



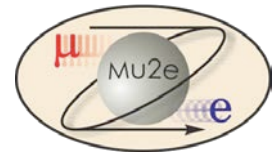
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# Mu2e CD-2 Review: Change Control

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# Change Control - Outline

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- Overview of Process
- Documentation, Procedures, Tools
- Change Thresholds
- Project Controls Tasks
- CR Web Form
- Change Management Database
- CR Detail Reports and Log

# Change Control - Overview

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- Change Process described in Mu2e Configuration Management Plan (DocDB #509)
  - Describes responsibilities of Change Control Board (CCB), Project Management, Project Controls, Configuration Mgr.
- Mechanism for making changes is fully described in Mu2e Change Control Procedure (DocDB #2971)
  - Who does what and when; approval process
- Process uses Web Form for change requests, database to maintain detailed history, P6 & Cobra to update cost and schedule impacts, DocDB to post Change records and log file.

# Change Control Procedure

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- Steps described in Doc #2971:
  - 1. Prepare supporting documentation [CAM]
  - 2. Fill out and submit Change Request (CR) Form [CAM]
  - 3. Enter data into CR database [Config Mgr]
  - 4. Obtain approvals – depends on CR Level [Config Mgr]
  - 5. Update cost & schedule information in P6 & Cobra, and finalize CR database entries [PCL] → *see details next slide*
  - 6. Then actually do the changes...

# Project Controls Activities

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The Project Controls team does the following tasks for each Change Request

- Create CR files in P6 and Cobra
  - P6: copy latest baseline
- Make changes in P6 CR file
  - Do not change historic BCWS
  - Identify changes using coding
- Integrate changed activities into Cobra CR file
- Prepare reports from the CR files identifying schedule and cost impacts to attach to CR package
- When CR is approved, implement the change
  - P6: update baseline and incorporate change into working file
  - Cobra: incorporate change into project file

Summary: Changes are made in a CR copy of the baseline schedule, integrated into a Cobra CR file, and reports issued to identify impacts. Once approved, the change is implemented in P6 and Cobra project files.

# Change Request Levels (Thresholds)

Table 6.0  
Mu2e Project

	L1 Technical, Schedule	L2 Cost Baseline	L3 Control Levels	L4
	Deputy Director for Science Programs	Associate Director of Science for HEP	Federal Project Director*	Fermilab/Mu2e Project Manager
Scope	Any change in scope and /or performance that affects the ability to satisfy the mission need or is not in conformance with the current approved PEP Section 2.1 and PDS.	Any addition to scope as described in PEP section 2.1 or major changes in technology or approach to Level 2 WBS components as shown in Section 2.4.	Major changes in technology or approach to Level 3 WBS components as shown Appendix 2.	Major changes to WBS below Level 3.
Cost	Increase in TPC, TEC, or OPC as shown in Table 2.2.	Any contingency usage over \$5M for a single item or any cumulative change greater than 50% of a Level 2 WBS.**	Cumulative contingency use of \$1M.**	Any change that increases the cost of a single item by more than \$50k.
Schedule	Any change to CD-4 date as shown in Table 2.3.	Any changes to Tier 1 milestone as shown in Table 2.3.	Any changes to Tier 2 milestone shown in Table 2.3.	Any changes to milestones below Tier 2.
Funding		Any changes to funding profile as shown in Section 2.5 that negatively impacts the Performance Baseline.		

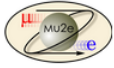
Table from PEP  
(DocDB #1172)

\* Any contingency usage will require the approval by the FPD or Federal personnel. Contingency use up to the \$1M threshold is considered management reserve. This threshold may be reduced at the FPD discretion based on the progress and remaining risks of the project.

\*\* After the cumulative threshold has been reached and the next higher change authority has been notified and has approved the changes, the cumulative cost thresholds will reset.

# Change Request Form

[http://mu2e.fnal.gov/cgi-bin/change\\_request.pl](http://mu2e.fnal.gov/cgi-bin/change_request.pl)



## Mu2e Change Request Form

This form must be used whenever requesting changes to the Project Baseline schedule or cost. Before filling out this form, please post supporting documentation to DocDB. Fields indicated by \* are required. Additional information on the change request procedure is found in the [Change Control Plan](#) in DocDB. See Table I of this document for Change Level thresholds.

Requestor Name: \*  Requestor Email: \*

Change Level (if known):

Change type: \*  Technical  Cost  Schedule  Other (at least one item must be checked)

WBS / Activity ID: \*

WBS Description / Activity Name:

Supporting information found in DocDB number(s): \*  (use comma-separated list if more than one number)

L2 sub-project affected:  (multiple selections can be made using control-click)

- Project
- Accelerator
- Conventional Construction
- Solenoids
- Muon Beamline
- Tracker
- Calorimeter
- Cosmic Ray Veto
- Trigger and DAQ

Form asks for base cost & schedule impacts.  
Submitted form data is emailed to Configuration Manager (CM) with copy to requestor

Brief description: \*

Brief justification: \*

Cost Impact:

Include Rollup M&S cost (\$FY12) before and after change. Include labor resource hours, by type, before and after change. *Before change* numbers should come from the Baseline cost/schedule. while *After change* numbers should be based on the

# Change Control Database

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- MS Access database used as tool to manage changes.
  - Tracks approval status
  - Records cost impact (both Preliminary and Final amounts) by type (M&S or Labor) and by Labor resource
  - Also records schedule impacts by task
  - Prints detailed report for each CR → *see example next slide*
  - Data source is CR form
  - Access file stored in DocDB (#4406), maintained by Configuration Manager
- Summary report of all CRs to date maintained in Change Log (Excel) – DocDB #4600




# Change Request Detail Report



## Mu2e Change Request

Mu2e CR Num [3](#) Date submitted: [8/20/2014](#) Change Level: [4](#)

Requestor: [Frances Leavell](#) Request Status: [Approved](#)

Change_type: <input type="checkbox"/> Cost	WBS: <a href="#">475</a> WBS Description: <a href="#">Mu2e Project</a>
Supporting Documents: <a href="#">4470</a>	Approvals: <input type="checkbox"/> CCB OK: <input type="checkbox"/>  <a href="#">8/29/14</a> Project manager Date Approved
L2 Subprojects: <a href="#">All</a>	

Description: [Routine rate adjustments were made in July 2014 by Finance to more accurately reflect labor fringe and DSC overhead rates. The new rates were applied to the project resources. Cost impact: net decrease of \\$21,549,86.](#)

Justification: [Implementing the new rates provides up-to-date pricing of resources.](#)

### Cost Impacts:

Estimate type	Cost type	Labor resource type	Before amount	After amount	Cost Units
Final	M&S	none	107,025,671	106,434,256	dollars
Final	Labor	various	110,808,408	111,378,273	dollars

### Schedule Impacts:

Task Description	Before			After			Duration units
	Start	End	Duration	Start	End	Duration	
none							

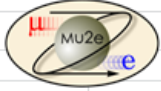
Technical Impact: [None](#)

Risk Impact: [None](#)

This printable form is produced by Access for each CR.

- Stored as PDF in DocDB
- Contains signature box for approvals
- Lists cost, schedule impacts, supporting documents, change type and level, affected L2 subprojects, WBS, justification, technical & risk impacts...

# Change Request Log

	A	B	C	D	E	F	G	H	I	J
1										
2			<b>Mu2e Change Request Log</b>	updated	10/2/2014					
3										
4										
5	<i>CR#</i>	<i>WBS</i>	<i>Description of change</i>	<i>Date Submitted</i>	<i>Level</i>	<i>Cost Impact</i>	<i>Schedule Impact</i>	<i>From Contingency or Mgmt Res Funds</i>	<i>Approval Status</i>	<i>DocDB</i>
6	1	475.03	changes to remote target handling control room	8/20/2013	4	\$ 95,489	none	mgmt reserve	approved	4412
7	2	475.0	Establish internal baseline and incorporate recommendations from Director's Review.	8/8/2014	4	\$ 361,274	9 days	mgmt reserve	approved	4448
8	3	475.0	New rate adjustments for labor fringe and overhead.	8/20/2014	4	\$ (21,550)	none	mgmt reserve	approved	4473
9	4	475.0	Cost leveling; new CD-3c strategy	10/2/2014	4	\$ 500,080	-7 days	mgmt reserve	submitted	4599
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22			Total cost of changes			\$ 935,293				
23										
24			Original Baseline Management Reserve			\$ 1,000,000				
25			Changes			\$ 935,293				
26			Remaining Management Reserve			\$ 64,707				
27										
28			Original Baseline Contingency			\$46,195,957				
29			Changes							
30			Remaining Contingency			\$46,195,957				

- Summary record of all changes
- Tracks contingency and mgmt reserve used