



Muon Campus AIP

Change Request Form

CR#: Cryo019

1) DATE: 8/4/16

2) WBS: Cryo1

3) Originator: Ken Domann

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

5) Technical Description & Primary Motivation for Change: A room temperature helium gas delivery and return line is needed for the initial Mu2e magnet cool down. This scope was overlooked in the project planning but is essential for the Mu2e cryogenic system operation. To compensate for this increase in scope, two tasks from the "refrigerator upgrades" are removed. The net effect is to reduce the budget by \$38,352 with a corresponding increase in contingency.

6) Assessment of Cost Impact (Use attachments if needed): See attached.

7) Assessment of Schedule Impact (Use attachments if needed): See attached. No impact on milestones.

8) Secondary Impact & Other Comments: N/A

9) Approvals:

AIP Project Manager:

Date: 8/8/2016

AIP Project Coordinator:

Date: 8/18/2016

AD Div Director:

Date: _____

Directorate:

Date: _____

Cryo CR019 Labor Delta

UID	WBS	Name	New Hours	Old Hours	Delta Hours	Comment
1	Cryo1	Muon Campus Cryogenics - AIP	37,611.00	36,841.00	770.00	
840	Cryo1.05	Cryo Experiment Interfaces	7,559.00	6,591.00	968.00	
1456	Cryo1.05.01	Muze Interface Connection	7,389.00	6,421.00	968.00	
3010	Cryo1.05.01.17	Muze Interface - Install Helium Gas Lines between MC-1 and N	645.00	0.00	645.00	New activity
		FNPD_CRYO_EN	45.00	0.00	45.00	
		FNPD_CRYO_TECH	600.00	0.00	600.00	
2999	Cryo1.14	MC-1 Refrigerator Upgrades	2,203.00	2,401.00	(198.00)	
3008	Cryo1.14.09	Install Adjuster Nut on all Engine Valves *** Deleted ***	0.00	30.00	(30.00)	Activity Deleted
		FNPD_CRYO_EN	0.00	6.00	(6.00)	
		FNPD_CRYO_TECH	0.00	24.00	(24.00)	
3009	Cryo1.14.10	Replace all BC Valve Actuators *** Deleted ***	0.00	168.00	(168.00)	Activity Deleted
		FNPD_CRYO_EN	0.00	24.00	(24.00)	
		FNPD_CRYO_TECH	0.00	144.00	(144.00)	

Cryo CR019 Material Delta

UID	WBS	Name	New M&S	Old M&S	Delta	Comment
1	Cryo1	Muon Campus Cryogenics - AIP	\$3,507,065	\$3,565,205	(\$58,140)	
840	Cryo1.05	Cryo Experiment Interfaces	\$317,581	\$297,581	\$20,000	
1456	Cryo1.05.01	Mu2e Interface Connection	\$317,581	\$297,581	\$20,000	
3010	Cryo1.05.01.17	Mu2e Interface - Install Helium Gas Lines between MC-1 and MC-2	\$20,000	\$0	\$20,000	New activity
2999	Cryo1.14	MC-1 Refrigerator Upgrades	\$47,500	\$125,640	(\$78,140)	
3007	Cryo1.14.08	Instrument Air Pipeline	\$3,600	\$9,000	(\$5,400)	
3008	Cryo1.14.09	Install Adjuster Nut on all Engine Valves *** Deleted ***	\$0	\$24,000	(\$24,000)	Activity Deleted
3009	Cryo1.14.10	Replace all BC Valve Actuators *** Deleted ***	\$0	\$48,690	(\$48,690)	Activity Deleted

Cryo CR019 Schedule Information

UID	WBS	Name	Start	Finish	Comments
1	Cryo1	Muon Campus Cryogenics - AIP	6/3/13	7/6/17	
840	Cryo1.05	Cryo Experiment Interfaces	8/19/13	5/9/17	
1456	Cryo1.05.01	Muze Interface Connection	5/22/14	5/9/17	
3010	Cryo1.05.01.17	Muze Interface - Install Helium Gas Lines between MC-1 and MC-2	7/28/16	10/31/16	New activity
2999	Cryo1.14	MC-1 Refrigerator Upgrades	7/1/16	12/1/16	
3000	Cryo1.14.01	Dampen noisy instrument signals in PLC	8/1/16	9/30/16	New start and finish dates
3001	Cryo1.14.02	Display all Muze Refrigerator Variables in FIX	8/1/16	9/30/16	New start date
3002	Cryo1.14.03	Callb all Cryo Instrmts, incl Charg VPTs, Trans, Gauges, Check Callb on Thermometry, Flow Meters, etc.	8/1/16	12/1/16	New start and finish dates
3003	Cryo1.14.04	Inst Press Trace Cables for all Engines, Wired to an Oscill w/Select Switch	8/1/16	9/30/16	New start date
3004	Cryo1.14.05	Correct all Control Loops, Fix Feedback, Retune, 26 Loops for Compressors & One Refrig	9/1/16	12/1/16	New start and finish dates
3005	Cryo1.14.06	Instl Block & Bypass Valves for Purifier, Allow Temp Instl of Mobile Purifier	8/1/16	12/1/16	New start and finish dates
3006	Cryo1.14.07	Move Nitrogen Gas Pipe	9/1/16	12/1/16	New finish date
3007	Cryo1.14.08	Instrument Air Pipeline	7/28/16	10/31/16	New start and finish dates
3008	Cryo1.14.09	Install Adjuster Nut on all Engine Valves *** Deleted ***	7/1/16	7/29/16	Activity deleted
3009	Cryo1.14.10	Replace all BC Valve Actuators *** Deleted ***	7/1/16	7/29/16	Activity deleted

Cryo CR019 Pre CR CAP

Control Account,WBS (4)	Resource,TYPE	Results	FY12	FY13	FY14	FY15	FY16	FY17	Cumulative
Cryo1.02.01.01 Cryo AIP General Project Oversight - FY13	Scheduled	0.00	51,346.42	0.00	0.00	0.00	0.00	0.00	51,346.42
Cryo1.02.01.02 Cryo AIP General Project Oversight - FY14	Scheduled	0.00	3,594.06	129,557.05	0.00	0.00	0.00	0.00	133,151.10
Cryo1.02.01.03 Cryo AIP General Project Oversight - FY15	Scheduled	0.00	0.00	2,134.07	30,214.73	0.00	0.00	0.00	32,348.80
Cryo1.02.01.04 Cryo AIP General Project Oversight - FY16	Scheduled	0.00	0.00	0.00	3,820.92	170,506.37	0.00	0.00	174,327.29
Cryo1.02.01.05 Cryo AIP General Project Oversight - FY17	Scheduled	0.00	0.00	0.00	0.00	5,329.44	165,459.60	170,789.04	
Cryo1.02.01.07 Cryo AIP Gen Proj OS - FY15 Supp	Scheduled	0.00	0.00	0.00	0.00	74,049.03	0.00	74,049.03	
Cryo1.03 Cryo Basic Engineering	Scheduled	0.00	33,093.96	236,082.70	0.00	0.00	0.00	269,176.66	
Cryo1.04.01 LN2 system	Scheduled	0.00	4,514.95	409,013.92	0.00	0.00	0.00	413,528.87	
Cryo1.04.02 Gas management system	Scheduled	0.00	57,841.53	178,224.26	0.00	0.00	0.00	236,065.78	
Cryo1.04.03 ODH system	Scheduled	0.00	49,757.63	0.00	0.00	0.00	0.00	49,757.63	
Cryo1.04.04 Cryo Refrigerator system	Scheduled	0.00	149,077.19	1,134,055.74	152,524.20	0.00	0.00	1,435,657.13	
Cryo1.04.05 Cryo Compressor System	Scheduled	0.00	59,453.27	367,138.94	0.00	0.00	0.00	426,592.21	
Cryo1.04.06 Cryo Interconnect Piping	Scheduled	0.00	225,594.62	512,339.28	0.00	0.00	0.00	737,933.91	
Cryo1.04.07 Cryo Interconnect Electrical & Controls	Scheduled	0.00	46,627.36	119,526.30	0.00	0.00	0.00	166,153.66	
Cryo1.04.08 Cryogenic Fluids	Scheduled	0.00	0.00	0.00	261,857.93	0.00	0.00	261,857.93	
Cryo1.05.01 Muze Interface Connection	Scheduled	0.00	0.00	70,813.93	320,085.24	646,830.81	70,325.02	1,108,055.00	
Cryo1.05.02 g-2 interface connection	Scheduled	0.00	27,198.92	0.00	0.00	0.00	0.00	27,198.92	
Cryo1.06 Cryo Safety Documents	Scheduled	0.00	0.00	155,311.42	0.00	0.00	0.00	155,311.42	
Cryo1.07 Testing/Checkout	Scheduled	0.00	0.00	0.00	65,416.12	0.00	70,041.98	135,458.10	
Cryo1.08 Cryo g-2 Acceptance Tests	Scheduled	0.00	0.00	11,968.50	102,502.33	0.00	0.00	114,470.83	
Cryo1.09 Cryo Muze Acceptance Tests	Scheduled	0.00	0.00	0.00	0.00	0.00	97,077.96	97,077.96	
Cryo1.10 Cryo Distribution Box (CDB)	Scheduled	0.00	0.00	0.00	322,703.66	1,105,006.77	587,613.14	2,015,323.58	
Cryo1.14 MC-1 Refrigerator Upgrades	Scheduled	0.00	0.00	0.00	0.00	138,519.18	277,168.34	415,687.52	
Grand Total	Scheduled	0.00	658,342.28	3,375,923.74	1,333,174.17	2,066,192.57	1,267,686.03	8,701,318.80	

Cryo CR019 Post CR CAP

Control Account,WBS (4)	Resource,TYPE	Results	FY12	FY13	FY14	FY15	FY16	FY17	Cumulative
Cryo1.02.01.01 Cryo AIP General Project Oversight - FY13	Scheduled	0.00	51,346.42	0.00	0.00	0.00	0.00	0.00	51,346.42
Cryo1.02.01.02 Cryo AIP General Project Oversight - FY14	Scheduled	0.00	3,594.06	129,557.05	0.00	0.00	0.00	0.00	133,151.10
Cryo1.02.01.03 Cryo AIP General Project Oversight - FY15	Scheduled	0.00	0.00	2,134.07	30,214.73	0.00	0.00	0.00	32,348.80
Cryo1.02.01.04 Cryo AIP General Project Oversight - FY16	Scheduled	0.00	0.00	0.00	3,820.92	170,506.37	0.00	0.00	174,327.29
Cryo1.02.01.05 Cryo AIP General Project Oversight - FY17	Scheduled	0.00	0.00	0.00	0.00	5,329.44	165,459.60	170,789.04	170,789.04
Cryo1.02.01.07 Cryo AIP Gen Proj OS - FY15 Supp	Scheduled	0.00	0.00	0.00	74,049.03	0.00	0.00	74,049.03	74,049.03
Cryo1.03 Cryo Basic Engineering	Scheduled	0.00	33,093.96	236,082.70	0.00	0.00	0.00	269,176.66	269,176.66
Cryo1.04.01 LN2 system	Scheduled	0.00	4,514.95	409,013.92	0.00	0.00	0.00	413,528.87	413,528.87
Cryo1.04.02 Gas management system	Scheduled	0.00	57,841.53	178,224.26	0.00	0.00	0.00	236,065.78	236,065.78
Cryo1.04.03 ODH system	Scheduled	0.00	0.00	49,757.63	0.00	0.00	0.00	49,757.63	49,757.63
Cryo1.04.04 Cryo Refrigerator system	Scheduled	0.00	149,077.19	1,134,055.74	152,524.20	0.00	0.00	1,435,657.13	1,435,657.13
Cryo1.04.05 Cryo Compressor System	Scheduled	0.00	59,453.27	367,138.94	0.00	0.00	0.00	426,592.21	426,592.21
Cryo1.04.06 Cryo Interconnect Piping	Scheduled	0.00	225,594.62	512,339.28	0.00	0.00	0.00	737,933.91	737,933.91
Cryo1.04.07 Cryo Interconnect Electrical & Controls	Scheduled	0.00	46,627.36	119,526.30	0.00	0.00	0.00	166,153.66	166,153.66
Cryo1.04.08 Cryogenic Fluids	Scheduled	0.00	0.00	0.00	261,857.93	0.00	0.00	261,857.93	261,857.93
Cryo1.05.01 Muze Interface Connection	Scheduled	0.00	0.00	70,813.93	320,085.24	704,422.87	97,344.65	1,192,666.69	1,192,666.69
Cryo1.05.02 g-2 interface connection	Scheduled	0.00	27,198.92	0.00	0.00	0.00	0.00	27,198.92	27,198.92
Cryo1.06 Cryo Safety Documents	Scheduled	0.00	0.00	155,311.42	0.00	0.00	0.00	155,311.42	155,311.42
Cryo1.07 Testing/Checkout	Scheduled	0.00	0.00	0.00	65,416.12	0.00	70,041.98	135,458.10	135,458.10
Cryo1.08 Cryo g-2 Acceptance Tests	Scheduled	0.00	0.00	11,968.50	102,502.33	0.00	0.00	114,470.83	114,470.83
Cryo1.09 Cryo Muze Acceptance Tests	Scheduled	0.00	0.00	0.00	0.00	0.00	97,077.96	97,077.96	97,077.96
Cryo1.10 Cryo Distribution Box (CDB)	Scheduled	0.00	0.00	0.00	322,703.66	1,105,006.77	587,613.14	2,015,323.58	2,015,323.58
Cryo1.14 MC-1 Refrigerator Upgrades	Scheduled	0.00	0.00	0.00	0.00	155,882.14	136,842.09	292,724.23	292,724.23
Grand Total	Scheduled	0.00	658,342.28	3,375,923.74	1,333,174.17	2,141,147.60	1,154,379.41	8,662,967.21	8,662,967.21