12GeV Commissioning and Initial Physics Plans

Arne Freyberger Operations Dept. Accelerator Division JLAB

December 14, 2011



^{nem} Arne Freyberger Operati12GeV Commissioning and Initial Phy December14, 2011



Outline





efferson Lab Arne Freyberger Operati12GeV Commissioning and Initial Phy December14, 2011 2



6MSD Lessons

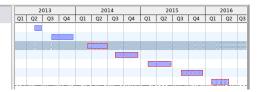
What can we learn from the 6MSD in regards to 12GeV commissioning and the initial physics program?

- Potential for damaging (destroying) equipment is non-zero.
- Impact of the loss of beam line components can be large in terms of scheduling and waiting for repaired components.
 - There will be a need to be flexible the first few years has the weakest elements are flushed out of the system.
- Machine will be a challenge to commission and understand.
- Beam Quality may not be completely under control.
 - C100 for example
 - Pathlength



12 GeV Strawman

Task	Duration
🕀 🚾 Spring 2013 Run	42
🕀 ங Fall 2013 Run	122.9
🕀 😎 Spring 2014 Run	112
🕀 ங Fall 2014 Run	130
🗉 🗾 Spring 2015 Run	133
🕀 🗾 Fall 2015 Run	123
🖲 🚾 Spring 2016 Run	98



- Assumes 12 month shutdown (might be longer)
- Assumes 35 weeks of operation per Fiscal Year (might be less)
- Assumes 2 run periods per year (Spring/Fall) (might be more efficient to have one long run period Sept→May).



12 GeV Generic Strawman

Task	Durati			2	013			20	14			20	015
Task	Durati	on	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q
🗉 🚾 Accelerator Run I	l	42		-	,								
🗉 ங Accelerator Run II	1	122.9			-								
🗉 ங Accelerator Run III		112					-	_					
🗄 ங Accelerator Run IV		130							-				
🕀 ங Physics Run I		133									-	_	
🕀 ங Physics Run II		123											
🕀 ங Physics Run III		98	8										

Same plan with names that aren't tied to dates.

2016

01 Q2 Q3

Q3 Q4

- There is a possibility of Physics during the later Accelerator runs.
- Lets walk through this one run at a time.

Accelerator Run |

Task	Durati			2	013			20	14			20	15		1	2016	
Task	Durati	on	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
🗉 🔁 Accelerator Run I	1	42			•												
🕀 ங Accelerator Run II	1	122.9			-												
🗉 ங Accelerator Run III	1 C C C C C C C C C C C C C C C C C C C	112							,								
🕀 ங Accelerator Run IV		130							-								
🕀 🎫 Physics Run I		133									-	_	,				
🕀 ங Physics Run II		123											-				
🕀 ங Physics Run III		98	8												-	_	

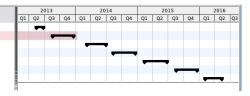
Duration 6 weeks

- Goal 1-pass spin up, with RF at 2.2 GeV per pass
- Risks RF and Magnets....
- Physics No!



Accelerator Run II

Task	Duration	
🐵 🚾 Accelerator Run I	I	42
🕀 ங Accelerator Run II	(1	22.9
🕀 ங Accelerator Run III	1	112
🕀 ங Accelerator Run IV		130
🕀 ங Physics Run I	1	133
🕀 ங Physics Run II		123
Physics Run III	1	98



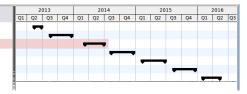
Duration 17.5 weeks

- Goal 3-pass spin up, with a stretch gold of 5.5 pass spin up. Magnet and beam transport characterization.
- Issues Pathlength system will restrict energy configuration. Injector C100 must be installed before this run.
- Physics Beam to Hall-A, 1wk for detector checkout.



Accelerator Run III

Task	Duration	
e 🔁 Accelerator Run I	1 4	12
🗄 ங Accelerator Run II	ı 122	.9
🗉 🔁 Accelerator Run III	(13	12
🗄 ங Accelerator Run IV	(13	30
🗄 ங Physics Run I	(13	33
🗄 ங Physics Run II	(13	23
🗉 ங Physics Run III		98



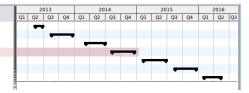
Duration 16 weeks

- Goal 1/2/3 pass separation, Beam to Hall-D, 5.5pass beam characterization. 12GeV beam.
- Issues Need upgraded doglegs (pathlength) for this run.
- Physics Beam to Hall-D, 3wk for transport tests. Hall-A physics (passes 1/2/3) if separators work and beam quality acceptable?



Accelerator Run IV

Task	Duratio	on
e 🗾 Accelerator Run I	t.	42
🖲 ங Accelerator Run II	1	122.9
🗉 ங Accelerator Run III	4	112
🗉 🔁 Accelerator Run IV	1	130
🖲 🗾 Physics Run I	1	133
🖲 ங Physics Run II		123
🕀 ங Physics Run III		98



Duration 18.6 weeks

Goal 2-hall operations, First beam to B&C, B&C transport characterization, 4&5 pass separation(at end of run).

Issues Separators, physics quality beam?

Physics Hall-A engineering/Physics run (passes 1/2/3), B&C detector tests,



Task	Durati			2	013			20	14			20	15			2016	
Task	Duratio	DN	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
🗉 🔁 Accelerator Run I	t	42		-	,												
🕀 ங Accelerator Run II	t.	122.9			-												
🗉 🚾 Accelerator Run III	1 C	112							,								
🗄 ங Accelerator Run IV		130							-								
🕀 🔁 Physics Run I	1	133									-	_	,				
🕀 ங Physics Run II	1	123															
🖲 🔜 Physics Run III		98	8												-	_	
			1													z	

Duration 19 weeks

- Goal Beam optics procedure finalization, 3-hall operation
- Issues Hopefully fewer than last run.
- Physics Hall-D engineering run, Hall-A Physics, Hall-B/C?



Task	Durati			2	013			20	14			20	15		1	2016	
Task	Durati	on	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
🗉 🔁 Accelerator Run I	t	42		-	,												
🗉 ங Accelerator Run II	t.	122.9			-												
e ங Accelerator Run III	1 C C C C C C C C C C C C C C C C C C C	112						_	,								
e ங Accelerator Run IV		130							-								
🗈 🗾 Physics Run I		133									-	_	,				
e 🔁 Physics Run II		123											-	-			
🕀 ங Physics Run III	1	98	8												-	-	

Duration 17.6 weeks

- Goal 3-hall operation, 5-pass capable
- Issues Hopefully fewer than last run.
- Physics Hall-A Physics, Hall B&C engineering runs



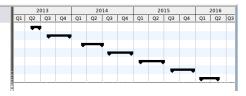
Task	Durati			2	013			20	14			20	15			2016	
Task	Durati	on	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
🐵 ங Accelerator Run I	t	42		-	,												
🗉 ங Accelerator Run II	t.	122.9			-												
🗄 ங Accelerator Run III	1 C	112															
🕀 ங Accelerator Run IV		130							-								
🕀 ங Physics Run I		133									-	_	,				
🕀 ங Physics Run II		123											-				
🗉 🔁 Physics Run III	1	98													-	-	

Duration 14 weeks

- Goal 3-hall operation, 5-pass capable
- Issues Hopefully fewer than last run.
- Physics Physics in all halls



Task	Durat	ion
🗉 薲 Accelerator Run I	l.	42
🗉 📆 Accelerator Run II	(122.9
🗉 冠 Accelerator Run III		112
e ங Accelerator Run IV		130
e 赋 Physics Run I	1 C	133
🗄 🔜 Physics Run II		123
🗉 🎫 Physics Run III		98



- This is the baseline plan, based on
 - A 12 month shutdown
 - 35 wks of operation per year
 - Two 17.5'ish run periods per year, with 8.5'ish *downs* between runs.
- It will be changed to accommodate reality
- Hall-A Physics optimistically could occur in Accelerator Run III, but Run IV is probably more realistic.

