MEMORANDUM

Date: December 13, 2016
To: Distribution
From: Rolf Ent and Arne Freyberger for the Nuclear Physics Experiment Scheduling Committee
Subject: Accelerator Schedule through December 2017

Schedule

Attached is the accelerator operations schedule through December 2017. It has also been posted at http://www.jlab.org/div_dept/physics_division/experiments/schedule.html.

The operations schedule is based on expected fiscal 2017 and 2018 funding, remaining 12 GeV project requirements in Hall B & C, and, consequently, may be subject to further adjustments due to actual funding and the remaining 12 GeV project tasks. Our previous expectations for 2017 were that we could operate the accelerator for physics from early February to early May, followed by a short summer running for experiments requiring non-standard energy per pass settings and with a total machine energy of less than 6 GeV. Fall had halls B and C going through their engineering run (Hall B) and commissioning experiments. Hall A would have executed two more ^{3}H experiments to complete the block of four experiments (the other two would have taken place in Spring and Summer 2017). A Continuing Resolution budget for fiscal 2017 (October 1, 2016 – September 31, 2016), as is the present situation, cannot support the number of weeks of accelerator operations for physics on which the above schedule was built. We will focus instead our resources during Spring 2017 on operating the accelerator to demonstrate the Key Performance Parameters of Halls B and C as required by the 12 GeV project schedule. With the completion of the GlueX engineering run, GlueX in Hall D will begin its first physics production phase. There is an additional goal for Spring 2017 - to fully exercise multi-hall RF separation with high loading in the machine in preparation for Fall 2017. A combination of Hall D and a “Ping-Pong” of Halls A and C will be used to provide two halls for these studies. There will be no summer run. Fall has the start of the ^{3}H program in Hall A, Hall B has an engineering run followed by the commissioning experiment (part of run Group A). Hall C will calibrate the Super High Momentum Spectrometer (SHMS), recommission the High Momentum spectrometer (HMS) and follow with the set of commissioning experiments chosen by Hall C. Hall D will continue the GlueX run started in the Spring. The schedule has been reviewed and approved by the Director.

The Jefferson Lab Nuclear Physics Experiment Scheduling Committee developed the schedule. Committee members are: Volker Burkert, Eugene Chudakov, Rolf Ent (Co-Chair), Arne Freyberger (Co-Chair), Javier Gomez, Cynthia Keppel, Robert McKeown, Fulvia Pilat, Matt Poelker, Patrizia Rossi and Mike Spata.

Supplementary Information

Accelerator

The accelerator portion of the 12 GeV Upgrade was completed with the acceptance of the project CD-4A deliverables at the end of 2014. The beam time between achieving the project goals and the present has been utilized to transition the gap from project goals to supporting physics quality beams. Supporting the physics program means delivering beams with acceptable quality at the parameters required for the experimental program with an acceptable reliability. In addition to transitioning from project goals to physics operations, opportunistic beam operations for physics were supported during this period.

Achieving the beam parameters in terms of beam emittance, size, energy spread was established in Fall 2015 and Spring 2016. During these run periods, CEBAF was operated at the design energy of 2.2 GeV/pass and delivered 12 GeV CW beam to Hall-D and high power (770 kW) 11 GeV CW beam to Hall-A simultaneously. The measured emittance evolution and energy spread meet the out-year specifications for 12 GeV CEBAF. This achievement validated the accelerator design and the process of establishing a CEBAF configuration that is model driven. Achieving the required beam parameters at the experimentalist target is a more deterministic process with CEBAF on design as modeling tools can be used to guide and accelerate the process.

While the beam during this period was at design energy (2.2 GeV/pass) and the beam parameters meet the experimentalist requirements, the overall CEBAF reliability was not very good. There were many contributing factors including very little gradient margin, cryogenic contamination and teething pains with the new 5^{th} pass 750 MHz RF separation system. A reliability team, chartered by the Lab Director, has been meeting regularly since Spring to identify the root causes and a path forward on improving CEBAF system reliability as well as the reliability culture at the lab. In addition, a gradient team, chartered by the Accelerator Division AD, has been meeting regularly since January to develop plans to improve the energy reach. Their findings have been summarized as JLab tech-note JLAB-TN-16-038.

In parallel with these focused team efforts, CEBAF Operations is concentrating on improving the reliability of all systems. Specifically new cryogenic procedures have been put in place to reduce (eliminate) the injection of contaminants into the LHe volume. These procedures now require that the Linacs transition to 4K for all cryogenic operations that exposed the LHe volume to atmosphere and therefore activities like cryocycling a cryomodule will take longer. Additionally improvements, to the new 750 MHz separator system over Summer 2016 should improve its performance by about 20%, providing much needed headroom. The 750 MHz system improvements were achieved by improving the geometry (moving all four cavities close together), improving the power supply so the cavities will receive more input power and improving the cooling and controls of the cavities.

Evaluating CEBAF performance, during Spring 2016 in terms of reliability and energy reach, led to the determination that CEBAF needs at least 50 MeV/linac of gradient margin in order to support the physics program. This amount of margin provides operations with the flexibility to quickly move gradient in case a cavity or even an entire C20/C50 cryomodule becomes problematic (100 MeV/linac of margin is needed to survive the loss of an entire C100 module). Requiring this headroom led to the lowering of the energy from 2.2 GeV/pass in Spring 2016 to 2.1 GeV/pass in Fall 2016. Fall 2016 operations, to date, have been more reliable and sustained in terms of RF performance (up to a recent RF window failure that has resulted beamline vacuum excursions in two South linac cryomodules and a one-week interruption to the program, see the new cryogenic contamination procedure comments above).

The new 750 MHz separation system is one part of achieving 4-hall simultaneous capability. The other aspect of 4-hall operations is adding a 4th laser with its RF controls to the laser table. The 4th laser was installed on the laser table in Summer 2016 and the RF controls are scheduled to be completed early 2017. With this new capability, comes some additional constraints that the user should be aware of, these constraints include:

- 4-hall operations requires at least one of the original halls (ABC) to receive 5th pass beam.
- Any of the original halls receiving 5th pass beam concurrently with Hall-D will receive beam with a 249.5 MHz repetition rate.
- Hall-D must be at 249.5 MHz repetition rate whenever an original hall is simultaneously receiving 5th pass beam. That is Hall-D can only receive 499 MHz beam when the 5th pass separator is turned off.

4-hall operation will be scheduled as opportunistic (3+ halls) until the complete 4-hall system is commissioned and the delivered beam parameters, including reliability, meet the users requirements.

Hall A

Since last Fall, Hall A has continued with the E12-06-114, "Measurements of the Electron-helicity Dependent Cross sections of the DVCS with CEBAF at 12 GeV" (DVCS), and E12-07-108, "Precision Measurement of the Proton Elastic Cross-Section at High Q2" (GMp), experiments. During Fall 2016, DVCS and GMp ran with one new and one repurposed resistive quadrupole as the first magnet on each of the HRS spectrometers, replacing the aging superconducting quadrupole magnets. DVCS and GMp have successfully completed all requisite optics studies for this new configuration. Beam quality has steadily improved and, as a standalone Hall, high currents up to ~80 uAmps were delivered. This enabled GMp to complete their dedicated running. DVCS was also able to complete their 5 pass running. This will mark the completion of the first two 12 GeV experiments in Hall A. The next run period will continue with a suite of four

experiments in Hall A that will utilize a tritium target (E12-10-103, E12-11-112, E12-14-009 and E12-14-011).

Hall B

Construction and installation activities for the Hall B 12 GeV upgrade project continued during the spring of 2016. The CLAS12 Forward Carriage was nearly completed with the installation of the low threshold Cherenkov Counters and 4 of the region 2 FTOF panels. Both the HPS and the PRAD experiment took data during the spring of 2016. HPS achieved over 75% of its goals, while the PRAD experiment was successfully completed in early summer with a significantly higher statistical precision than anticipated. In parallel to HPS and PRAD, the construction of the Torus magnet was completed. In the summer and fall, the Torus magnet was pumped down, cooled down to 4K, and energized to full design current of 3800A, and a survey of the magnetic field was carried out.

The Hall B beam line is now in preparation to be ready for final commissioning in early 2017. It will be in place for the KPP demonstration with all CLAS12 detector elements present, however without the solenoid magnet in place. Following the new Hall B schedule, the CLAS12 Central Detector will be installed once the solenoid magnet is in place (expected for March 2017). The first physics quality beam is expected in the fall of 2017 for a 30 days engineering run, which is followed by data taking for Run Group A using a liquid hydrogen target.

Hall C

With the 5 superconducting magnets delivered, the Super High Momentum Spectrometer (SHMS) is nearing completion. The horizontal bender and first quadrupole (Q1) have been tested to full operational currents. Q2 is undergoing test and has already surpassed the current needed to operate the SHMS above 11 GeV momentum. Q3 is also on site on the SHMS carriage. Final assembly of the dipole to join the cryostat to the cryo service can has started. With the installation of SHMS drift chambers, all the detectors needed for the initial Hall C experiments are installed. The HMS dipole has been tested to full current operations as required for the 12 GeV science program. A large number of broken wires in one of the HMS drift chambers have been replaced, restoring full operation of the HMS detector stack. New HMS drift chambers, with a design similar to the SHMS chambers, have been fabricated and will replace the existing HMS chambers after full bench testing.

The Spring of 2016 will see Hall C's beam line and HMS checkout, and a week of operations to achieve the Key Performance Parameters for the 12-GeV project scope. Then, we plan to continue SHMS calibrations followed by a subset of experiments (E12-06-107, E12-10-002/008, and E12-10-003) to fully checkout the spectrometer acceptance

and detector performance. We then plan to move towards three experiments (E12-09-017, E12-09-002 and E12-09-011) to make the spectrometer ready for the full Hall C physics program of precision cross section measurements and L/T separations.

Hall D

In the Spring of 2016 the engineering run of GlueX took place, at the nominal accelerator energy of 12 GeV. Several diamond radiators were used. The main parameters of GlueX were achieved, including the DAQ rate of about 30 kHz at a 5-10% dead time. Start of the GlueX physics phases during Fall 2016 has been unfortunately delayed by an ARC 7 power supply failure, which did not allow beam to be delivered above 4^{th}-pass. We still hope to achieve a short GlueX run to test upgrades to the TOF, the DAQ and a thinner diamond radiator. The updated schedule has GlueX (E12-06-102) starting Spring 2017 and continuing Fall 2017.

Notes to the Schedule

We summarize here the detailed notes to the schedule. They appear in the rightmost column of the schedule listing, and are listed at the earliest date in the schedule when they are applicable but they extend for a considerable time after they first appear. All of the notes are repeated here for clarity and information.

Detailed notes,

NOTE 17.1. Hall B operates up to two weeks in February to establish the Key Performance Parameters (KPPs).

NOTE 17.2. High Momentum Spectrometer (HMS) and/or beam line commissioning if compatible with 12 GeV Project work schedule for Hall C. Otherwise, use Hall A to maintain 2-hall accelerator operations and fully exercise multi-hall RF separation with high-loading in the machine.

NOTE 17.3. Parts of E12-10-003/E12-06-107 maybe possible while demonstrating high current operation in Hall C at 5-passes simultaneously with Hall D at 5.5-passes

NOTE 17.4. Will revert to three-hall operation if efficient four-hall operation cannot be sustained.

NOTE 17.5. Adjustments to the start date are possible. In all cases we expect to start with a 30 days Engineering run, followed by a week to make necessary changes before starting Run Group A.

NOTE 17.6. Intention is to follow early Hall C commissioning experiments with E12-09-017/002/011.

NOTE 17.7. Intention is to follow ^{3}H experiment E12-10-103 in Hall A with E12-11-112, E12-14-009 and E12-14-011.

Additional Schedule Information

- On the schedule, daily status changes take place at the end of the owl shift (~ 7 AM) unless otherwise indicated.
- Operating one or more of Halls A, B and C at five passes together with Hall D at 5.5 passes requires a polarized gun laser frequency of 250MHz for those halls. A laser frequency of 500 MHz can be used otherwise. For the same average beam current, the charge per micro-bunch when operating the laser at 250 MHz will be twice that of 500 MHz. For each hall, the energy, current, polarization column now also includes the laser frequency.

The Meaning of Priority on the Accelerator Schedule

Generally, the assignment of priority to a hall means that the identified hall will have the primary voice in decisions on beam quality and/or changes in operating conditions. We will do our best to deliver the beam conditions identified in the schedule for the priority hall. It will not, however, mean that the priority hall can demand changes in beam energy that would affect planned running in the other halls without the consent of the other halls. Of course, final authority for decisions about unplanned changes in machine operation will rest with the laboratory management.

The operation of more than one hall at Jefferson Lab substantively complicates the interaction between the experimenters and the accelerator operations group. It is in the interests of the entire physics community that the laboratory be as productive as possible. Therefore, we require that the run coordinators for all operating halls do their best to respond flexibly to the needs of experiments running in other halls. The run coordinators for all experiments either receiving beam or scheduled to receive beam that day should meet with the Program Deputy at 7:45 AM in the MCC on weekdays and at the Program Deputy's discretion on weekends.

To provide some guidance and order to the process of resolving the differing requirements of the running halls, we have assigned a "priority hall" for each day beam delivery has been scheduled. We outline here the meaning of priority and its effect on accelerator operations.

The priority hall has the right to:

- require a re-tune of the accelerator to take place immediately when beam quality is not acceptable
- insist that energy changes occur as scheduled
- obtain hall access as desired
- request that beam delivery interruptions for experiment-related operations which temporarily block normal beam delivery to all other halls take place as requested.

Mott measurements of the beam polarization or pulsed operation for current monitor calibrations represent examples of such interruptions. Interruptions of this type require, at a minimum, 24 hours advance notification and coordination with the Program Deputy and the other halls.

These interruptions shall be limited by a sum rule - the total time lost to the non-priority hall(s) due to such requests shall not exceed 2.5 hours in any 24-hour period. It is, of course, highly preferred that these measurements be scheduled at the morning meeting of the run coordinators whenever possible, and coordinated between halls whenever possible.

When the priority hall has requested a re-tune, if the re-tune degrades a previously acceptable beam for one of the other, lower priority running halls, then the re-tune shall continue until the beam is acceptable to both the priority hall and the other running halls that had acceptable beam at the time the re-tune began.

Non-priority halls can:

- require that a retune of the accelerator take place within 2.5 hours of the desired time (it will nominally occur at the earliest convenient break in the priority hall's schedule)
- require access to the hall within 1 hour of the desired time (again, it will nominally occur at the earliest convenient break in the priority hall's schedule)
- request that beam delivery interruptions for experiment-related operations which temporarily block normal beam delivery to all other halls occur within 2.5 hours of the desired time. Interruptions of this type require, at a minimum, 24 hours advance notification and coordination with the Program Deputy and the other halls.

The ability of non-priority halls to request retunes and accesses shall be limited by a sum rule - the total time lost to the priority hall due to such requests shall not exceed 2.5 hours in any 24-hour period. (To facilitate more extended tuning associated with complex beam delivery, with the agreement of the run coordinators for all operating halls, the sum rule may be applied over a period as long as three days, so long as the average impact is less than 2.5 hours/day.) In the event that two non-priority halls are running, the 2.5 hours shall be split evenly between them in the absence of mutual agreement on a different split.

All Halls:

Can negotiate with other halls, and with the Accelerator and Physics Division for changes in scheduled energy changes (either direction).

Initial Tune-up of New Beams:

Normally one and one half shifts (12 hours) is set aside for tune-up whenever a new beam setup is being tuned (for unusual beam setups more time may be scheduled

explicitly for tuning at the discretion of the scheduling committee). It is understood that beam tune-ups shall *always* be done in the order that the accelerator operations group believes will minimize the *total* time needed to tune *all* scheduled beams (i.e., the "priority hall" beam is not necessarily tuned first). In the event that obtaining the new beam setup requires more than the scheduled time, the Accelerator Program Deputy is authorized to spend up to one additional shift of tuning in an effort to deliver all scheduled beams instead of just the "priority hall" beam.

Maintenance/Development. Accelerator Division may request up to sixteen hours per week. Users will be consulted in deciding how these sixteen hours per week are placed on the calendar, i.e. five shorter or three long blocks of time.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Date	Weekday		Operations	Hall A	Hall A	Hall B	Hall B	Hall C	Hall C	Hall D	Hall D	Priority	FFB	Pass	Notes
2			(GeV/pass)/Pol	Status	Experiment	GeV/μA/Pol	Experiment	GeV/nA/Pol/MHz	Experiment	GeV/μA/Pol/MHz	Experiment	GeV/nA/Po/MHz	Hall	Hall	A/B/C/D	Notes
3	CY 2017 Begins															
4	01/01/17	Sunday	down													
5	01/02/17	Monday	down													
6	01/03/17	Tuesday	down													
7	01/04/17	Wednesday	down													
8	01/05/17	Thursday	down													
9	01/06/17	Friday	down													
10	01/07/17	Saturday	down													
11	01/08/17	Sunday	down													
12	01/09/17	Monday	down													
13	01/10/17	Tuesday	down													
14	01/11/17	Wednesday	down													
15	01/12/17	Thursday	down													
16	01/13/17	Friday	down													
17	01/14/17	Saturday	down													
18	01/15/17	Sunday	down													
19	01/16/17	Monday	down													
20	01/17/17	Tuesday	down													
21	01/18/17	Wednesday	down													
22	01/19/17	Thursday	down													
23	01/20/17	Friday	down													
24	01/21/17	Saturday	down													
25	01/22/17	Sunday	down													
26	01/23/17	Monday	down													
27	01/24/17	Tuesday	down													
28	01/25/17	Wednesday	down													
29	01/26/17	Thursday	2.1	Restore									Acc.			
30	01/27/17	Friday	2.1	Restore									Acc.			
31	01/28/17	Saturday	2.1	Restore									Acc.			
32	01/29/17	Sunday	2.1	5-th pass setup									Acc.			
33	01/30/17	Monday	2.1	1 hall							E12-06-102	11.7/200/-	D		-/-/-/5.5	
34	01/31/17	Tuesday	2.1	1 hall							E12-06-102	11.7/200/-	D		-/-/-/5.5	
35	02/01/17	Wednesday	2.1	2 halls			3-pass beam line setup	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
36	02/02/17	Thursday	2.1	2 halls			3-pass beam line setup	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
37	02/03/17	Friday	2.1	2 halls			**NOTE 17.1**	**NOTE 17.1**			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
38	02/04/17	Saturday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
39	02/05/17	Sunday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
40	02/06/17	Monday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	**NOTE 17.1**
41	02/07/17	Tuesday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	**HALL B operates up-to two weeks in February to establish the Key Performance Parameters (KPP)**
42	02/08/17	Wednesday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
43	02/09/17	Thursday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
44	02/10/17	Friday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
45	02/11/17	Saturday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
46	02/12/17	Sunday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
47	02/13/17	Monday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
48	02/14/17	Tuesday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
49	02/15/17	Wednesday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
50	02/16/17	Thursday	2.1	2 halls			pre-OPS/KPP	6.4/-/-			E12-06-102	11.7/200/-	B/D		-/3/-/5.5	
51	02/17/17	Friday	2.1	2 halls	**NOTE 17.2**				**NOTE 17.2**		E12-06-102	11.7/200/-	D/A		1/-/?/5.5	**NOTE 17.2**
52	02/18/17	Saturday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
53	02/19/17	Sunday	2.1	2 halls	**Use to maintain two hall operation if Hall C not available**				**HMS/beam line commissioning if compatible with 12 GeV project schedule**		E12-06-102	11.7/200/-	D/A		1/-/?/5.5	**HMS / beam line commissioning if compatible with 12 GeV Project work schedule for Hall C**
54	02/20/17	Monday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
55	02/21/17	Tuesday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
56	02/22/17	Wednesday	2.1	2 halls			**Schedule float for HALL B to demonstrate KPPs**				E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
57	02/23/17	Thursday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	**Otherwise use Hall A to maintain 2 hall accelerator ops**
58	02/24/17	Friday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
59	02/25/17	Saturday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
60	02/26/17	Sunday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
61	02/27/17	Monday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
62	02/28/17	Tuesday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
63	03/01/17	Wednesday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
64	03/02/17	Thursday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
65	03/03/17	Friday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
66	03/04/17	Saturday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
67	03/05/17	Sunday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
68	03/06/17	Monday	2.1	2 halls							E12-06-102	11.7/200/-	D/A		1/-/?/5.5	
69	03/07/17	Tuesday	2.1	2 halls					beam line comm @ 3pass		E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
70	03/08/17	Wednesday	2.1	2 halls					beam line comm @ 3pass		E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
71	03/09/17	Thursday	2.1	2 halls					pre-OPS/KPP	6.4/20/-	E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
72	03/10/17	Friday	2.1	2 halls					pre-OPS/KPP	6.4/20/-	E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
73	03/11/17	Saturday	2.1	2 halls					pre-OPS/KPP	6.4/20/-	E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
74	03/12/17	Sunday	2.1	2 halls					pre-OPS/KPP	6.4/20/-	E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
75	03/13/17	Monday	2.1	2 halls					pre-OPS/KPP	6.4/20/-	E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
76	03/14/17	Tuesday	2.1	2 halls					pre-OPS/KPP	6.4/20/-	E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
77	03/15/17	Wednesday	2.1	2 halls					pre-OPS/KPP	6.4/20/-	E12-06-102	11.7/200/-	C/D		-/-/3/5.5	
78	03/16/17	Thursday	2.1	2 halls					**NOTE 17.3**	10.6/20/-	E12-06-102	11.7/200/-	D/C		-/-/5/5.5	**NOTE 17.3**
79	03/17/17	Friday	2.1	2 halls					Opportunistic Studies	10.6/20/-	E12-06-102	11.7/200/-	D/C		-/-/5/5.5	
80	03/18/17	Saturday	2.1	2 halls					Opportunistic Studies	10.6/20/-	E12-06-102	11.7/200/-	D/C		-/-/5/5.5	**Parts of E12-10-003/E12-06-107 maybe possible during this period of simultaneous hall operation at 5 and 5.5 passes**
81	03/19/17	Sunday	2.1	2 halls					Opportunistic Studies	10.6/20/-	E12-06-102	11.7/200/-	D/C		-/-/5/5.5	
82	03/20/17	Monday	2.1	2 halls					Opportunistic Studies	10.6/20/-	E12-06-102	11.7/200/-	D/C		-/-/5/5.5	
83	03/21/17	Tuesday	2.1	2 halls					Opportunistic Studies	10.6/20/-	E12-06-102	11.7/200/-	D/C		-/-/5/5.5	
84	03/22/17	Wednesday	2.1	2 halls					Opportunistic Studies	10.6/20/-	E12-06-102	11.7/200/-	D/C		-/-/5/5.5	
85	03/23/17	Thursday	down	Cryo Reconfig												
86	03/24/17	Friday	down	Cryo Reconfig												
87	03/25/17	Saturday	down	Cryo Reconfig												
88	03/26/17	Sunday	down	Cryo Reconfig												
89	03/27/17	Monday	down	Cryo Reconfig												
90	03/28/17	Tuesday	down	Cryo Reconfig												

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
91	03/29/17	Wednesday	down	Cryo Reconfig												
92	03/30/17	Thursday	down	Cryo Reconfig												
93	03/31/17	Friday	down	Cryo Reconfig												
94	04/01/17	Saturday	down	Cryo Reconfig												
95	04/02/17	Sunday	down	Cryo Reconfig												
96	04/03/17	Monday	down	Cryo Reconfig												
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98	04/05/17	Wednesday	down	Cryo Reconfig												
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100	04/07/17	Friday	down	Cryo Reconfig												
101	04/08/17	Saturday	down	Cryo Reconfig												
102	04/09/17	Sunday	down	Cryo Reconfig												
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104	04/11/17	Tuesday	down	Cryo Reconfig												
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182	06/28/17	Wednesday	down													
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184	06/30/17	Friday	down													
185	07/01/17	Saturday	down													
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250	09/04/17	Monday	down	Cryo/RF Restoration												
251	09/05/17	Tuesday	down	Cryo/RF Restoration												
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266	09/20/17	Wednesday	down	Cryo/RF Restoration												
267	09/21/17	Thursday	down	Cryo/RF Restoration												
268	09/22/17	Friday	down	Cryo/RF Restoration												
269	09/23/17	Saturday	down	Cryo/RF Restoration												
270	09/24/17	Sunday	down	Cryo/RF Restoration												
271	09/25/17	Monday	2.1	Restore												
272	09/26/17	Tuesday	2.1	Restore												

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273	09/27/17	Wednesday	2.1	Restore												
274	09/28/17	Thursday	2.1	Restore												
275	09/29/17	Friday	2.1	Restore												
276	09/30/17	Saturday	2.1	Restore												
277	FY18 Begins															
278	10/01/17	Sunday	2.1	Restore												
279	10/02/17	Monday	2.1	**NOTE 17.4**	E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/1,3/5.5	**NOTE 17.4** **Will revert to three hall operation if efficient four hall operation can not be sustained**
280	10/03/17	Tuesday	2.1		E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/1,3/5.5	
281	10/04/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/1,3/5.5	
282	10/05/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/1,3/5.5	
283	10/06/17	Friday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/1,3/5.5	
284	10/07/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/1,3/5.5	
285	10/08/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/1,3/5.5	
286	10/09/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS commissioning	2.2, 6.4/20/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/1,3/5.5	
287	10/10/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS Comm./E12-10-002	6.4/20/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/3/5.5	
288	10/11/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	SHMS Comm./E12-10-002	6.4/20/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/3/5.5	**NOTE 17.5** **Adjustments to the start date are possible** **In all cases we expect to start with a 30 days Engineering run, followed by a week to make necessary changes before starting Run Group A**
289	10/12/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	Pass change (12hrs)		E12-06-102	11.7/200/-	C/D/A/B		5/5/4/5.5	
290	10/13/17	Friday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	E12-06-107	8.5/80/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/4/5.5	
291	10/14/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	E12-06-107	8.5/80/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/4/5.5	
292	10/15/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-		10.6/100/p	E12-06-107	8.5/80/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/4/5.5	
293	10/16/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-	**NOTE 17.5**	10.6/100/p	E12-06-107	8.5/80/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/4/5.5	
294	10/17/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	8.5/80/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/4/5.5	
295	10/18/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	Pass change (12hrs)		E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
296	10/19/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
297	10/20/17	Friday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
298	10/21/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
299	10/22/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
300	10/23/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
301	10/24/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
302	10/25/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
303	10/26/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
304	10/27/17	Friday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
305	10/28/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		5/5/5/5.5	
306	10/29/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
307	10/30/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
308	10/31/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
309	11/01/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
310	11/02/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-06-107	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
311	11/03/17	Friday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
312	11/04/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
313	11/05/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		5/5/5/5.5	
314	11/06/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
315	11/07/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
316	11/08/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
317	11/09/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
318	11/10/17	Friday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
319	11/11/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
320	11/12/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
321	11/13/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	C/D/A/B		5/5/5/5.5	
322	11/14/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-	Engineering Run (30 days)	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
323	11/15/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-	CLAS12 changes/improvements	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
324	11/16/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-	CLAS12 changes/improvements	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
325	11/17/17	Friday	2.1	3+ halls	E12-10-103	10.6/20/-	CLAS12 changes/improvements	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
326	11/18/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-	CLAS12 changes/improvements	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
327	11/19/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-	CLAS12 changes/improvements	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
328	11/20/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-	CLAS12 changes/improvements	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
329	11/21/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-	CLAS12 changes/improvements	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	B/C/D/A		5/5/5/5.5	
330	11/22/17	Wednesday	down													
331	11/23/17	Thursday	down													
332	11/24/17	Friday	down													
333	11/25/17	Saturday	down													
334	11/26/17	Sunday	down													
335	11/27/17	Monday	down													
336	11/28/17	Tuesday	2.1	Restore												
337	11/29/17	Wednesday	2.1	Restore												
338	11/30/17	Thursday	2.1	**NOTE 17.4**	E12-10-103	10.6/20/-	Run Group A	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		2/5/5/5.5	
339	12/01/17	Friday	2.1		E12-10-103	10.6/20/-	Run Group A	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		2/5/5/5.5	
340	12/02/17	Saturday	2.1	3+ halls	E12-10-103	10.6/20/-	Run Group A	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	A/B/C/D		2/5/5/5.5	
341	12/03/17	Sunday	2.1	3+ halls	E12-10-103	10.6/20/-	Run Group A	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		2/5/5/5.5	
342	12/04/17	Monday	2.1	3+ halls	E12-10-103	10.6/20/-	Run Group A	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		2/5/5/5.5	
343	12/05/17	Tuesday	2.1	3+ halls	E12-10-103	10.6/20/-	Run Group A	10.6/100/p	E12-10-002/008	10.6/65/-	E12-06-102	11.7/200/-	D/A/B/C		2/5/5/5.5	
344	12/06/17	Wednesday	2.1	3+ halls	E12-10-103	10.6/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	D/A/B/C		2/5/5/5.5	
345	12/07/17	Thursday	2.1	3+ halls	E12-10-103	10.6/20/-	Run Group A	10.6/100/p	**NOTE 17.6**	**NOTE 17.6**	E12-06-102	11.7/200/-	C/D/A/B		2/5/5/5.5	**NOTE 17.6** **Our intention is to follow with E12-09-017/002/011**
346	12/08/17	Friday	2.1	3+ halls	Pass change (12hrs)		Run Group A	10.6/100/p			E12-06-102	11.7/200/-	C/D/A/B		2/5/5/5.5	
347	12/09/17	Saturday	2.1	3+ halls	E12-10-103	6.6/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	C/D/A/B		2/5/5/5.5	
348	12/10/17	Sunday	2.1	3+ halls	E12-10-103	6.6/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	C/D/A/B		2/5/5/5.5	
349	12/11/17	Monday	2.1	3+ halls	E12-10-103	6.6/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	C/D/A/B		2/5/5/5.5	
350	12/12/17	Tuesday	2.1	3+ halls	Pass change (12hrs)		Run Group A	10.6/100/p			E12-06-102	11.7/200/-	B/C/D/A		2/5/5/5.5	
351	12/13/17	Wednesday	2.1	3+ halls	E12-10-103	4.3/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	B/C/D/A		2/5/5/5.5	
352	12/14/17	Thursday	2.1	3+ halls	E12-10-103	4.3/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	B/C/D/A		2/5/5/5.5	
353	12/15/17	Friday	2.1	3+ halls	E12-10-103	4.3/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	B/C/D/A		2/5/5/5.5	
354	12/16/17	Saturday	2.1	3+ halls	E12-10-103	4.3/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	B/C/D/A		2/5/5/5.5	
355	12/17/17	Sunday	2.1	3+ halls	E12-10-103	4.3/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	B/C/D/A		2/5/5/5.5	
356	12/18/17	Monday	2.1	3+ halls	E12-10-103	4.3/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	A/B/C/D		2/5/5/5.5	
357	12/19/17	Tuesday	2.1	3+ halls	Pass change (12hrs)		Run Group A	10.6/100/p			E12-06-102	11.7/200/-	A/B/C/D		2/5/5/5.5	
358	12/20/17	Wednesday	2.1	3+ halls	E12-10-103	8.5/20/-	Run Group A	10.6/100/p			E12-06-102	11.7/200/-	A/B/C/D		2/5/5/5.5	
359	12/21/17	Thursday	down													
360	12/22/17	Friday	down		**NOTE 17.7**	**NOTE 17.7**										**NOTE 17.7**
361	12/23/17	Saturday	down													
362	12/24/17	Sunday	down													

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
363	12/25/17	Monday	down													**Our intention is to follow E12-10-103 with the three 3H experiments E12-11-112/E12-14-009/E12-14-011/**
364	12/26/17	Tuesday	down													
365	12/27/17	Wednesday	down													
366	12/28/17	Thursday	down													
367	12/29/17	Friday	down													
368	12/30/17	Saturday	down													
369	12/31/17	Sunday	down													
370	CY 2018 Begins															