

# **The Long Shut Down Re-Baseline Review Part II**

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## **Experimental Nuclear Physics**

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December 17, 2012

# Overview.

1. Address current status of the cryogenic systems that service the experimental end stations.
2. Review present state of flood recovery, expenditures to date and projected future expenses.
3. Identify staffing issues in the experimental halls and how they will be addressed.

# Status of End Station Cryogenic Systems

## Hall A – Integrated

- Cryo distribution is controlled directly by JLab Cryo Group.
- Cryo hardware (JT valves) being updated to those used by JLab.

## Hall B – Will be Integrated

- New Torus & Solenoid undergoing design (Torus) & contract issuing (Solenoid).
- Integration is assumed because JLab Engineering/Cryo personnel are involved.

## Hall C - Boundary Control Only

- JLab Cryo Group sets flow limits to hall.
- Flow inside the hall is controlled by the hall.
- Too expensive to change

## Hall D - Integrated

- JLab Engineering/Cryo Group heavily involved in bringing up the Hall D solenoid

# Flood Recovery

- ❖ Following the flood on August 25, 2012 the Hall Work Coordinators, Engineering and Facilities staff were contacted to perform a damage assessment.
- ❖ The data collected was a 'best guess' because much of the damage could not be confirmed until systems were re-energized.
- ❖ In addition to repair and replacement of damaged components, the recovery plan also includes preventive measures to avoid future damage.
- ❖ The following tables identify the estimated expenditures that will be required to restore all hall systems to full operation.

# Flood Damage by Experimental Hall

	Minimum Estimate		Maximum Estimate		When Required		Actual			
	Time	Cost	Time	Cost	Date	Reason	Date Completed	Cost	Notes	
<b>HALL A</b>	<b>Damage</b>									
	A.1. Replace 4 - 1000W UPS Systems	1 wk	\$2,000	3 wks	\$2,000	10/1/2012	Components already ordered	10/1/2012	\$3,267	Replaced
	A.2. Replace Data Acquisition Controllers	2 wks	\$0	2 wks	\$14,000	3/1/2013	1 Year prior to experiment start	10/1/2012	\$0	No damage
	A.3. Repair/Replace 16 - Bogie Controllers	1 wk	\$0	1 wk	\$16,000	3/1/2013	1 Year prior to experiment start			
	A.4. Replace Damaged Computing Equipment	3 wks	\$2,000	3 wks	\$10,000	3/1/2013	1 Year prior to experiment start			
	A.5. Replace Data Acquisition Controllers	2 wks	\$0	2 wks	\$14,000	3/1/2013	1 Year prior to experiment start			
<b>Total Hall A:</b>		<b>\$4,000</b>		<b>\$56,000</b>				<b>\$3,267</b>		
<b>HALL B</b>	B.1. Repair/Replace Drift Chamber Signal Cables	2 wks	\$0		\$50,000	10/1/2014	6 Months prior to experiment start			
	B.2. Repair/Replace Drift Chamber High Voltage Cables	1 wks	\$0		\$50,000	10/1/2014	6 Months prior to experiment start			
	B.3. Repair/Replace CLAS 6 Electronics	1 wks	\$0		Unknown					
	B.4. Pump-out Flooded Tagger Dump	2 wks	\$0	2 wks	\$0	9/11/2012	Immediately to avoid damage	9/11/2012	\$0	W/O Labor
	B.5. Repair/Replace Lower Truck Ramp Overhead Door	4 wks	\$5,000	4 wks	\$15,000	3/1/2013	6 Months or sooner			
	B.6. Repair/Replace Turbo Q Vacuum Pumps and Spare Tagger Turbo Pump	4 wks	\$5,000	4 wks	\$15,000	3/1/2013	6 Months or sooner	10/1/2012	\$0	No Damage
<b>Total Hall B:</b>		<b>\$10,000</b>		<b>\$130,000</b>				<b>\$0</b>		
<b>HALL C</b>	C.1. Replace 50 - 120 Volt Electrical Receptacles	2 wks	\$5,000	2 wks	\$5,000	9/11/2012	Required for immediate use	9/11/2012	\$5,000	Replaced
	C.2. Repair/Replace 3 - JLG Man Lifts	2 wks	\$6,250	8 wks	\$100,000	10/1/2012	Required for SOS removal		\$82,894	2 Repaired, 1 replaced
	C.3. Repair/Replace Scissor Lift	2 wks	\$3,000	8 wks	\$24,000	10/1/2012	Required for SOS removal		\$7,249	Repaired
	C.4. Replace 12 - Vacuum Pumps	4 wks	\$180,000	8 wks	\$180,000	10/1/2014	1/3 Per year for 3 years	9/26/2012	\$19,797	Partial
	C.5. Replace Damaged Power Tools	1 wk	\$3,000	1 wk	\$15,000	10/1/2012	Required immediately	10/18/2012	\$3,000	
	C.6. Replace Damaged Network Switch	1 wk	\$2,400	1 wk	\$2,400	9/11/2012	Required immediately	9/11/2012	\$0	Reset breaker
	C.7. Clean QTOR Magnet Coils	1 wk	\$0	1 wk	\$0	10/15/2012	Must be cleaned to relocate	10/1/2012	\$0	W/O Labor
	C.8. Replace Bogey Motors	1 wk	\$1,500	1 wk	\$1,500	10/1/2014	6 Months prior to experiment start			
	C.9. Clean and Oil Rusted Material Handling Equipment	1 wk	\$0	1 wk	\$0	10/1/2012	Required to prevent further damage	10/1/2012	\$0	W/O Labor
	C.10. Clean and Oil Rusted Detector Rails	1 wk	\$0	1 wk	\$0	10/1/2012	Required to prevent further damage	10/1/2012	\$0	W/O Labor
	C.11. Replace Target Group Micro-Drive Power Supplies	4 wk	\$30,000	8 wk	\$30,000	4/1/2014	1 Year prior to experiment start			
	C.12. Replace Target Group Power 10 Heater Supplies	4 wk	\$20,000	8 wk	\$20,000	4/1/2014	1 Year prior to experiment start			
	C.13. Replace Large Power Supplies	4 wk	\$150,000	8 wk	\$150,000	10/1/2014	6 Months prior to experiment start			
	C.14. Replace Inundated Circuit Breakers	4 wk	\$5,000	8 wk	\$50,000	9/11/2012	Required for immediate use	10/1/2012	\$5,000	Cleaned
	C.15. Replace Miscellaneous Equipment, and Golf Cart	4 wk	\$10,000	8 wk	\$90,000	10/1/2014	1/3 Per year for 3 years		\$6,480	Replace golf cart
<b>Total Hall C:</b>		<b>\$416,150</b>		<b>\$667,900</b>				<b>\$129,420</b>		
<b>HALL D</b>	D.1. Hall D Reports No Appreciable Damage		0		0					
	<b>Total Hall D:</b>		<b>0</b>		<b>0</b>				<b>\$0</b>	
<b>ENG</b>	ENG.1. Personnel Safety System Repair/Replace/Maintain	2 wk	\$11,625	4 wk	\$11,625	3/1/2013	Triage now, ODH by Jan/13, PSS by Jan/15			
	ENG.2. Hall A Instrumentation & Controls	1 wk	\$12,000	1 wk	\$12,000	2/1/2014	1 Month prior to experiment start			
	ENG.3. Hall C Instrumentation & Controls	16 wk	\$124,000	16 wk	\$171,000	10/1/2013	Available for magnet hot check-out			
	<b>Total Engineering:</b>		<b>\$147,625</b>		<b>\$194,625</b>				<b>\$0</b>	
<b>Grand Total All Experimental Halls:</b>		<b>\$577,775</b>		<b>\$1,048,525</b>				<b>\$132,687</b>		

# Preventative Measures to Mitigate Future Damage

	Minimum Estimate		Maximum Estimate		When Required		Actual		
	Time	Cost	Time	Cost	Date	Reason	Date Completed	Cost	Notes
<b>HALL A</b>	<b>Preventive Measures</b>								
P-A.1. Aluminum Mini-Gate	1 wk	\$1,000	1 wk	\$1,000	9/1/2012	Completed	9/11/2012	\$1,000	W/O Labor
P-A.2. Guillotine Gate for Truck Ramp	8 wk	\$92,000	12 wk	\$105,000	4/1/2013	Required by start of storm season			
<b>Total Hall A:</b>		<b>\$93,000</b>		<b>\$106,000</b>				<b>\$1,000</b>	
<b>HALL B</b>	<b>Preventive Measures</b>								
P-B.1. Kellner Flood Gate	1 wk	\$1,000	2 wks	\$2,000	9/15/2012	Provide intermediate flood protection	9/11/2012	\$1,000	W/O Labor
P-B.2. Guillotine Gate for Truck Ramp	8 wk	\$92,000	12 wk	\$105,000	4/1/2013	Required by start of storm season			
<b>Total Hall B:</b>		<b>\$93,000</b>		<b>\$107,000</b>				<b>\$1,000</b>	
<b>HALL C</b>	<b>Preventive Measures</b>								
P-C.1. Kellner Flood Gate	1 wk	\$1,000	1 wk	\$1,000	9/11/2012	Completed	9/11/2012	\$1,000	W/O Labor
P-C.2. Automatic Sump Pump in Hall C	4 wk	\$6,000	8 wks	\$12,000	4/1/2013	Required by start of storm season			
P-C.3. Guillotine Gate for Truck Ramp	8 wk	\$92,000	12 wk	\$105,000	4/1/2013	Required by start of storm season			
<b>Total Hall C:</b>		<b>\$99,000</b>		<b>\$118,000</b>				<b>\$1,000</b>	
<b>HALL D</b>	<b>Preventive Measures</b>								
P-D.1. Guillotine Gate for Multiple Ramps and Doors	8 wk	250,000	12 wk	285,000	4/1/2013	Required by start of storm season			
<b>Total Hall D:</b>		<b>\$250,000</b>		<b>\$285,000</b>				<b>\$0</b>	
<b>Site</b>	<b>Preventive Measures</b>								
P-S.1. Additional On Site Storm Water Retention	1 yr	800,000	2 yr	1,200,000	10/1/2014	Must be integrated with master plan			
<b>Total Site Improvements:</b>		<b>\$800,000</b>		<b>\$1,200,000</b>				<b>\$0</b>	
<b>Grand Total All Experimental Halls:</b>		<b>\$1,335,000</b>		<b>\$1,816,000</b>				<b>\$3,000</b>	

# Projected Remedial/Preventive Expenditures by Fiscal Year

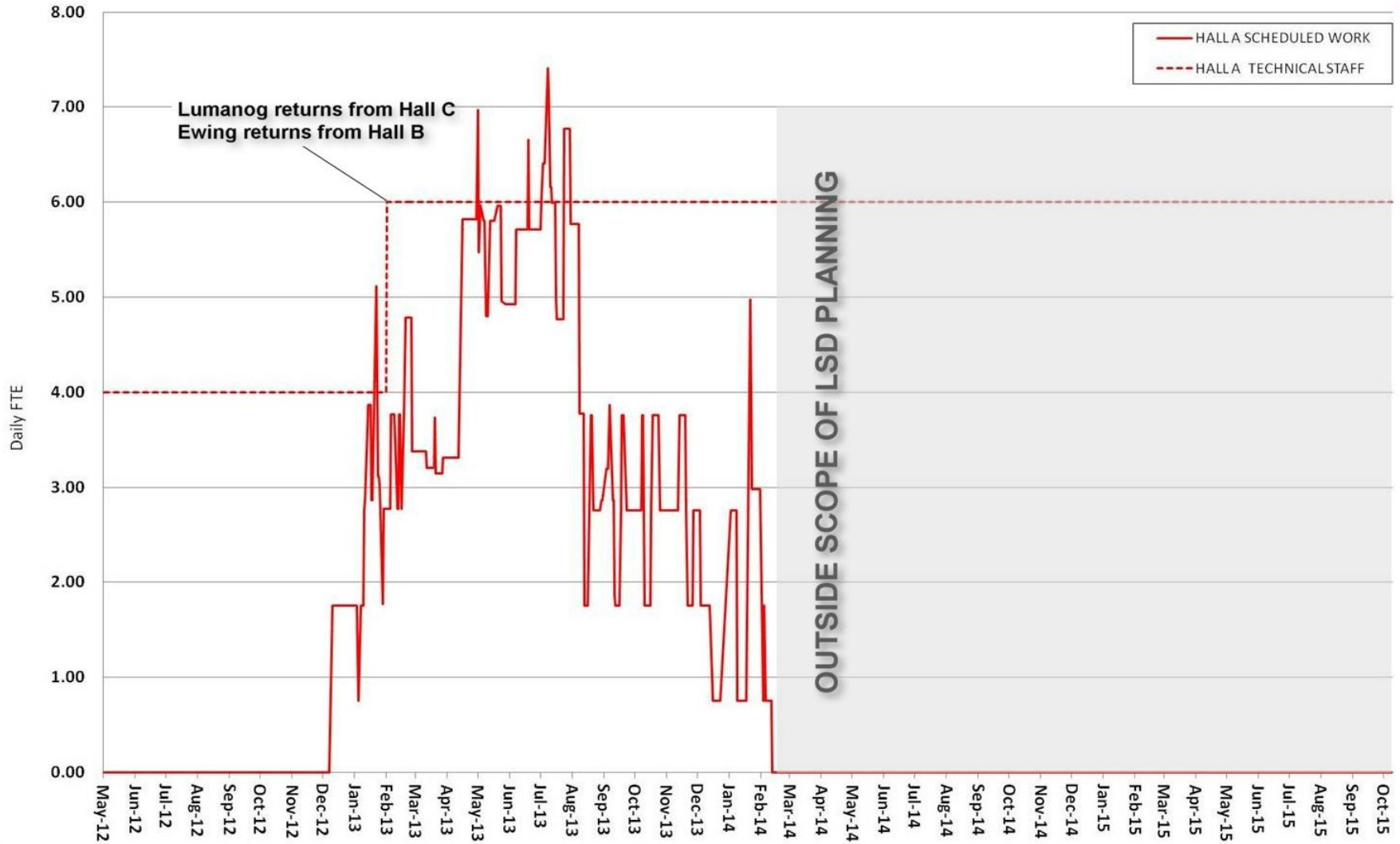
	Minimum Estimate		Maximum Estimate		When Required		Actual			
	Time	Cost	Time	Cost	Date	Reason	Date Completed	Cost	Notes	
FY-12	P-A.1. Aluminum Mini-Gate	1 wk	\$1,000	1 wk	\$1,000	9/1/2012	Completed	9/11/2012	\$1,000	W/O Labor
	B.4. Pump-out Flooded Tagger Dump	2 wks	\$0	2 wks	\$0	9/11/2012	Immediately to avoid damage	9/11/2012	\$0	W/O Labor
	C.1. Replace 50 – 120 Volt Electrical Receptacles	2 wks	\$5,000	2 wks	\$5,000	9/11/2012	Required for immediate use	9/11/2012	\$5,000	Replaced
	C.6. Replace Damaged Network Switch	1 wk	\$2,400	1 wk	\$2,400	9/11/2012	Required immediately	9/11/2012	\$0	Reset breaker
	C.14. Replace Inundated Circuit Breakers	4 wk	\$5,000	8 wk	\$50,000	9/11/2012	Required for immediate use	10/1/2012	\$5,000	Cleaned
	P-C.1. Kellner Flood Gate	1 wk	\$1,000	1 wk	\$1,000	9/11/2012	Completed	9/11/2012	\$1,000	W/O Labor
	P-B.1. Kellner Flood Gate	1 wk	\$1,000	2 wks	\$2,000	9/15/2012	Provide intermediate flood protection	9/1/2012	\$1,000	W/O Labor
<b>Total FY-12 Expenditures</b>		<b>\$15,400</b>		<b>\$61,400</b>				<b>\$13,000</b>		
FY-13	A.1. Replace 4 - 1000W UPS Systems	1 wk	\$2,000	3 wks	\$2,000	10/1/2012	Components already ordered	10/1/2012	\$3,267	Replaced
	C.2. Repair/Replace 3 – JLG Man Lifts	2 wks	\$6,250	8 wks	\$100,000	10/1/2012	Required for SOS removal		\$82,894	2 Repaired, 1
	C.3. Repair/Replace Scissor Lift	2 wks	\$3,000	8 wks	\$24,000	10/1/2012	Required for SOS removal		\$7,249	Repaired
	C.5. Replace Damaged Power Tools	1 wk	\$3,000	1 wk	\$15,000	10/1/2012	Required immediately	10/18/2012	\$3,000	
	C.9. Clean and Oil Rusted Material Handling Equipment	1 wk	\$0	1 wk	\$0	10/1/2012	Required to prevent further damage	10/1/2012	\$0	W/O Labor
	C.10. Clean and Oil Rusted Detector Rails	1 wk	\$0	1 wk	\$0	10/1/2012	Required to prevent further damage	10/1/2012	\$0	W/O Labor
	C.7. Clean QTOR Magnet Coils	1 wk	\$0	1 wk	\$0	10/15/2012	Must be cleaned to relocate	10/1/2012	\$0	W/O Labor
	A.2. Replace Data Acquisition Controllers	2 wks	\$0	2 wks	\$14,000	3/1/2013	1 Year prior to experiment start	10/1/2012	\$0	No damage
	A.3. Repair/Replace 16 – Bogie Controllers	1 wk	\$0	1 wk	\$16,000	3/1/2013	1 Year prior to experiment start			
	A.4. Replace Damaged Computing Equipment	3 wks	\$2,000	3 wks	\$10,000	3/1/2013	1 Year prior to experiment start			
	A.5. Replace Data Acquisition Controllers	2 wks	\$0	2 wks	\$14,000	3/1/2013	1 Year prior to experiment start			
	B.5. Repair/Replace Lower Truck Ramp Overhead Door	4 wks	\$5,000	4 wks	\$15,000	3/1/2013	6 Months or sooner			
	B.6. Repair/Replace Turbo Q Vacuum Pumps and Spare Taggs	4 wks	\$5,000	4 wks	\$15,000	3/1/2013	6 Months or sooner	10/1/2012	\$0	No Damage
	ENG.1. Personnel Safety System Repair/Replace/Maintain	2 wk	\$11,625	4 wk	\$11,625	3/1/2013	Triage now, ODH by Jan/13, PSS by Jan/15			
	P-A.2. Guillotine Gate for Truck Ramp	8 wk	\$92,000	12 wk	\$105,000	4/1/2013	Required by start of storm season			
	P-B.2. Guillotine Gate for Truck Ramp	8 wk	\$92,000	12 wk	\$105,000	4/1/2013	Required by start of storm season			
	P-C.2. Automatic Sump Pump in Hall C	4 wk	\$6,000	8 wks	\$12,000	4/1/2013	Required by start of storm season			
P-C.3. Guillotine Gate for Truck Ramp	8 wk	\$92,000	12 wk	\$105,000	4/1/2013	Required by start of storm season				
P-D.1. Guillotine Gate for Multiple Ramps and Doors	8 wk	250,000	12 wk	285,000	4/1/2013	Required by start of storm season				
<b>Total FY-13 Expenditures</b>		<b>\$569,875</b>		<b>\$848,625</b>				<b>\$96,410</b>		
FY-14	ENG.3. Hall C Instrumentation & Controls	16 wk	\$124,000	16 wk	\$171,000	10/1/2013	Available for magnet hot check-out			
	ENG.2. Hall A Instrumentation & Controls	1 wk	\$12,000	1 wk	\$12,000	2/1/2014	1 Month prior to experiment start			
	C.11. Replace Target Group Micro-Drive Power Supplies	4 wk	\$30,000	8 wk	\$30,000	4/1/2014	1 Year prior to experiment start			
	C.12. Replace Target Group Power 10 Heater Supplies	4 wk	\$20,000	8 wk	\$20,000	4/1/2014	1 Year prior to experiment start			
	<b>Total FY-14 Expenditures</b>		<b>\$186,000</b>		<b>\$233,000</b>				<b>\$0</b>	
FY-15	B.1. Repair/Replace Drift Chamber Signal Cables	2 wks	\$0		\$50,000	10/1/2014	6 Months prior to experiment start			
	B.2. Repair/Replace Drift Chamber High Voltage Cables	1 wks	\$0		\$50,000	10/1/2014	6 Months prior to experiment start			
	C.4. Replace 12 – Vacuum Pumps	4 wks	\$180,000	8 wks	\$180,000	10/1/2014	1/3 Per year for 3 years	9/26/2012	\$19,797	Partial
	C.8. Replace Bogey Motors	1 wk	\$1,500	1 wk	\$1,500	10/1/2014	6 Months prior to experiment start			
	C.13. Replace Large Power Supplies	4 wk	\$150,000	8 wk	\$150,000	10/1/2014	6 Months prior to experiment start			
	C.15. Replace Miscellaneous Equipment, and Golf Cart	4 wk	\$10,000	8 wk	\$90,000	10/1/2014	1/3 Per year for 3 years		\$6,480	Replace golf cart
	P-S.1. Additional On Site Storm Water Retention	1 yr	800,000	2 yr	1,200,000	10/1/2014	Must be integrated with master plan			
<b>Total FY-15 Expenditures</b>		<b>\$1,141,500</b>		<b>\$1,721,500</b>				<b>\$26,277</b>		
<b>Grand Total</b>		<b>\$1,912,775</b>		<b>\$2,864,525</b>				<b>\$135,687</b>		

# Physics Staffing Issues

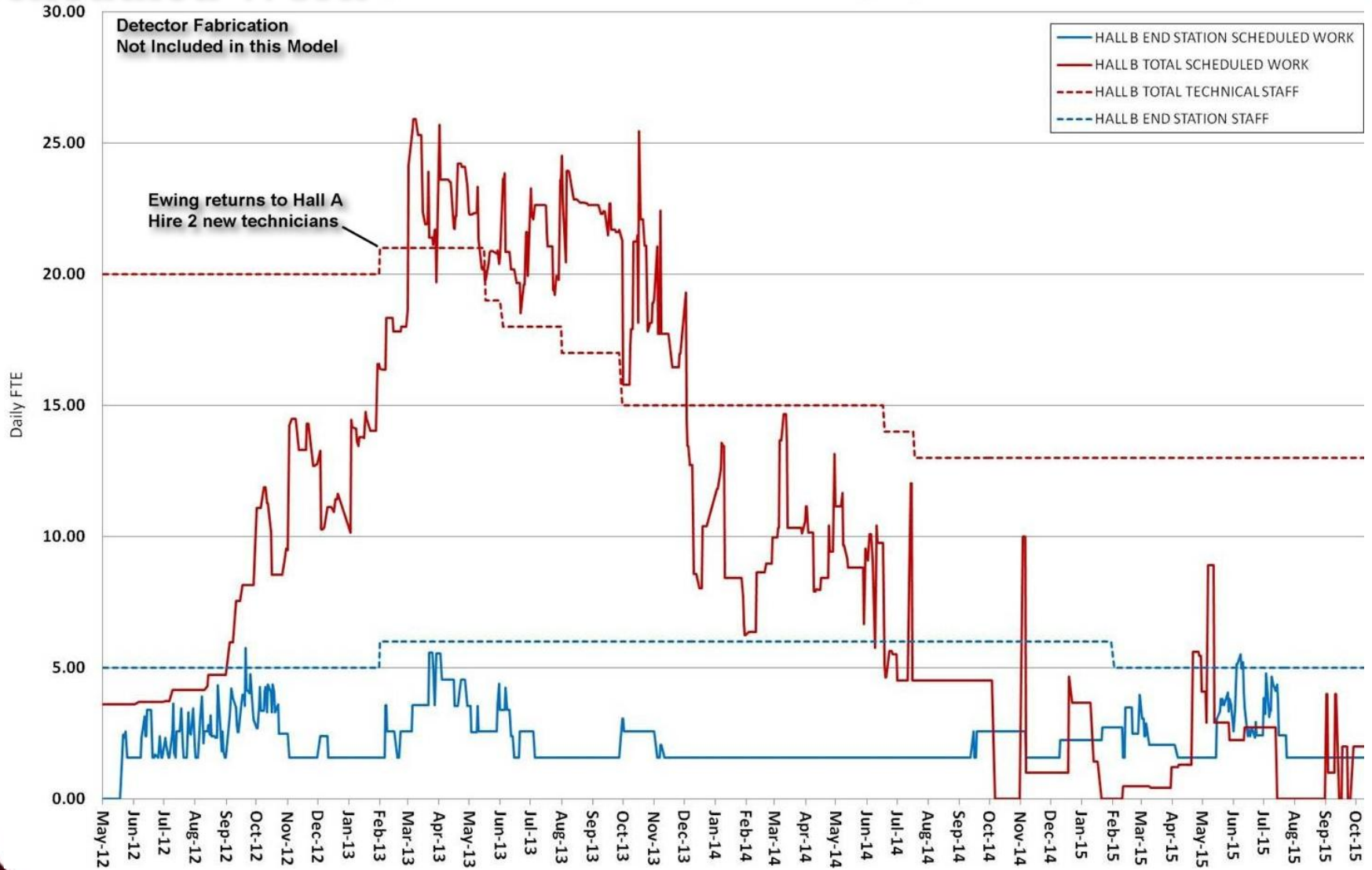
- ❑ Concerns have been raised that the current level of technical staffing may not be sufficient to meet scheduled work needs.
- ❑ In response to this concern, we have developed manpower models that examine our staffing levels for each hall with respect to work.
- ❑ Currently, Experimental Nuclear Physics has 46 mechanical and electrical technicians (including Hall Coordinators) allocated across all four halls.
- ❑ Additionally, some engineering staff are matrixed to the halls to provide specific support.
- ❑ By April 2013, this number is projected to decrease unless some contract employees are extended.



# Experimental Hall A: Technical Manpower vs. Scheduled Work



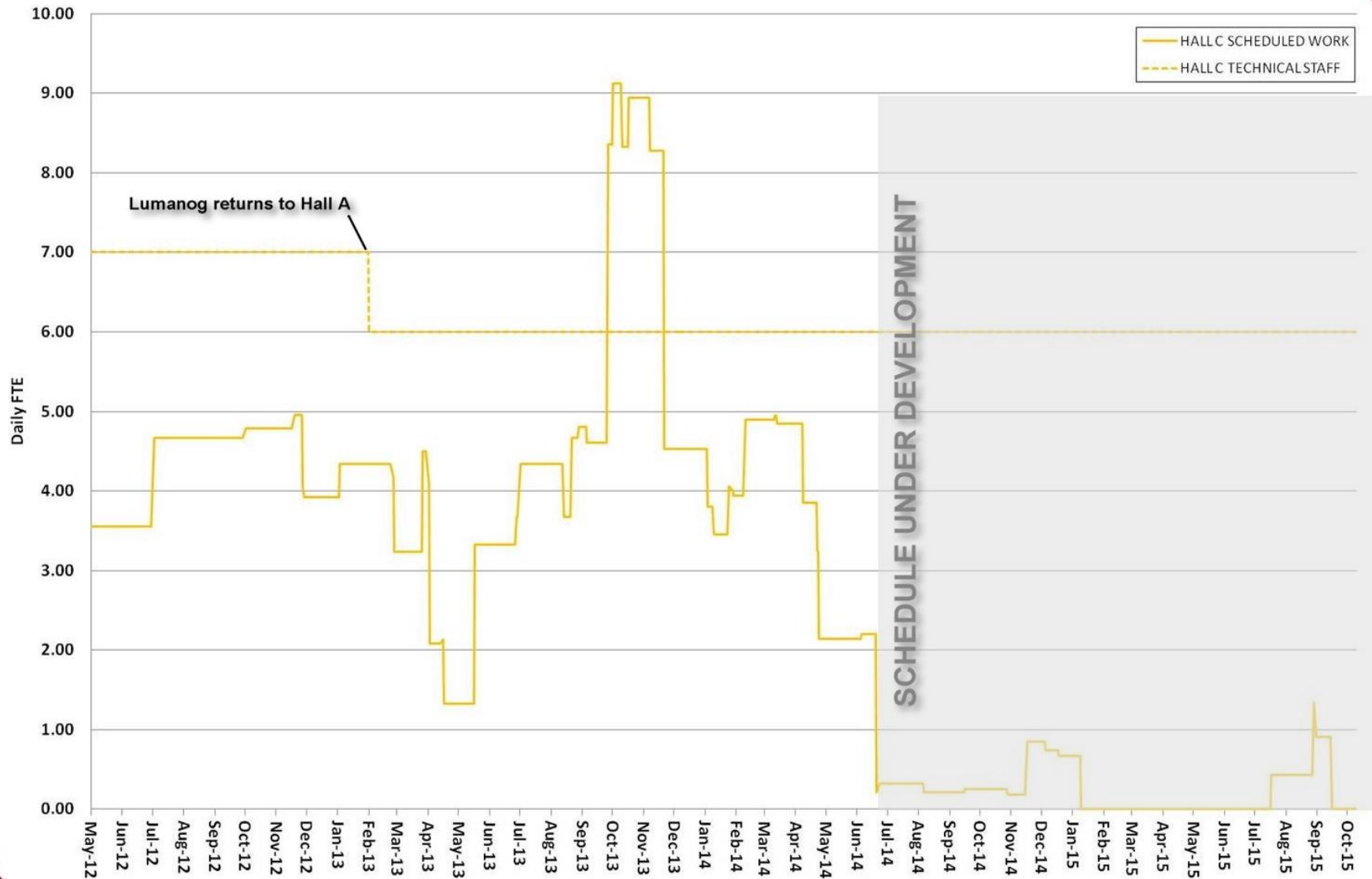
# Experimental Hall B: Technical Manpower vs. Scheduled Work



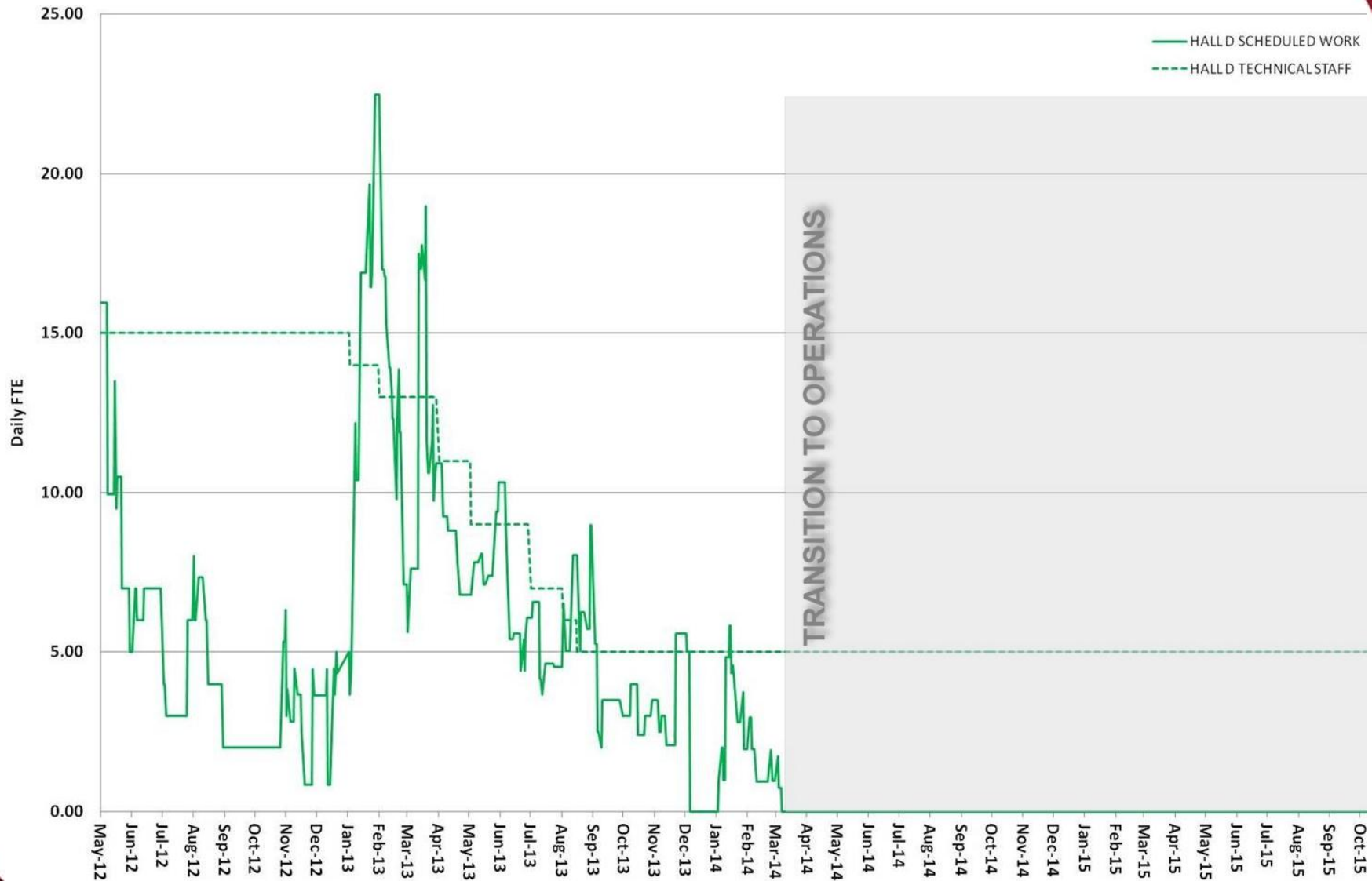
# Experimental Hall B: Data Provided from 12 GeV Schedule

WBS	Detector	MT (mw)	MT (#)	ET (mw)	ET (#)	Duration (Q)	Notes
1.4.2.2.1.1	Silicon Vertex Tracker (SVT)	11	0.1	11	0.1	8	Crew in place
1.4.2.2.1.3	Drift Chambers	314	4.7	237	3.5	7	Crew in place
1.4.2.2.2.3	Pre-Shower Calorimeters (PCAL)	38	1.1	0	0.0	4	Crew in place, using visitors
1.4.2.2.3.1	Central Time of Flight	112	2.0	12	0.2	6	Used 4x P6 Baseline remaining based on Progress file
1.4.2.2.3.2	Forward Time of Flight	132	2.9	6	0.1	5	1 MT for past 14 weeks
1.4.2.2.4.1	High Threshold Cherenkov Counters	200	3.6	0	0.0	6	My guess is 8Q, 270 mwk; 2.5 MT present all FY2012
1.4.2.2.4.2	Low Threshold Cherenkov Counter	24	0.4	0	0.0	6	Only prep work to date
1.4.2.3.1	Trigger	0	0.0	0	0.0	7	Largely Hall Scientific staff
1.4.2.3.2	DAQ	0	0.0	1	0.0	5	Largely Hall Scientific staff
1.4.2.3.3	Online	0	0.0	8	0.4	3	Largely Hall Scientific staff, visitors
1.4.2.3.4	Offline	0	0.0	0	0.0	0	(No work on project); visitors
1.4.2.3.5	Slow Controls	0	0.0	0	0.0	4	Largely Hall Scientific staff
1.4.2.4	Electronics	0	0.0	7	0.6	2	Largely Hall Scientific staff
1.4.2.5.1	Faraday Cup	12	1.1	0	0.0	2	Largely Hall Scientific staff
1.4.2.5.2	Moeller Polarimeter	11	0.3	4	0.1	4	Largely Hall Scientific staff
1.4.2.5.4	Beamline Components	9	0.3	0	0.0	4	Largely Hall Scientific staff, visitors
1.4.2.6.4	Installation	261	2.9	90	1.0	9	Use existing Hall tech staff ?
1.4.2.7.1	New Torus	478	7.1	0	0.0	7	I am skeptical of duration , lack of ET, effort; under study
1.4.2.7.2	New Solenoid	0	0.0	0	0.0	7	I am skeptical of duration , lack of ET, effort; under study
1.4.2.7.3	Magnet Infrastructure	45	1.3	0	0.0	4	I am skeptical of duration , lack of ET, effort; under study

# Experimental Hall C: Technical Manpower vs. Scheduled Work



# Experimental Hall D: Technical Manpower vs. Scheduled Work



# Experimental Nuclear Physics: Total Technical Staffing vs. Total Scheduled Work

