Experiment Readiness Review of Physics Division

Hall C SHMS Q2, Q3, and Dipole: Resource Loaded Schedule

Steven Lassiter

October 12, 2016

Schedule

- Schedule prepared taken in account experiences of previous magnet installations: HMS magnets and SHMS Q1 and HB.
- Use of overtime, double shifts and weekend work will be employed to maintain schedule.
- Resources from other areas of the Lab have been identified to assist if need be.



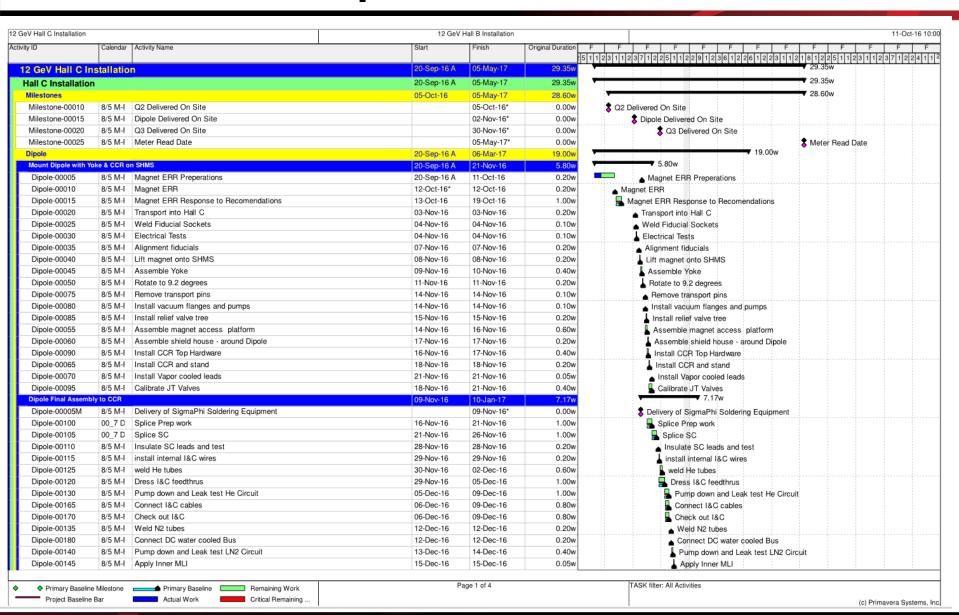
Resources

Activity ID	Activity Name	Resource Name	Resource Type	Start Finis	h	Budgeted Units
Q2-00005	Move SHMS to Beam Right	Hall C Tech	Labor	30-Sep-16	3-Oct-16	1
Q2-00025	Alignment fiducials	Alignment Tech	Labor	6-Oct-16	6-Oct-16	3
Q2-00030	Lift magnet onto SHMS	Hall C Techs	Labor	6-Oct-16	7-Oct-16	1
Q2-00020	Electrical Tests	Hall C Engineer	Labor	6-Oct-16	6-Oct-16	0.5
Q2-00030	Lift magnet onto SHMS	Hall C Tech	Labor	6-Oct-16	7-Oct-16	3
Q2-00015	Weld Fiducial Sockets	Hall C Tech	Labor	6-Oct-16	6-Oct-16	0.5
Q2-00015	Weld Fiducial Sockets	Hall C Welder	Labor	6-Oct-16	6-Oct-16	0.5
Q2-00035	Remove transport pins	Hall C Tech	Labor	7-Oct-16	7-Oct-16	1.5
Q2-00040	Assemble Yoke	Hall C Tech	Labor	10-Oct-16	12-Oct-16	6
Q2-00065	Install vacuum flanges and pumps	Hall C Tech	Labor	10-Oct-16	10-Oct-16	1
Q2-00085	Magnet pump down	Hall C Tech	Labor	10-Oct-16	15-Oct-16	1
Q2-00045	Assemble magnet access platform	Hall C Tech	Labor	12-Oct-16	17-Oct-16	9
Dipole-00015	Magnet ERR Response to Recomendations	Hall C Engineer	Labor	13-Oct-16	19-Oct-16	5
Q2-00147	Install AC Power for top of CCR	ELEC TECH ELECTRICIAN	Labor	17-Oct-16	19-Oct-16	4
Q2-00090	Leak test and pressure test	Hall C Engineer	Labor	17-Oct-16	17-Oct-16	1
Q2-00090	Leak test and pressure test	Hall C Tech	Labor	17-Oct-16	17-Oct-16	1
Q2-00070	Install relief valve tree	Hall C Tech	Labor	17-Oct-16	18-Oct-16	2
Q2-00095	N2 gas purge magnet helium circuit	Hall C Tech	Labor	18-Oct-16	20-Oct-16	3
Q2-00075	Install CCR Top Hardware	Hall C Tech	Labor	18-Oct-16	20-Oct-16	2
Q2-00050	Dress I&C Feedthrus	Spec Support Group	Labor	18-Oct-16	20-Oct-16	2
Q2-00060	Check out I&C	Hall C Engineer	Labor	20-Oct-16	26-Oct-16	4
Q2-00080	Calibrate JT Valves	Hall C Engineer	Labor	20-Oct-16	24-Oct-16	1
Q2-00055	Connect I&C cables	Hall C Tech	Labor	20-Oct-16	26-Oct-16	4
Q2-00080	Calibrate JT Valves	Hall C Tech	Labor	20-Oct-16	24-Oct-16	2
Q2-00100	Connect DC water cooled Bus	Hall C Tech	Labor	26-Oct-16	27-Oct-16	2
Q2-00100	Connect DC water cooled Bus	Spec Support Group	Labor	26-Oct-16	27-Oct-16	1
Q2-00105	Connect N2 gas vent line, warm He return line	Hall C Tech	Labor	27-Oct-16	28-Oct-16	2
Q2-00110	Install Lead gas return lines	Hall C Tech	Labor	28-Oct-16	2-Nov-16	6
Q2-00115	Leak test Helium gas lines and lead return line	Hall C Tech	Labor	2-Nov-16	3-Nov-16	1
Q2-00120	Pump and purge helium circuit	Hall C Tech	Labor	3-Nov-16	7-Nov-16	2
Dipole-00020	Transport into Hall C	Lockwood	Nonlabor	3-Nov-16	3-Nov-16	1
Dipole-00030	Electrical Tests	Hall C Engineer	Labor	4-Nov-16	4-Nov-16	0.5
Dipole-00025	Weld Fiducial Sockets	Hall C Welder	Labor	4-Nov-16	4-Nov-16	0.5
Dipole-00035	Alignment fiducials	Alignment Tech	Labor	7-Nov-16	7-Nov-16	2
Q2-00125	Circulate warm He gas thru magnet	ESR operator	Labor	7-Nov-16	9-Nov-16	0.4
Q2-00125	Circulate warm He gas thru magnet	Hall C Tech	Labor	7-Nov-16	9-Nov-16	2
Dipole-00040	Lift magnet onto SHMS	Hall C Tech	Labor	8-Nov-16	8-Nov-16	3
Dipole-00040	Lift magnet onto SHMS	Lockwood	Nonlabor	8-Nov-16	8-Nov-16	1
Q2-00135	Insert U-tubes	ESR operator	Labor	9-Nov-16	10-Nov-16	1
Dipole-00045	Assemble Yoke	Hall C Tech	Labor	9-Nov-16	10-Nov-16	6





Dipole Schedule



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Dipole-Q2 Schedule

eV Hall C Installation			12 GeV	Hall B Installation		11-Oct-1
rity ID	Calendar	Activity Name	Start	Finish	Original Duration	F F F F F F F F F F F F F F F F F F F
Dipole-00150	8/5 M-I	Install Shield	15-Dec-16	15-Dec-16	0.15w	_ Install Shield
Dipole-00155	8/5 M-I	Apply outer MLI	16-Dec-16	16-Dec-16	0.05w	▲ Apply outer MLI
Dipole-00175	8/5 M-I	N2 gas purge magnet helium circuit	15-Dec-16	16-Dec-16	0.40w	N2 gas purge magnet helium circuit
Dipole-00160	8/5 M-I	Install and weld one pass chimney	16-Dec-16	20-Dec-16	0.40w	Install and weld one pass chimney
Dipole-00185	00 7 D	Magnet pump down	20-Dec-16	25-Dec-16	1.00w	Magnet pump down
Dipole-00190	8/5 M-I	Leak test and pressure test	03-Jan-17	03-Jan-17	0.20w	Leak test and pressure test
Dipole-00210	8/5 M-I	Connect N2 gas vent line, warm He return line	03-Jan-17	03-Jan-17	0.20w	Connect N2 gas vent line, warm He return line
Dipole-00195	8/5 M-I	Vent vacuum to N2 Gas	04-Jan-17	04-Jan-17	0.02w	▲ Vent vacuum to N2 Gas
Dipole-00200	8/5 M-I	Complete chimney welding	04-Jan-17	06-Jan-17	0.40w	Complete chimney welding
Dipole-00215	8/5 M-I	Install Lead gas return lines	04-Jan-17	06-Jan-17	0.60w	Install Lead gas return lines
Dipole-00205	8/5 M-I	Final Pump down vacuum	06-Jan-17	10-Jan-17	0.40w	Final Pump down vacuum
Connect Cryogenic	s		09-Jan-17	03-Feb-17	3.80w	▼ 3.80w
Dipole-00220	8/5 M-I	Leak test Helium gas lines and lead return line	09-Jan-17	09-Jan-17	0.20w	▲ Leak test Helium gas lines and lead return line
Dipole-00225	8/5 M-I	Pump and purge helium circuit	10-Jan-17	11-Jan-17	0.40w	Pump and purge helium circuit
Dipole-00230	8/5 M-I	Circulate warm He gas thru magnet	12-Jan-17	13-Jan-17	0.40w	Circulate warm He gas thru magnet
Dipole-00240	8/5 M-I	Insert U-tubes	17-Jan-17	17-Jan-17	0.20w	▲ Insert U-tubes
Dipole-00235	8/5 M-I	Install Q3-D vacuum tube	02-Feb-17	03-Feb-17	0.40w	
Cool Down Dipole			30-Jan-17	16-Feb-17	2.80w	2,80w
Dipole-00247	8/5 M-I	Final Alignment	30-Jan-17	01-Feb-17	0.60w	▲ Final Alignment
Dipole-00248	8/5 M-I	Initial Quench Detector Settings	02-Feb-17	02-Feb-17	0.20w	Initial Quench Detector Settings
Dipole-00249	8/5 M-I	Install Electrical Shields on top of CCR	02-Feb-17	03-Feb-17	0.40w	Install Electrical Shields on top of CCR
Dipole-00245	00 7 D	Cool down Dipole to 80 K	30-Jan-17	13-Feb-17	3.00w	Cool down Dipole to 80 K
Dipole-00250	8/5 M-I	Helium fill Dipole	14-Feb-17	16-Feb-17	0.60w	Helium fill Dipole
Dipole-00255	8/5 M-I	Adjust Cryo controls	14-Feb-17	16-Feb-17	0.60w	Adjust Cryo controls
Power Test Dipole			17-Feb-17	06-Mar-17	2.40w	2.40w
Dipole-00260	8/5 M-I	Low power testing ~ 10 %	17-Feb-17	20-Feb-17	0.40w	Low power testing ~ 10 %
Dipole-00265	8/5 M-I	Progressive testing and support adjustment	21-Feb-17	27-Feb-17	1.00w	Progressive testing and support adjustment
Dipole-00275	8/5 M-I	Magnet Accepted		27-Feb-17	0.00w	Magnet Accepted
Dipole-00270	8/5 M-I	Dipole Full-Field Testing	28-Feb-17	06-Mar-17	1.00w	Dipole Full-Field Testing
Q2			30-Sep-16 A	04-Jan-17	12.15w	▼ 12.15w
Mount Q2 w/Yoke o	n SHMS		30-Sep-16 A	19-Oct-16	2.65w	▼ 2,65w
Q2-00005	8/5 M-I	Move SHMS to Beam Right	30-Sep-16*	03-Oct-16	0.20w	Move SHMS to Beam Right
Q2-00010	8/5 M-I	Transport into Hall C	06-Oct-16 A	06-Oct-16	0.20w	Transport into Hall C
Q2-00025	8/5 M-I	Alignment fiducials	06-Oct-16	06-Oct-16	0.10w	▲ Alignment fiducials
Q2-00015	8/5 M-I	Weld Fiducial Sockets	06-Oct-16	06-Oct-16	0.10w	▲ Weld Fiducial Sockets
Q2-00020	8/5 M-I	Electrical Tests	06-Oct-16	06-Oct-16	0.10w	▲ Electrical Tests
Q2-00030	8/5 M-I	Lift magnet onto SHMS	06-Oct-16	07-Oct-16	0.20w	Lift magnet onto SHMS
Q2-00035	8/5 M-I	Remove transport pins	07-Oct-16	07-Oct-16	0.10w	Remove transport pins
Q2-00040	8/5 M-I	Assemble Yoke	10-Oct-16	12-Oct-16	0.40w	Assemble Yoke
Q2-00045	8/5 M-I	Assemble magnet access platform	12-Oct-16	17-Oct-16	0.60w	Assemble magnet access platform
Q2-00147	8/5 M-I	Install AC Power for top of CCR	17-Oct-16	19-Oct-16	0.40w	Install AC Power for top of CCR
Connect I&C			18-Oct-16	26-Oct-16	1.20w	▼ 1.20w
Q2-00050	8/5 M-I	Dress I&C Feedthrus	18-Oct-16	20-Oct-16	0.40w	Dress I&C Feedthrus
Q2-00055	8/5 M-I	Connect I&C cables	20-Oct-16	26-Oct-16	0.80w	Connect I&C cables
Primary Baselin		Primary Baseline Remaining Work	P	age 2 of 4		TASK filter: All Activities

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Q2-Q3 Schedule

		Activity Name	Start	Finish	Original Duration f	
00.0000	0/5.54.6		22.2.112	22.2 : 12		1 1 2 3 1 1 2 3 7 1 2 2 5 1 1 2 2 9 1 2 3 6 1 2 2 6 1 2 2 3 1 1 2 1 8 1 2 2 5 1 1 2 3 1 1 2 3 7 1 2 2
Q2-00060		Check out I&C	20-Oct-16	26-Oct-16	0.80w	Leck out I&C ▼ 5.70w
Vac. & Cryo. / Pump I			10-Oct-16	17-Nov-16	5.70w	
Q2-00065		Install vacuum flanges and pumps	10-Oct-16	10-Oct-16	0.10w	▲ Install vacuum flanges and pumps
Q2-00085	00_7 D	Magnet pump down	10-Oct-16	15-Oct-16	1.00w	Magnet pump down
Q2-00090	8/5 M-I	Leak test and pressure test	17-Oct-16	17-Oct-16	0.20w	▲ Leak test and pressure test
Q2-00070	8/5 M-I	Install relief valve tree	17-Oct-16	18-Oct-16	0.20w	Install relief valve tree
Q2-00075	8/5 M-I	Install CCR Top Hardware	18-Oct-16	20-Oct-16	0.40w	Install CCR Top Hardware
Q2-00095	00_7 D	N2 gas purge magnet helium circuit	18-Oct-16	20-Oct-16	0.60w	N2 gas purge magnet helium circuit
Q2-00080	8/5 M-I	Calibrate JT Valves	20-Oct-16	24-Oct-16	0.40w	Calibrate JT Valves
Q2-00100	8/5 M-I	Connect DC water cooled Bus	26-Oct-16	27-Oct-16	0.20w	Connect DC water cooled Bus
Q2-00105	8/5 M-I	Connect N2 gas vent line, warm He return line	27-Oct-16	28-Oct-16	0.20w	Connect N2 gas vent line, warm He return line
Q2-00110	8/5 M-I	Install Lead gas return lines	28-Oct-16	02-Nov-16	0.60w	Install Lead gas return lines
Q2-00115	8/5 M-I	Leak test Helium gas lines and lead return line	02-Nov-16	03-Nov-16	0.20w	Leak test Helium gas lines and lead return line
Q2-00120	8/5 M-I	Pump and purge helium circuit	03-Nov-16	07-Nov-16	0.40w	Pump and purge helium circuit
Q2-00125	8/5 M-I	Circulate warm He gas thru magnet	07-Nov-16	09-Nov-16	0.40w	Circulate warm He gas thru magnet
Q2-00135	8/5 M-I	Insert U-tubes	09-Nov-16	10-Nov-16	0.20w	Insert U-tubes
Q2-00130	8/5 M-i	Install Q1-Q2 vacuum tube	15-Nov-16	17-Nov-16	0.40w	Install Q1-Q2 vacuum tube 1.70w
Cool-down Q2			10-Nov-16	22-Nov-16	1.70w	
Q2-00142		Final Alignment	10-Nov-16	15-Nov-16	0.60w	Final Alignment
Q2-00143	8/5 M-I	Initial Quench Detector Settings	15-Nov-16	16-Nov-16	0.20w	Initial Quench Detector Settings
Q2-00144	8/5 M-I	Install Electrical Shields on top of CCR	15-Nov-16	17-Nov-16	0.40w	Install Electrical Shields on top of CCR
Q2-00140	00_7 D	Cool down to 80 K	10-Nov-16	20-Nov-16	2.00w	Cool down to 80 K
Q2-00145	8/5 M-I	Helium fill	21-Nov-16	22-Nov-16	0.40w	Helium fill
Power-test Q2	015.14.4		21-Nov-16	04-Jan-17	5.00w	
Q2-00150		Adjust controls	21-Nov-16	22-Nov-16	0.40w	Adjust controls
Q2-00155	8/5 M-I	Low power testing ~ 10 %	23-Nov-16	28-Nov-16	0.40w	Low power testing ~ 10 %
Q2-00160	8/5 M-I	Progressive testing and support adjustment	29-Nov-16	12-Dec-16	2.00w	Progressive testing and support adjustment
Q2-00165	8/5 M-I	Acceptance Test	13-Dec-16	04-Jan-17	2.00w	Acceptance Test
Q3	0.000		01-Dec-16	16-Feb-17	9.80w	7 2.40w
Mount Q3 w/Yoke on			01-Dec-16	16-Dec-16	2.40w	
Q3-00005	8/5 M-I	Transport into Hall C	01-Dec-16	01-Dec-16	0.20w	
Q3-00010	8/5 M-I	Weld Fiducial Sockets	02-Dec-16	02-Dec-16	0.10w	▲ Weld Fiducial Sockets
Q3-00015	8/5 M-I	Electrical Tests	02-Dec-16	02-Dec-16	0.10w	Lectrical Tests
Q3-00020	8/5 M-I	Alignment fiducials	05-Dec-16	05-Dec-16	0.20w	▲ Alignment fiducials
Q3-00025	8/5 M-I	Lift magnet onto SHMS	06-Dec-16	06-Dec-16	0.20w	Lift magnet onto SHMS
Q3-00035	8/5 M-I	Remove transport pins	07-Dec-16	07-Dec-16	0.10w	■ Remove transport pins
Q3-00030	8/5 M-I	Rotate SHMS to Beam Left	07-Dec-16	07-Dec-16	0.20w	▲ Rotate SHMS to Beam Left
Q3-00040	8/5 M-I	Assemble Yoke	08-Dec-16	09-Dec-16	0.40w	Assemble Yoke
Q3-00045	8/5 M-I	Assemble magnet access platform	12-Dec-16	14-Dec-16	0.60w	Assemble magnet access platform
Q3-00047	8/5 M-I	Install AC Power for top of CCR	15-Dec-16	16-Dec-16	0.40w	Install AC Power for top of CCR
Connect I&C	-1-11		16-Dec-16	03-Jan-17	1.40w	1.40w
Q3-00050	8/5 M-I	Dress I&C Feedthrus	16-Dec-16	19-Dec-16	0.40w	Dress I&C Feedthrus
Q3-00055	8/5 M-I	Connect I&C cables	20-Dec-16	03-Jan-17	0.80w	Connect I&C cables
Q3-00060	8/5 M-I	Check out I&C	20-Dec-16	03-Jan-17	0.80w	Check out I&C
 Primary Baseline 	a Milastona	Primary Baseline Remaining Work	F	Page 3 of 4		TASK filter: All Activities





Q3-Final Preparations Schedule

y ID	Calendar	Activity Name	Start	Hall B Installation	Original Duration F	11-0
		·	Cital	1 11311		3 1 2 3 7 1 2 5 1 1 2 9 1 2 3 6 1 2 2 6 1 2 2 3 1 1 2 1 8 1 2 2 5 1 1 2 3 1 1 2 3 7 1 2
Vac. & Cryo. / Pump I			07-Dec-16	20-Jan-17	5.10w	5.10w
Q3-00065	8/5 M-I	Install vacuum flanges and pumps	07-Dec-16	07-Dec-16	0.10w	▲ Install vacuum flanges and pumps
Q3-00085	00_7 D	Magnet pump down	08-Dec-16	12-Dec-16	1.00w	Magnet pump down
Q3-00090	8/5 M-I	Leak test and pressure test	13-Dec-16	13-Dec-16	0.20w	Leak test and pressure test
Q3-00070	8/5 M-I	Install relief valve tree	15-Dec-16	15-Dec-16	0.20w	▲ Install relief valve tree
Q3-00095	8/5 M-I	N2 gas purge magnet helium circuit	14-Dec-16	16-Dec-16	0.60w	N2 gas purge magnet helium circuit
Q3-00075	8/5 M-I	Install CCR Top Hardware	16-Dec-16	19-Dec-16	0.40w	Install CCR Top Hardware
Q3-00080	8/5 M-I	Calibrate JT Valves	20-Dec-16	21-Dec-16	0.40w	Lalibrate JT Valves
Q3-00100	8/5 M-I	Connect DC water cooled Bus	04-Jan-17	04-Jan-17	0.20w	
Q3-00105	8/5 M-I	Connect N2 gas vent line, warm He return line	05-Jan-17	05-Jan-17	0.20w	Connect N2 gas vent line, warm He return line
Q3-00110	8/5 M-I	Install Lead gas return lines	06-Jan-17	10-Jan-17	0.60w	■ Install Lead gas return lines
Q3-00115	8/5 M-I	Leak test Helium gas lines and lead return line	11-Jan-17	11-Jan-17	0.20w	▲ Leak test Helium gas lines and lead return line
Q3-00120	8/5 M-I	Pump and purge helium circuit	12-Jan-17	13-Jan-17	0.40w	Pump and purge helium circuit
Q3-00125	8/5 M-I	Circulate warm He gas thru magnet	17-Jan-17	18-Jan-17	0.40w	Circulate warm He gas thru magnet
Q3-00135	8/5 M-I	Insert U-tubes	19-Jan-17	19-Jan-17	0.20w	Insert U-tubes
Q3-00130	8/5 M-I	Install Q2-Q3 and Q3-Dipole vacuum tube	19-Jan-17	20-Jan-17	0.40w	Install Q2-Q3 and Q3-Dipole vacuum tube
Coll-down Q3			20-Jan-17	31-Jan-17	1.60w	▼ 1.60w
Q3-00142	8/5 M-I	Final Alignment	20-Jan-17	24-Jan-17	0.60w	Final Alignment
Q3-00143	8/5 M-I	Initial Quench Detector Settings	25-Jan-17	25-Jan-17	0.20w	▲ Initial Quench Detector Settings
Q3-00144	8/5 M-I	Install Electrical Shields on top of CCR	25-Jan-17	26-Jan-17	0.40w	Install Electrical Shields on top of CCR
Q3-00140	00_7 D	Cool down to 80 K	20-Jan-17	29-Jan-17	2.00w	Cool down to 80 K
Q3-00145	8/5 M-I	Helium fill Q3	30-Jan-17	31-Jan-17	0.40w	Helium fill Q3
Power-test Q3			30-Jan-17	16-Feb-17	2.80w	₹ — 2.80w
Q3-00150	8/5 M-I	Adjust controls	30-Jan-17	31-Jan-17	0.40w	▲ Adjust controls
Q3-00155	8/5 M-I	Low power testing ~ 10 %	01-Feb-17	02-Feb-17	0.40w	Low power testing ~ 10 %
Q3-00160	8/5 M-I	Progressive testing and support adjustment	03-Feb-17	09-Feb-17	1.00w	Progressive testing and support adjustment
Q3-00165	8/5 M-I	Acceptance Test	10-Feb-17	16-Feb-17	1.00w	Acceptance Test
Final Preparations fo	or Beam		18-Nov-16	14-Mar-17	14.80w	▼ 14.80w
Install NGC & Beam-	pipe		18-Nov-16	14-Mar-17	14.80w	▼ 14.80w
Beam-00005	8/5 M-I	Install Drift Chambers	18-Nov-16	28-Nov-16	1.00w	Install Drift Chambers
Beam-00025	8/5 M-I	ARR Prep Work	19-Dec-16*	09-Jan-17	1.60w	ARR Prep Work
Beam-00030	8/5 M-I	ARR	09-Jan-17	10-Jan-17	0.20w	▲ ARR
Beam-00035	8/5 M-I	ARR Response to Recomendations	10-Jan-17	18-Jan-17	1.00w	ARR Response to Recomendations
Beam-00010	8/5 M-I	Install Vac. Extension w/Shutter OR NGC	18-Jan-17	24-Jan-17	1.00w	Install Vac. Extension w/Shutter OR NGC
Beam-00012	8/5 M-I	Install Final Roof and Wall Blocks	25-Jan-17	25-Jan-17	0.20w	▲ Install Final Roof and Wall Blocks
Beam-00015	8/5 M-I	Install & Leak-Check Beam Pipes DS of Tgt	26-Jan-17	01-Feb-17	1.00w	Install & Leak-Check Beam Pipes DS of Tgt
Beam-00020	8/5 M-I	Complete Power-test of All Magnets Together	07-Mar-17	07-Mar-17	0.20w	
Beam-00040	8/5 M-I	Commissioning with Beam	08-Mar-17	14-Mar-17	1.00w	Commissioning with Beam





Key Dates

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Delivery

- Q2Oct 06 2016

- Q3 Dec 01 2016

Dipole Nov 03 2016

Cool down Starts

Nov 10 2016 - Q2

– Q3Jan 20 2017

Dipole Jan 30 2017

Power Testing Starts

Nov 23 2016 - Q2

– Q3 Feb 01 2017

Dipole Feb 17 2017

Magnet Accepted

Jan 04 2017 – Q2

– Q3 Feb 16 2017

Dipole Mar 06 2017

 Power Test all SHMS Magnets

Mar 7 2017

 Commissioning with Beam

Mar 8-14 2017



Summary

- A schedule has been developed for the installation, testing, calibration and commissioning of the SHMS Magnets that is based on previous magnet installations.
- Schedule is mostly sequential per magnet and parallel among magnets.
- Schedule is based on experiences from previous magnets.