



Muon Campus AIP

Change Request Form

CR#:Cryo027

1) DATE: 7/5/18

2)WBS: Cryo1

3) Originator: Mike Lamm

4) WBS Description of Primary Affected Tasks: Muon Campus Cryogenics - AIP

5) Technical Description & Primary Motivation for Change: The project is behind schedule primary because of delays in getting the Cryo Distribution Box (CDB) fabricated and delivered. This has had a "ripple" down effect of standing army costs in the installation and acceptance, related to this there are costs associated with having to now wait for a down time for the running g-2 experiment before we are able to complete the cryo connections in the MC-1 refrigerator room. It is very unlikely with the present CDB delivery forecast of Sept 2018, we will be able to use the g-2 shutdown window of opportunity to fully cryo commission the Mu2e muon campus cryo line. A smaller problem is that there is inadequate funding in the present project to pay for instrumentation needed to monitor the CDB. We therefore propose to descope the project to not include the cryo testing and acceptance of the cryo line and close the CRYP AIP project once the line is connected and tested (including CDB) at room temperature.

The net effect of this CR is to decrease the budget by \$128,113 with a corresponding increase in contingency.

6) Assessment of Cost Impact (Use attachments if needed): See attached. With the project descopeing, there will be sufficient funds and contingency to complete the project.

7) Assessment of Schedule Impact (Use attachments if needed): New project end date will be in October 2018. There is no impact to the Mu2e Project.

8) Secondary Impact & Other Comments: N/A

9) Approvals:

AIP Project Manager:

Michael / Lamm

Date: 07/05/2018

AIP Project Coordinator:

Mary E. Lamm

Date: 7/5/18

AD Div Director:

Michael Lamm

Date: 7/6/2018

Directorate:

Date: _____

Cryo CR027 Pre CR CAP

Task Code		FY13	FY14	FY15	FY16	FY17	FY18	Cumulative
Cryo1.02.01.01 Cryo AIP General Project Oversight - FY13	Scheduled	\$51,346	\$0	\$0	\$0	\$0	\$0	\$51,346
Cryo1.02.01.02 Cryo AIP General Project Oversight - FY14	Scheduled	\$3,594	\$129,557	\$0	\$0	\$0	\$0	\$133,151
Cryo1.02.01.03 Cryo AIP General Project Oversight - FY15	Scheduled	\$0	\$2,134	\$30,215	\$0	\$0	\$0	\$32,349
Cryo1.02.01.04 Cryo AIP General Project Oversight - FY16	Scheduled	\$0	\$0	\$3,821	\$170,506	\$0	\$0	\$174,327
Cryo1.02.01.05 Cryo AIP General Project Oversight - FY17	Scheduled	\$0	\$0	\$0	\$5,329	\$164,828	\$0	\$170,158
Cryo1.02.01.07 Cryo AIP Gen Proj OS - FY15 Supp	Scheduled	\$0	\$0	\$74,049	\$0	\$0	\$0	\$74,049
Cryo1.02.01.09 Cryo AIP General Project OS - FY18	Scheduled	\$0	\$0	\$0	\$0	\$0	\$27,234	\$27,234
Cryo1.02.01.10 Cryo Final Safety Documents	Scheduled	\$0	\$0	\$0	\$0	\$44,594	\$1,305	\$45,898
Cryo1.03 Cryo Basic Engineering	Scheduled	\$33,094	\$236,083	\$0	\$0	\$0	\$0	\$269,177
Cryo1.04.01 LN2 system	Scheduled	\$4,515	\$409,014	\$0	\$0	\$0	\$0	\$413,529
Cryo1.04.02 Gas management system	Scheduled	\$57,842	\$178,224	\$0	\$0	\$0	\$0	\$236,066
Cryo1.04.03 DDH system	Scheduled	\$0	\$49,758	\$0	\$0	\$0	\$0	\$49,758
Cryo1.04.04 Cryo Refrigerator system	Scheduled	\$149,077	\$1,134,056	\$152,524	\$0	\$0	\$0	\$1,435,657
Cryo1.04.05 Cryo Compressor System	Scheduled	\$59,453	\$367,139	\$0	\$0	\$0	\$0	\$426,592
Cryo1.04.06 Cryo Interconnect Piping	Scheduled	\$225,595	\$512,339	\$0	\$0	\$0	\$0	\$737,934
Cryo1.04.07 Cryo Interconnect Electrical & Controls	Scheduled	\$46,627	\$119,526	\$0	\$0	\$0	\$0	\$166,154
Cryo1.04.08 Cryogenic Fluids	Scheduled	\$0	\$0	\$261,858	\$0	\$0	\$0	\$261,858
Cryo1.05.01 M42e Interface Connection	Scheduled	\$0	\$70,814	\$320,085	\$704,423	\$127,069	\$15,893	\$1,238,284
Cryo1.05.02 g-2 Interface connection	Scheduled	\$27,199	\$0	\$0	\$0	\$0	\$0	\$27,199
Cryo1.06 Cryo Safety Documents	Scheduled	\$0	\$155,311	\$0	\$0	\$0	\$0	\$155,311
Cryo1.07 Testing/Checkout	Scheduled	\$0	\$0	\$65,416	\$0	\$38,255	\$31,876	\$135,547
Cryo1.08 Cryo g-2 Acceptance Tests	Scheduled	\$0	\$11,969	\$102,502	\$0	\$0	\$0	\$114,471
Cryo1.09 Cryo M42e Acceptance Tests	Scheduled	\$0	\$0	\$0	\$0	\$0	\$99,664	\$99,664
Cryo1.10 Cryo Distribution Box (CDB)	Scheduled	\$0	\$0	\$322,704	\$1,105,007	\$512,957	\$240,125	\$2,180,792
Cryo1.14 MC-1 Refrigerator Upgrades	Scheduled	\$0	\$0	\$0	\$155,882	\$135,227	\$0	\$291,109
Grand Total	Scheduled	\$658,342	\$3,375,924	\$1,333,174	\$2,141,148	\$1,022,929	\$416,097	\$8,947,614

Cryo CR027 Post CR CAP

Task Code		FY13	FY14	FY15	FY16	FY17	FY18	FY19	Cumulative
Cryo1.02.01.01 Cryo AIP General Project Oversight - FY13	Scheduled	\$51,346	\$0	\$0	\$0	\$0	\$0	\$0	\$51,346
Cryo1.02.01.02 Cryo AIP General Project Oversight - FY14	Scheduled	\$3,594	\$129,557	\$0	\$0	\$0	\$0	\$0	\$133,151
Cryo1.02.01.03 Cryo AIP General Project Oversight - FY15	Scheduled	\$0	\$2,134	\$30,215	\$0	\$0	\$0	\$0	\$32,349
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Cryo1.02.01.07 Cryo AIP Gen Proj OS - FY15 Supp	Scheduled	\$0	\$0	\$74,049	\$0	\$0	\$0	\$0	\$74,049
Cryo1.02.01.09 Cryo AIP General Project OS - FY18	Scheduled	\$0	\$0	\$0	\$0	\$0	\$27,234	\$0	\$27,234
Cryo1.02.01.10 Cryo Final Safety Documents	Scheduled	\$0	\$0	\$0	\$0	\$44,594	\$1,305	\$0	\$45,898
Cryo1.02.01.11 Cryo AIP Gen Proj OS - FY18 Suppl	Scheduled	\$0	\$0	\$0	\$0	\$0	\$28,517	\$0	\$28,517
Cryo1.03 Cryo Basic Engineering	Scheduled	\$33,094	\$236,083	\$0	\$0	\$0	\$0	\$0	\$269,177
Cryo1.04.01 LN2 system	Scheduled	\$4,515	\$409,014	\$0	\$0	\$0	\$0	\$0	\$413,529
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Cryo1.04.03 ODH system	Scheduled	\$0	\$49,758	\$0	\$0	\$0	\$0	\$0	\$49,758
Cryo1.04.04 Cryo Refrigerator system	Scheduled	\$149,077	\$1,134,056	\$152,524	\$0	\$0	\$0	\$0	\$1,435,657
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Cryo1.06 Cryo Safety Documents	Scheduled	\$0	\$155,311	\$0	\$0	\$0	\$0	\$0	\$155,311
Cryo1.07 Testing/Checkout	Scheduled	\$0	\$0	\$65,416	\$0	\$38,255	(\$39,847)	\$0	\$63,824
Cryo1.08 Cryo #2 Acceptance Tests	Scheduled	\$0	\$11,969	\$102,502	\$0	\$0	\$0	\$0	\$114,471
Cryo1.09 Cryo MuZe Acceptance Tests	Scheduled	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cryo1.10 Cryo Distribution Box (CDB)	Scheduled	\$0	\$0	\$322,704	\$1,105,007	\$512,957	\$108,408	\$146,473	\$2,195,549
Cryo1.14 MC-1 Refrigerator Upgrades	Scheduled	\$0	\$0	\$0	\$155,882	\$135,227	\$0	\$0	\$291,109
Grand Total	Scheduled	\$658,342	\$3,375,924	\$1,333,174	\$2,141,148	\$1,022,929	\$141,510	\$146,473	\$8,819,501

CR027 Schedule Changes

UID	WBS	Name	Start	Finish	Comments
1	Cry01	Muon Campus Cryogenics - AIP	6/3/13	10/12/18	
2777	Cry01.01	Cryo AIP Milestones	6/3/13	10/12/18	
2778	Cry01.01.01	Cryo AIP Management Milestones	6/3/13	10/12/18	
2784	Cry01.01.01.04	Finish Cryo AIP Project	10/12/18	10/12/18	New baseline dates
2787	Cry01.01.02	Interface milestones	1/8/14	6/1/18	
2791	Cry01.01.02.05	Cryo Mu2e Distribution Box Cold (Mu2e Interface) ** Deleted **	6/1/18	6/1/18	Task deleted
2804	Cry01.01.03	Project Plan Milestones	6/17/13	10/12/18	
2991	Cry01.01.03.06	Transfer Line MC1 - MC2 Installed	8/15/18	8/15/18	New baseline dates
2990	Cry01.01.03.07	Mu2e Cryo Distribution Box Delivered	9/24/18	9/24/18	New baseline dates
2802	Cry01.01.03.08	Mu2e Acceptance Tests Complete ** Deleted **	6/1/18	6/1/18	Task deleted
2803	Cry01.01.03.09	Project Complete	10/12/18	10/12/18	New baseline dates
829	Cry01.02	Cryo Project Management	6/17/13	9/28/18	
2761	Cry01.02.01	General Project OS	6/17/13	9/28/18	
3022	Cry01.02.01.11	Cryo AIP Gen Proj OS - FY18 Suppl	6/1/18	9/28/18	New task
840	Cry01.05	Cryo Experiment interfaces	8/19/13	8/15/18	
1456	Cry01.05.01	Mu2e Interface Connection	5/22/14	8/15/18	
2531	Cry01.05.01.21	Mu2e is connected	8/15/18	8/15/18	New baseline dates
2831	Cry01.07	Testing/Checkout	10/22/14	6/1/18	
2824	Cry01.07.02	Mu2e Cryo Checkout ** Deleted **	6/1/18	6/1/18	Task deleted
2837	Cry01.07.03	Mu2e ORC ** Deleted **	6/1/18	6/1/18	Task deleted
2972	Cry01.09	Mu2e Acceptance Tests	6/1/18	6/1/18	
2611	Cry01.09.01	Cryo Mu2e Acceptance Tests ** Deleted **	6/1/18	6/1/18	Task deleted
2937	Cry01.10	Cryo Distribution Box (CDB)	4/15/15	10/12/18	
2962	Cry01.10.03	Procurement and Fabrication of CDB	2/1/16	10/12/18	
2954	Cry01.10.03.10	Vendor Ship CDB to Fermilab	9/14/18	9/14/18	New baseline dates
2953	Cry01.10.03.13	Fermi Perform safety review of CDB	9/17/18	9/17/18	New baseline dates
2952	Cry01.10.03.14	Acceptance tests at Fermilab	9/24/18	10/12/18	New baseline dates
2951	Cry01.10.03.15	CDB received and accepted	10/12/18	10/12/18	New baseline dates
2970	Cry01.10.04	Ancillary Components	4/15/15	8/24/18	
3017	Cry01.10.04.07	Procure CDB Instrumentation	6/1/18	8/24/18	New scope
3020	Cry01.10.04.11	TL from Helium dewar to CDB for acceptance test ** Deleted **	6/1/18	6/1/18	Task deleted
2823	Cry01.13	Mu2e Checkout complete ** Deleted **	6/1/18	6/1/18	Task deleted

CR027 Labor Delta

UID	WBS	Name	New Hours	Old Hours	Hrs Delta	Comments
	1 Cryo1	Muon Campus Cryogenics - AIP	36763	38194	(1431)	
	829 Cryo1.02	Cryo Project Management	3179	3060	119	
	2761 Cryo1.02.01	General Project OS	3179	3060	119	
	3022 Cryo1.02.01.11	Cryo AIP Gen Proj OS - FY18 Suppl	119	0	119	New task
		FNAD_AC_EXP_PHYST	17	0	17	
		FNTD_CRYO_SR	68	0	68	
		FNTD_PRI_MNGR	34	0	34	
	2831 Cryo1.07	Testing/Checkout	620	1240	(620)	
	2824 Cryo1.07.02	MuZe Cryo Checkout **Deleted**	0	620	(620)	Task deleted
		FNPD_CRYO_EN	0	260	(260)	
		FNPD_CRYO_TECH	0	360	(360)	
	2972 Cryo1.09	MuZe Acceptance Tests	0	686	(686)	
	2611 Cryo1.09.01	Cryo MuZe Acceptance Tests ** Deleted **	0	686	(686)	Task deleted
		FNPD_CRYO_EN	0	243	(243)	
		FNPD_CRYO_TECH	0	443	(443)	
	2937 Cryo1.10	Cryo Distribution Box (CDB)	5507	5751	(244)	
	2970 Cryo1.10.04	Ancillary Components	1505	1749	(244)	
	3017 Cryo1.10.04.07	Procure CDB Instrumentation	0	144	(144)	Revised scope
		FNPD_MECH_ASMBY_TECH	0	40	(40)	
		FNTD_WELDER	0	16	(16)	
		FNPD_MECH_DESIGN_EN	0	72	(72)	
		FNPD_MECH_DESIGNER	0	16	(16)	
	3020 Cryo1.10.04.11	TL from Helium dewar to CDB for acceptance test **Deleted**	0	100	(100)	Task deleted
		FNPD_MECH_ASMBY_TECH	0	40	(40)	
		FNTD_WELDER	0	20	(20)	
		FNPD_MECH_DESIGN_EN	0	20	(20)	
		FNPD_MECH_DESIGNER	0	20	(20)	

Cryo CR027 Material Delta

UID	WBS	Name	New M&S	Old M&S	M&S Delta	Comments
1	Cryo1	Muon Campus Cryogenics - AIP	\$3,640,961	\$3,677,261	(\$36,300)	
829	Cryo1.02	Cryo Project Management	\$157,998	\$154,998	\$3,000	
2761	Cryo1.02.01	General Project OS	\$157,998	\$154,998	\$3,000	
3022	Cryo1.02.01.11	Cryo AIP Gen Proj OS - FY18 Suppl	\$3,000	\$0	\$3,000	New task
2972	Cryo1.09	MuZe Acceptance Tests	\$0	\$16,800	(\$16,800)	
2611	Cryo1.09.01	Cryo MuZe Acceptance Tests ** Deleted **	\$0	\$16,800	(\$16,800)	Task deleted
2937	Cryo1.10	Cryo Distribution Box (CDB)	\$1,227,738	\$1,250,238	(\$22,500)	
2970	Cryo1.10.04	Ancillary Components	\$312,542	\$335,042	(\$22,500)	
3017	Cryo1.10.04.07	Procure CDB Instrumentation	\$22,500	\$40,000	(\$17,500)	Added scope
3020	Cryo1.10.04.11	TL from Helium dewar to CDB for acceptance test ** Deleted **	\$0	\$5,000	(\$5,000)	Task deleted