Sample Distribution Laboratory - Room 1126; (Equipment - 9 gloveboxes, 1 fume hood, and misc. lab apparatus equipment and instrument/programmatic equipment). CSA scope of work includes furnishing, installing, and anchoring of 2 storage cabinets, 4 wall cabinets, and 18 linear feet of casework. Approx. 1,800 sq. ft. of cleaning, scraping, and painting of the lab, as spaced. Installation of smoke seals and fire stops and installation of NU-Clad base mold for the casework and storage cabinets. Self-perform and/or subcontractor is to furnish and install room signage. Approx. 20 prefabbed structural stainless steel HVAC duct supports will be furnished and installed by the subcontractor. Also approx. 50 misc. supports, connections, and clamps furnished and installed for the small bore piping. This excludes the procurement of the equipment installed in this scope (gloveboxes, fume hoods, and programmatic equipment). **(Electrical)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Electrical Bulks installation. Electrical Bulk materials include lab lighting fixtures, glovebox lighting fixtures, conduit, receptacles, gaskets, covers, switches, breakers, wire, and bonding. Wiring harnesses were also included in the Electrical Bulks, as necessary. Six lab rooms will be outfitted and begin operations. Electrical requirements for supplying power to the proposed lab equipment and instrumentation in each of the rooms is necessary. The six lab rooms are not currently fitted out and the scope of work reflects the material, installation, testing, bonding, and labelling requirements necessary to

provide power and lighting in each of the labs. In general, the electrical headers (conduit, wireway, and outlet boxes) are furnished and installed in a prior construction phase and this phase finalizes the install from the electrical headers and terminal boxes to individual pieces of equipment and instruments. Installation (along with major mechanical equipment) includes the following:

Install Package #1:

(4) Metal Sample Distribution Laboratory - Room 1126; Electrical Bulks installed to support 9 gloveboxes, 1 fume hood, and misc. lab apparatus equipment and programmatic equipment. Scope of work includes installation of approximately light fixtures, receptacles or pigtails, switches, breakers, wire, test and label terminations, and install glovebox lights.

(HVAC)

Install Package #1:

4) Metal Sample Distribution Laboratory - Room 1126.

This scope covers the HVAC scope of work for the Equipment Install Packages include the final Zone 1 and Zone 2 exhaust air connections and appurtenances from the "In-Lab Header Install Package" to the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, filter housings associated with exhaust duct and other miscellaneous service equipment as required.

(Instrumentation)

The Scope of Work reflects the Merrick Design "REI2 Project - Equipment Install Packages #1 and #2" which includes Instrumentation installation. The majority of the instrumentation is Rad Monitoring Instrumentation and Programmatic Instruments. Instrumentation includes computers, radiation monitoring equipment, fire detection and alarm devices, analyzers, recorders, laboratory and programmatic instruments, and instrument and control valves. Six lab rooms will be outfitted. Instrumentation requirements for each proposed lab have been defined by LANL Programmatic REI2 SMEs. Instrumentation to support lab operations, i.e. fire alarm detection and notification equipment and small bore tubing, has been conceptually estimated based on anticipated locations of instrumentation devices. The six labs are not currently fitted out and the scope of work reflects the equipment, material, installation, and testing necessary to provide instrumentation in each of the labs. Instrumentation requirements (along with major mechanical equipment) includes the following:

Install Package #1:

(4) Metal Sample Distribution Laboratory - Room 1126; Instrumentation to support 9 gloveboxes, 1 fume hood, and misc. lab apparatus equipment. Scope of work includes furnishing, installing, and calibrating of Canberra Net Cams, Glovebox Hand Probe Monitors, and Fixed Air Head Samplers. Other instrumentation includes laboratory

apparatus such as balances, printers. Instrument systems and accessories include a rebar cutter and chamber, and four Vacuum Atmosphere Dri-Trains.

(Mechanical)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Mechanical Equipment install and fit-out of six Lab Rooms located in the existing RLUOB Facility. The six lab rooms are not currently fitted out and the scope of work reflects installation and testing of mechanical equipment in the lab rooms and extending the existing utilities from the headers to individual pieces of equipment. Install packages (along with major mechanical equipment) includes the following:

Install Package #1:

4) Metal Sample Distribution Laboratory - Room 1126; includes 9 gloveboxes, 1 fume hood, and misc. lab apparatus equipment

Mechanical equipment scope of work includes all tasks from initial receipt at the RLUOB loading dock through mechanical completion, and includes unloading and inspection, staging from loading dock to final location, assembly, leveling, aligning, and setting of equipment, construction testing. Anchoring of equipment, leak testing and other glovebox / fume hood testing requirements have been included in the mechanical equipment scope.

(Piping)

This scope covers piping bulk commodities. The Piping scope of work for the Equipment Install Packages include the final Laboratory Gas Piping, Process Piping, and Facility Water Distribution Piping system connections and appurtenances. The scope includes piping branches from the "In-Lab Header Install Package" point-of-connection (POC) to the final connection points at the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, and other miscellaneous service equipment as required. The project drawings and specifications provide a detailed list of the piping services required (e.g., compressed air, deionized water, RLW, etc.)

(Ar, N systems and GB Fire Suppression)

The Scope of Work reflects primarily changes to existing Argon and Nitrogen systems and installing the new glovebox fire suppression system in RLUOB facility. The scope is as follow:

1) Modification to the Argon, Nitrogen, Regen, and P10 systems to add restrictive orifices:

This scope includes installing one (1) restrictive orifice for each of above systems. This work will be performed in Metal Sample Distribution Lab-1126.

2) Install new glovebox fire suppression system:

The scope of work is applicable to Labs: Metal Sample Distribution Lab-1126. This scope includes installing (62) fire suppression aerosol generators, (7) Potter Convectional Panels, (62) J. boxes, 3,290 LF of 3/4" EMT conduits and 2/#16 AWG wire, including terminations. Included allowance for interface with existing RLUOB Fire Alarm Panel.

NIE

Yellow Net -

Place 3 CAT6a cable to each location in Labs 1126. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system.

Red Net -

Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.

Applicable SOW Reference:

Construction Execution Plan, CMRR-PLAN-00010

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.11
WBS Description: REI2 Lab 1123
Work Description (Scope) Scope includes the procurement and receipt of programmatic equipment and enclosure trains (6 and 7). Includes install of gloveboxes, programmatic equipment, final utility connection and testing and inspection of utilities.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account

WBS Number: 01.01.11.01

WBS Description: REI2 Lab 1123 Equipment Procurement

Work Description (Scope)

Scope consists of procurement and receipt of PR Group 19 Coulometer and 9 enclosures between train 6 and 7. Enclosure assemblies include stands, shelves, service panels, power feedthroughs, HEPA filter houses, door assemblies, and window glass.

Train/ Item	Types	Number
6	1x2 GB with Cup Sink	GB-GB-1123-01
	1x3 GB	GB-GB-1123-02
	1x3 OF	GB-OF-1123-03
	1x4 OF with Large Sink ASHRAE TESTING	GB-OF-1123-04
7	1x1 GB	GB-GB-1123-05
	1x3 GB with Large Sink	GB-GB-1123-06
	1x2 GB First Article	GB-GB-1123-07
	1x3 OF with Cup Sink	GB-OF-1123-08
	1x3 GB With Large Centrifuge Well	GB-GB-1123-09

Applicable SOW Reference:

CMRR-MAS-00001 (REI2 Material Assignment Schedule)

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.11.02
WBS Description: REI2 Lab 1123 Equipment Installation
Work Description (Scope) **(CSA)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes CSA material installation. Six lab rooms will be outfitted and begin operations. CSA materials and related installation requirements are required in each of the proposed lab rooms. The scope of work reflects the material, installation, and testing requirements necessary to fit out each lab. Prior construction included header install which included structural supports for header piping and electrical/data structural supports. Additional structural supports are included in this phase of the project. CSA scope of work (with major mechanical equipment noted) includes the following: 3) Coulometry/Oxide Distribution Laboratory - Room 1123; (Equipment - 9 gloveboxes and misc. lab apparatus equipment and instrument/programmatic equipment). CSA scope of work includes furnishing, installing, and anchoring of 3 storage cabinets, 3 wall cabinets, and 15 linear feet of casework. Approx. 1,800 sq. ft. of cleaning, scraping, and painting of the lab, as spaced. Installation of smoke seals and fire stops and installation of NU-Clad base mold for the casework and storage cabinets. Self-perform and/or subcontractor is to furnish and install room signage. Approx. 16 prefabbed structural stainless steel HVAC duct supports will be furnished and installed by the subcontractor. Also approx. 54 misc. supports, connections, and clamps furnished and installed for the small bore piping at the gloveboxes and fume hoods. This excludes the procurement of the equipment installed in this scope (gloveboxes, fume hoods, and programmatic equipment). **(Electrical)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Electrical Bulks installation. Electrical Bulk materials include lab lighting fixtures, glovebox lighting fixtures, conduit, receptacles, gaskets, covers, switches, breakers, wire, and bonding. Wiring harnesses were also included in the Electrical Bulks, as necessary. Six lab rooms will be outfitted and begin operations. Electrical requirements for supplying power to the proposed lab equipment and instrumentation in each of the rooms is necessary. The six lab rooms are not currently fitted out and the scope of work reflects the material, installation, testing, bonding, and labelling requirements necessary to provide power and lighting in each of the labs. In general, the

electrical headers (conduit, wireway, and outlet boxes) are furnished and installed in a prior construction phase and this phase finalizes the install from the electrical headers and terminal boxes to individual pieces of equipment and instruments. Installation (along with major mechanical equipment) includes the following:

Install Package #1: 3) Coulometry/Oxide Distribution Laboratory - Room 1123; Electrical Bulks installed to support 9 gloveboxes and misc. lab apparatus equipment instruments and programmatic equipment. Scope of work includes installation of approximately light fixtures, receptacles or pigtails, switches, breakers, wire, test and label terminations, and install glovebox lights.

(HVAC)

The HVAC scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes six Lab Room Areas located in the basement of the existing RLUOB Facility:

Install Package #1:

(3) Coulometry/Oxide Distribution Laboratory - Room 1123,

This scope covers the HVAC scope of work for the Equipment Install Packages include the final Zone 1 and Zone 2 exhaust air connections and appurtenances from the "In-Lab Header Install Package" to the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, filter housings associated with exhaust duct and other miscellaneous service equipment as required.

(Instrumentation)

The Scope of Work reflects the Merrick Design "REI2 Project - Equipment Install Packages #1 and #2" which includes Instrumentation installation. The majority of the instrumentation is Rad Monitoring Instrumentation and Programmatic Instruments. Instrumentation includes computers, radiation monitoring equipment, fire detection and alarm devices, analyzers, recorders, laboratory and programmatic instruments, and instrument and control valves. Six lab rooms will be outfitted. Instrumentation requirements for each proposed lab have been defined by LANL Programmatic REI2 SMEs. Instrumentation to support lab operations, i.e. fire alarm detection and notification equipment and small bore tubing, has been conceptually estimated based on anticipated locations of instrumentation devices. The six labs are not currently fitted out and the scope of work reflects the equipment, material, installation, and testing necessary to provide instrumentation in each of the labs. Instrumentation requirements (along with major mechanical equipment) includes the following:

Install Package #1:

(3) Coulometry/Oxide Distribution Laboratory - Room 1123; Instrumentation to support 9 gloveboxes and misc. lab apparatus equipment. Scope of work includes furnishing, installing, and calibrating of Canberra Net Cams, Glovebox Hand Probe Monitors, and Fixed Air Head Samplers. Other instrumentation includes laboratory apparatus such as balances, printers, DI units, furnace, hotblock, heat lamps, centrifuge, and hotplates. Instrument systems and accessories include an SRS fabricated coulometer and a Thermo-Scientific GENESYS 10s UV-Vis.

(Mechanical)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Mechanical Equipment install and fit-out of six Lab Rooms located in the existing RLUOB Facility. The six lab rooms are not currently fitted out and the scope of work reflects installation and testing of mechanical equipment in the lab rooms and extending the existing utilities from the headers to individual pieces of equipment. Install packages (along with major mechanical equipment) includes the following:

Install Package #1:

(3) Coulometry/Oxide Distribution Laboratory - Room 1123; includes 9 gloveboxes and misc. lab apparatus equipment,

The Mechanical Equipment scope of work for the Equipment Install Package includes the installation of the proposed fume hoods, gloveboxes, and the lab apparatus equipment.

Mechanical equipment scope of work includes all tasks from initial receipt at the RLUOB loading dock through mechanical completion, and includes unloading and inspection, staging from loading dock to final location, assembly, leveling, aligning, and setting of equipment, construction testing. Anchoring of equipment, leak testing and other glovebox / fume hood testing requirements have been included in the mechanical equipment scope.

(Piping)

This scope covers piping bulk commodities. The Piping scope of work for the Equipment Install Packages include the final Laboratory Gas Piping, Process Piping, and Facility Water Distribution Piping system connections and appurtenances. The scope includes piping branches from the "In-Lab Header Install Package" point-of-connection (POC) to the final connection points at the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, and other miscellaneous service equipment as required. The project drawings and specifications provide a detailed list of the piping services required (e.g., compressed air, deionized water, RLW, etc.)

(Ar, N systems and GB Fire Suppression)

The Scope of Work reflects primarily changes to existing Argon and Nitrogen systems and installing the new glovebox fire suppression system in RLUOB facility. The scope is as follow:

1) Modification to the Argon, Nitrogen, Regen, and P10 systems to add restrictive orifices:

This scope includes installing one (1) restrictive orifice for each of above systems. This work will be performed in Coulometry/Oxide Distribution Lab-1123.

2) Install new glovebox fire suppression system:

The scope of work is applicable to Lab: Coulometry/Oxide Distribution Lab-1123. This scope includes installing (62) fire suppression aerosol generators, (7) Potter Convectional Panels, (62) J. boxes, 3,290 LF of 3/4" EMT conduits and 2/#16 AWG wire, including terminations. Included allowance for interface with existing RLUOB Fire Alarm Panel.

NIE

Yellow Net -

Place 3 CAT6a cable to each location in Labs 1123. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system.

Red Net -

Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.

Applicable SOW Reference:

Construction Execution Plan, CMRR-PLAN-00010

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.12
WBS Description: REI2 Lab 1122
Work Description (Scope) Scope includes the procurement and receipt of enclosure trains (8 and 9). Includes install of gloveboxes, programmatic equipment, final utility connection and testing, and inspection of utilities.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account

WBS Number: 01.01.12.01

WBS Description: REI2 Lab 1122 Equipment Procurement

Work Description (Scope)

Scope consists of procurement and receipt of 11 enclosures between trains 8 and 9. Enclosure assemblies include stands, shelves, service panels, power feedthroughs, HEPA filter houses, door assemblies, and window glass.

Train/ Item	Types	Number
8	1x1 GB	GB-GB-1122-01
	1x2 OF	GB-OF-1122-02
	1x1 GB	GB-GB-1122-03
	1x2 OF	GB-OF-1122-04
	1x1 GB	GB-GB-1122-05
	1x1 OF	GB-OF-1122-06
9	1x2 OF	GB-OF-1122-07
	1x2 OF	GB-OF-1122-08
	1x1 GB	GB-GB-1122-09
	1x2 OF	GB-OF-1122-10
	1x2 GB First Article	GB-GB-1122-11

Applicable SOW Reference:

CMRR-MAS-00001 (REI2 Material Assignment Schedule)

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.12.02
WBS Description: REI2 Lab 1122 Equipment Installation
Work Description (Scope) **(CSA)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes CSA material installation. Six lab rooms will be outfitted and begin operations. CSA materials and related installation requirements are required in each of the proposed lab rooms. The scope of work reflects the material, installation, and testing requirements necessary to fit out each lab. Prior construction included header install which included structural supports for header piping and electrical/data structural supports. Additional structural supports are included in this phase of the project. CSA scope of work (with major mechanical equipment noted) includes the following: 2) Mass Spec Sample Prep Laboratory - Room 1122; (Equipment - 11 gloveboxes, relocation of the TIMS, misc. lab apparatus equipment and instrument/programmatic equipment). CSA scope of work includes furnishing, installing, and anchoring of 3 storage cabinets, 3 wall cabinets, and 14 linear feet of casework. Approx. 1,800 sq. ft. of cleaning, scraping, and painting of the lab, as spaced. Installation of smoke seals and fire stops and installation of NU-Clad base mold for the casework and storage cabinets. Self-perform and/or subcontractor is to furnish and install room signage. Approx. 13 prefabbed structural stainless steel HVAC duct supports will be furnished and installed by the subcontractor. Also approx. 54 misc. supports, connections, and clamps furnished and installed for the small bore piping at the gloveboxes and fume hoods. This excludes the procurement of the equipment installed in this scope (gloveboxes, fume hoods, and programmatic equipment). **(Electrical)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Electrical Bulks installation. Electrical Bulk materials include lab lighting fixtures, glovebox lighting fixtures, conduit, receptacles, gaskets, covers, switches, breakers, wire, and bonding. Wiring harnesses were also included in the Electrical Bulks, as necessary. Six lab rooms will be outfitted and begin operations. Electrical requirements for supplying power to the proposed lab equipment and instrumentation in each of the rooms is necessary. The six lab rooms are not currently fitted out and the scope of work reflects the material, installation, testing, bonding, and labelling requirements necessary to provide power and lighting in each of the labs. In

general, the electrical headers (conduit, wireway, and outlet boxes) are furnished and installed in a prior construction phase and this phase finalizes the install from the electrical headers and terminal boxes to individual pieces of equipment and instruments. Installation (along with major mechanical equipment) includes the following:

Install Package #1: 2) Mass Spec Sample Prep Laboratory - Room 1122; Electrical Bulks installed to support 11 gloveboxes, relocation of the TIMS, misc. lab apparatus equipment, instruments and programmatic equipment. Scope of work includes installation of approximately light fixtures, receptacles or pigtails, switches, breakers, wire, test and label terminations, and install glovebox lights.

(HVAC)

The HVAC scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes six Lab Room Areas located in the basement of the existing RLUOB Facility:

Install Package #1:

(2) Mass Spec Sample Prep Laboratory - Room 1122,

This scope covers the HVAC scope of work for the Equipment Install Packages include the final Zone 1 and Zone 2 exhaust air connections and appurtenances from the "In-Lab Header Install Package" to the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, filter housings associated with exhaust duct and other miscellaneous service equipment as required.

(Instrumentation)

The Scope of Work reflects the Merrick Design "REI2 Project - Equipment Install Packages #1 and #2" which includes Instrumentation installation. The majority of the instrumentation is Rad Monitoring Instrumentation and Programmatic Instruments. Instrumentation includes computers, radiation monitoring equipment, fire detection and alarm devices, analyzers, recorders, laboratory and programmatic instruments, and instrument and control valves. Six lab rooms will be outfitted. Instrumentation requirements for each proposed lab have been defined by LANL Programmatic REI2 SMEs. Instrumentation to support lab operations, i.e. fire alarm detection and notification equipment and small bore tubing, has been conceptually estimated based on anticipated locations of instrumentation devices. The six labs are not currently fitted out and the scope of work reflects the equipment, material, installation, and testing necessary to provide instrumentation in each of the labs. Instrumentation requirements (along with major mechanical equipment) includes the following:

Install Package #1:

(2) Mass Spec Sample Prep Laboratory - Room 1122; Instrumentation to support 11 gloveboxes, relocation of the TIMS, and misc. lab apparatus equipment. Scope of work

includes furnishing, installing, and calibrating of Canberra Net Cams, Glovebox Hand Probe Monitors, and Fixed Air Head Samplers. Other instrumentation includes laboratory apparatus such as balances, printers, DI units, and hotplates

(Mechanical)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Mechanical Equipment install and fit-out of six Lab Rooms located in the existing RLUOB Facility. The six lab rooms are not currently fitted out and the scope of work reflects installation and testing of mechanical equipment in the lab rooms and extending the existing utilities from the headers to individual pieces of equipment. Install packages (along with major mechanical equipment) includes the following:

Install Package #1:

(2) Mass Spec Sample Prep Laboratory - Room 1122; includes 11 gloveboxes and misc. lab apparatus equipment,

The Mechanical Equipment scope of work for the Equipment Install Package includes the installation of the proposed fume hoods, gloveboxes, and the lab apparatus equipment.

Mechanical equipment scope of work includes all tasks from initial receipt at the RLUOB loading dock through mechanical completion, and includes unloading and inspection, staging from loading dock to final location, assembly, leveling, aligning, and setting of equipment, construction testing. Anchoring of equipment, leak testing and other glovebox / fume hood testing requirements have been included in the mechanical equipment scope.

(Piping)

This scope covers piping bulk commodities. The Piping scope of work for the Equipment Install Packages include the final Laboratory Gas Piping, Process Piping, and Facility Water Distribution Piping system connections and appurtenances. The scope includes piping branches from the "In-Lab Header Install Package" point-of-connection (POC) to the final connection points at the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, and other miscellaneous service equipment as required. The project drawings and specifications provide a detailed list of the piping services required (e.g., compressed air, deionized water, RLW, etc.)

(Ar, N systems and GB Fire Suppression)

The Scope of Work reflects primarily changes to existing Argon and Nitrogen systems and installing the new glovebox fire suppression system in RLUOB facility. The scope is as follow:

1) Modification to the Argon, Nitrogen, Regen, and P10 systems to add restrictive orifices:

This scope includes installing one (1) restrictive orifice for each of above systems. This work will be performed in Mass Spec Sample Prep Lab-1122.

2) Install new glovebox fire suppression system:

The scope of work is applicable to Labs: Mass Spec Sample Prep Lab-1122. This scope includes installing (62) fire suppression aerosol generators, (7) Potter Convectional Panels, (62) J. boxes, 3,290 LF of 3/4" EMT conduits and 2/#16 AWG wire, including terminations. Included allowance for interface with existing RLUOB Fire Alarm Panel.

NIE

Yellow Net -

Place 3 CAT6a cable to each location in Labs 1122. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system.

Red Net -

Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.

Applicable SOW Reference:

Construction Execution Plan, CMRR-PLAN-00010

(See also SQDP 15-00173-REI2-PRO-01 Equipment Procurement and other listing provided by LANL SME for equipment and instrumentation required by laboratory)

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.13
WBS Description: REI2 Lab 1109/1110
Work Description (Scope): Scope includes the procurement and receipt of enclosure trains (14, 15 and 16). Includes install of gloveboxes, programmatic equipment, final utility connection and testing and inspection of utilities.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account

WBS Number: 01.01.13.01

WBS Description: REI2 Labs 1109/1110 Equipment Procurement

Work Description (Scope)

Scope consists of procurement and receipt of programmatic equipment PR Groups 09 (TEM), 10 (SEM), 16 (UV Spectrometer), 18 (Laser Ablation/ICPMS), & 25 (Titrator) and 10 enclosures between trains 14, 15, and 16. Enclosure assemblies include stands, shelves, service panels, power feedthroughs, HEPA filter houses, door assemblies, and window glass.

Train/ Item	Types	Number
14	1x3 GB with Cup Sink	GB-GB-1110-03
	1x2 OF	GB-OF-1110-04
	1x3 OF with Large Sink	GB-OF-1110-05
15	1x2 GB Inert with Spool	GB-GB-1109-05
	1x2 GB	GB-GB-1109-06
	1x2 OF	GB-OF-1109-07
	2x2 GB Access from four sides	GB-GB-1109-08
16	1x2 OF	GB-OF-1109-01
	1x2 GB	GB-GB-1109-02
	1x1 GB	GB-GB-1109-03

Applicable SOW Reference:

CMRR-MAS-00001 (REI2 Material Assignment Schedule)

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account
WBS Number: 01.01.13.02
WBS Description: REI2 Labs 1109/1110 Equipment Installation
Work Description (Scope) **(CSA)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes CSA material installation. Six lab rooms will be outfitted and begin operations. CSA materials and related installation requirements are required in each of the proposed lab rooms. The scope of work reflects the material, installation, and testing requirements necessary to fit out each lab. Prior construction included header install which included structural supports for header piping and electrical/data structural supports. Additional structural supports are included in this phase of the project. CSA scope of work (with major mechanical equipment noted) includes the following :(CSA) 2) TEM/SEM & Uranium Laboratory - Rooms 1109-1110; (Equipment - 10 gloveboxes, 3 fume hoods, and approx. 72 each - programmatic equipment). CSA scope of work includes furnishing, installing, and anchoring of 4 storage cabinet, 4 wall cabinets, and 16 linear feet of casework. Approx. 3,600 sq. ft. of cleaning, scraping, and painting of the lab, as spaced. Installation of smoke seals and fire stops and installation of NU-Clad base mold for the casework and storage cabinets. Self-perform and/or subcontractor is to furnish and install room signage. Approx. 33 prefabbed structural stainless steel HVAC duct supports will be furnished and installed by the subcontractor. Also approx. 48 misc. supports, connections, and clamps furnished and installed for the small bore piping at the gloveboxes and fume hoods. This excludes the procurement of the equipment installed in this scope (gloveboxes, fume hoods, and programmatic equipment). **(Electrical)** The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Electrical Bulks installation. Electrical Bulk materials include lab lighting fixtures, glovebox lighting fixtures, conduit, receptacles, gaskets, covers, switches, breakers, wire, and bonding. Wiring harnesses were also included in the Electrical Bulks, as necessary. Six lab rooms will be outfitted and begin operations. Electrical requirements for supplying power to the proposed lab equipment and

instrumentation in each of the rooms is necessary. The six lab rooms are not currently fitted out and the scope of work reflects the material, installation, testing, bonding, and labelling requirements necessary to provide power and lighting in each of the labs. In general, the electrical headers (conduit, wireway, and outlet boxes) are furnished and installed in a prior construction phase and this phase finalizes the install from the electrical headers and terminal boxes to individual pieces of equipment and instruments. Installation (along with major mechanical equipment) includes the following: Install Package #2: 2) TEM/SEM & Uranium Laboratory - Rooms 1109-1110; Electrical Bulks installed to support 10 gloveboxes, 3 fume hoods, and approx. 72 each - programmatic equipment. Install light fixtures as necessary, receptacles, switches, breakers, wire test and label terminations and install glovebox lights.

(HVAC)

The HVAC scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes six Lab Room Areas located in the basement of the existing RLUOB Facility:

Install Package #2:

(2) TEM/SEM & Uranium Laboratory - Rooms 1109-1110.

This scope covers the HVAC scope of work for the Equipment Install Packages include the final Zone 1 and Zone 2 exhaust air connections and appurtenances from the "In-Lab Header Install Package" to the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, filter housings associated with exhaust duct and other miscellaneous service equipment as required.

(Instrumentation)

The Scope of Work reflects the Merrick Design "REI2 Project - Equipment Install Packages #1 and #2" which includes Instrumentation installation. The majority of the instrumentation is Rad Monitoring Instrumentation and Programmatic Instruments. Instrumentation includes computers, radiation monitoring equipment, fire detection and alarm devices, analyzers, recorders, laboratory and programmatic instruments, and instrument and control valves. Six lab rooms will be outfitted. Instrumentation requirements for each proposed lab have been defined by LANL Programmatic REI2 SMEs. Instrumentation to support lab operations, i.e. fire alarm detection and notification equipment and small bore tubing, has been conceptually estimated based on anticipated locations of instrumentation devices. The six labs are not currently fitted out and the scope of work reflects the equipment, material, installation, and testing necessary to provide instrumentation in each of the labs. Instrumentation requirements (along with major mechanical equipment) includes the following:

Install Package #2:

(2) TEM/SEM & Uranium Laboratory - Rooms 1109 -1110; Instrumentation to support 10 gloveboxes, and 3 fume hoods. Scope of work includes furnishing, installing, and calibrating of Canberra Net Cams, Glovebox Hand Probe Monitors, and Fixed Air Head Samplers. Other instrumentation includes laboratory apparatus such as balances and microbalance, printers, DI units, various furnaces, heat lamps, heavy duty rebar cutters and a rebar sampler. Instrument systems and accessories include a tritrator, UV-Vis, particle analyzer, pycnometer, TEM-Tital Low Base, SEM-Quanta FEG 650, Broad argon ion beam system, ICP-MS by Agilent, laser ablation unit, Dri-Train, FT-IR, and a Horiba Raman.

(Mechanical)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Mechanical Equipment install and fit-out of six Lab Rooms located in the existing RLUOB Facility. The six lab rooms are not currently fitted out and the scope of work reflects installation and testing of mechanical equipment in the lab rooms and extending the existing utilities from the headers to individual pieces of equipment. Install packages (along with major mechanical equipment) includes the following:

Install Package #2:

(2) TEM/SEM & Uranium Laboratory - Rooms 1109-1110; 10 gloveboxes, 3 fume hoods

In addition, installation of other equipment common to labs included Safety Showers and Eye Washes, Mouse Traps, and Fire Extinguishers.

The Mechanical Equipment scope of work for the Equipment Install Package includes the installation of the proposed fume hoods, gloveboxes, and the lab apparatus equipment.

Mechanical equipment scope of work includes all tasks from initial receipt at the RLUOB loading dock through mechanical completion, and includes unloading and inspection, staging from loading dock to final location, assembly, leveling, aligning, and setting of equipment, construction testing. Anchoring of equipment, leak testing and other glovebox / fume hood testing requirements have been included in the mechanical equipment scope.

(Piping)

This scope covers piping bulk commodities. The Piping scope of work for the Equipment Install Packages include the final Laboratory Gas Piping, Process Piping, and Facility Water Distribution Piping system connections and appurtenances. The scope includes piping branches from the "In-Lab Header Install Package" point-of-connection (POC) to the final connection points at the Laboratory Enclosures (e.g.

Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, and other miscellaneous service equipment as required. The project drawings and specifications provide a detailed list of the piping services required (e.g., compressed air, deionized water, RLW, etc.).

(Ar, N systems and GB Fire Suppression)

The Scope of Work reflects primarily changes to existing Argon and Nitrogen systems and installing the new glovebox fire suppression system in RLUOB facility. The scope is as follow:

1) Modification to the Argon, Nitrogen, Regen, and P10 systems to add restrictive orifices:

This scope includes installing one (1) restrictive orifice for each of above systems. This work will be performed in TEM/SEM & Uranium Lab-1109-1110.

2) Install new glovebox fire suppression system:

The scope of work is applicable to Lab: TEM/SEM & Uranium Lab-1109-1110. This scope includes installing (62) fire suppression aerosol generators, (7) Potter Convectional Panels, (62) J. boxes, 3,290 LF of 3/4" EMT conduits and 2/#16 AWG wire, including terminations. Included allowance for interface with existing RLUOB Fire Alarm Panel.

NIE

Yellow Net -

Place 3 CAT6a cable to each location in Labs 1109/1110. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system.

Red Net -

Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.

Applicable SOW Reference:

Construction Execution Plan, CMRR-PLAN-00010

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 3 - Control Account
WBS Number: 01.01.14
WBS Description: REI2 Lab 1101/1102/1103
Work Description (Scope) Scope includes the procurement and receipt of programmatic equipment and enclosure trains (10, 11, 12 and 13). Includes install of gloveboxes, programmatic equipment, final utility connection and testing, and inspection of utilities.
Applicable SOW Reference: CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account

WBS Number: 01.01.14.01

WBS Description: REI2 Labs 1101/1102/1103 Equipment Procurement

Work Description (Scope)

Scope consists of procurement and receipt of programmatic equipment PR Groups 13 (Laue XRF), 14 (XRD Bruker), 15 (PPMS), 17 (Arc Melting Furnace), 21 (Lindberg Furnace), 26 (Vac Pump), 27 (Rigaku XRF Spectrometer), 28 (Bruker XRF Spectrometer), & 30 (ICP Spectrometer) and 17 enclosures between trains 10, 11, 12, & 13. Enclosure assemblies include stands, shelves, service panels, power feedthroughs, HEPA filter houses, door assemblies, and window glass.

Train/ Item	Types	Number
10	1x1 OF	GB-OF-1101-01
	2x3 GB Flush Inert with Spool	GB-GB-1101-02
	2x2 GB Flush Inert with Spool	GB-GB-1101-03
	2x3 GB 52" Tall with Spool	GB-GB-1101-04
	1x1 OF	GB-GB-1101-05
11	2x2 GB	GB-GB-1102-01
	1x1 OF	GB-OF-1102-02
	1x3 GB	GB-GB-1102-03
	1x2 OF with Large Sink	GB-OF-1102-04
	1x3 OF	GB-OF-1102-05
12	1x2 GB	GB-GB-1103-01
	1x2 OF	GB-OF-1103-02
	1x3 OF with Cup Sink	GB-OF-1103-03
13	1x4 GB with Cup Sink	GB-GB-1103-07
	1x1 OF	GB-OF-1103-05
	1x2 OF	GB-OF-1103-06
	1x3 OF with Cup Sink	GB-OF-1103-04

Applicable SOW Reference:

CMRR-MAS-00001 (REI2 Material Assignment Schedule)

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*

Level 4 - Control Account

WBS Number: 01.01.14.02

WBS Description: REI2 Labs 1101/1102/1103 Equipment Installation

Work Description (Scope)

(CSA)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes CSA material installation. Six lab rooms will be outfitted and begin operations. CSA materials and related installation requirements are required in each of the proposed lab rooms. The scope of work reflects the material, installation, and testing requirements necessary to fit out each lab. Prior construction included header install which included structural supports for header piping and electrical/data structural supports. Additional structural supports are included in this phase of the project. CSA scope of work (with major mechanical equipment noted) includes the following: Install Package #2:

1) XRF & MC Laboratory - Rooms 1101-1103; (Equipment - 17 gloveboxes, 2 fume hoods, misc. lab apparatus equipment, and 13 instruments). CSA scope of work includes furnishing, installing, and anchoring of 1 storage cabinet, 4 wall cabinets, and 38 linear feet of casework. Approx. 2,200 sq. ft. of cleaning, scraping, and painting of the lab, as spaced. Installation of smoke seals and fire stops and installation of NU-Clad base mold for the casework and storage cabinets. The Self perform and/or subcontractor is to furnish and install room signage. Approx. 34 prefabbed structural stainless steel HVAC duct supports will be furnished and installed by the subcontractor. Also approx. 85 misc. supports, connections, and clamps furnished and installed for the small bore piping at the gloveboxes and fume hoods.

(Electrical)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Electrical Bulks installation. Electrical Bulk materials include lab lighting fixtures, glovebox lighting fixtures, conduit, receptacles, gaskets, covers, switches, breakers, wire, and bonding. Wiring harnesses were also included in the Electrical Bulks, as necessary. Six lab rooms will be outfitted and begin operations. Electrical requirements for supplying power to the proposed lab equipment and instrumentation in each of the rooms is necessary. The six lab rooms are not currently fitted out and the scope of work reflects the material, installation, testing, bonding, and labelling requirements necessary to provide power and lighting in each of the

labs. In general, the electrical headers (conduit, wireway, and outlet boxes) are furnished and installed in a prior construction phase and this phase finalizes the install from the electrical headers and terminal boxes to individual pieces of equipment and instruments. Installation (along with major mechanical equipment) includes the following: Install Package #2: 1) XRF & MC Laboratory - Rooms 1101-1103; Electrical Bulks installed to support 17 gloveboxes, 2 fume hoods, misc. lab apparatus equipment, instruments and programmatic equipment. Install light fixtures as necessary, receptacles, switches, breakers, wire test and label terminations and install glovebox lights.

(HVAC)

The HVAC scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes six Lab Room Areas located in the basement of the existing RLUOB Facility:

Install Package #2:

1) XRF & MC Laboratory - Rooms 1101-1103,

This scope covers the HVAC scope of work for the Equipment Install Packages include the final Zone 1 and Zone 2 exhaust air connections and appurtenances from the "In-Lab Header Install Package" to the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, filter housings associated with exhaust duct and other miscellaneous service equipment as required.

(Instrumentation)

The Scope of Work reflects the Merrick Design "REI2 Project - Equipment Install Packages #1 and #2" which includes Instrumentation installation. The majority of the instrumentation is Rad Monitoring Instrumentation and Programmatic Instruments. Instrumentation includes computers, radiation monitoring equipment, fire detection and alarm devices, analyzers, recorders, laboratory and programmatic instruments, and instrument and control valves. Six lab rooms will be outfitted. Instrumentation requirements for each proposed lab have been defined by LANL Programmatic REI2 SMEs. Instrumentation to support lab operations, i.e. fire alarm detection and notification equipment and small bore tubing, has been conceptually estimated based on anticipated locations of instrumentation devices. The six labs are not currently fitted out and the scope of work reflects the equipment, material, installation, and testing necessary to provide instrumentation in each of the labs. Instrumentation requirements (along with major mechanical equipment) includes the following:

Install Package #2:

1) XRF & MC Laboratory - Rooms 1101-1103; Instrumentation to support 17 gloveboxes, 2 fume hoods, and misc. lab apparatus equipment. Scope of work includes furnishing, installing, and calibrating of Canberra Net Cams, Glovebox Hand Probe Monitors, and Fixed Air Head Samplers. Other instrumentation

includes laboratory apparatus such as balances and microbalance, printers, DI units, various furnaces, hotblock, heat lamps, centrifuge, hotplates, and a flame polishing kit. Instrument systems and accessories include an LAUE Bruker, and XRD Bruker AXS, a PPMS, and ICP Spectrometer, scroll and turbo vacuum pumps, PIPS model 695, electro polisher, low speed saw, arch melter, Rigaku WDXRF, TXRF Bruker, EDXRF Bruker AXS, mixer mill, pellet press, microscope, polisher, disc grinder, and length gauge. See also "REI-2 Procurement CD-2/3" equipment and other listing provided by LANL SME for equipment and instrumentation required by laboratory.

(Mechanical)

The Scope of Work reflects the "REI2 Project - Equipment Install Packages #1 and #2" which includes Mechanical Equipment install and fit-out of six Lab Rooms located in the existing RLUOB Facility. The six lab rooms are not currently fitted out and the scope of work reflects installation and testing of mechanical equipment in the lab rooms and extending the existing utilities from the headers to individual pieces of equipment. Install packages (along with major mechanical equipment) includes the following:

Install Package #2:

1) XRF & MC Laboratory - Rooms 1101-1103; 17 gloveboxes, 2 fume hoods, misc. lab apparatus equipment,

The Mechanical Equipment scope of work for the Equipment Install Package includes the installation of the proposed fume hoods, gloveboxes, and the lab apparatus equipment.

Mechanical equipment scope of work includes all tasks from initial receipt at the RLUOB loading dock through mechanical completion, and includes unloading and inspection, staging from loading dock to final location, assembly, leveling, aligning, and setting of equipment, construction testing. Anchoring of equipment, leak testing and other glovebox / fume hood testing requirements have been included in the mechanical equipment scope.

(Piping)

This scope covers piping bulk commodities. The Piping scope of work for the Equipment Install Packages include the final Laboratory Gas Piping, Process Piping, and Facility Water Distribution Piping system connections and appurtenances. The scope includes piping branches from the "In-Lab Header Install Package" point-of-connection (POC) to the final connection points at the Laboratory Enclosures (e.g. Glove-boxes & Fume Hoods), Laboratory Instrument/Equipment Pieces, and other miscellaneous service equipment as required. The project drawings and specifications

provide a detailed list of the piping services required (e.g., compressed air, deionized water, RLW, etc.)

(Ar, N systems and GB Fire Suppression)

The Scope of Work reflects primarily changes to existing Argon and Nitrogen systems and installing the new glovebox fire suppression system in RLUOB facility. The scope is as follow:

1) Modification to the Argon, Nitrogen, Regen, and P10 systems to add restrictive orifices:

This scope includes installing one (1) restrictive orifice for each of above systems. This work will be performed in XRF & MC Lab-1101-1103.

2) Install new glovebox fire suppression system:

The scope of work is applicable to Lab: XRF & MC Lab-1101-1103. This scope includes installing (62) fire suppression aerosol generators, (7) Potter Convectional Panels, (62) J. boxes, 3,290 LF of 3/4" EMT conduits and 2/#16 AWG wire, including terminations. Included allowance for interface with existing RLUOB Fire Alarm Panel.

NIE

Yellow Net -

Place 3 CAT6a cable to each location in Labs 1101/1102/1103. Place cabling to (2) communication rooms (1018 and 1020) located in the 1st floor area North, and South. Terminate, label and test all cabling at equipment end and field end. Seal all penetrations with proper fire stopping system.

Red Net -

Place 1" IMC conduit from existing 4x4 wire way to new POB locations per design drawings. Place new 6-strand fiber optic to each location from new red room 1015. Terminate, label and test all fiber strands bi-directionally. Submit test results to NIE for PTS approval.

Applicable SOW Reference:

Construction Execution Plan, CMRR-PLAN-00010

CMRR-PLAN-00019, Rev 0, *CMRR Project - REI2 Subproject, Project Execution Plan*