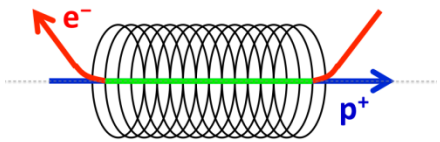
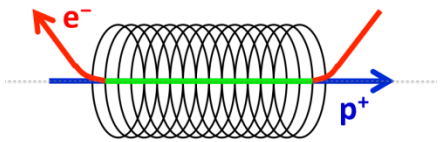


Electron Lens Superconducting Solenoid Status

Michael Anerella

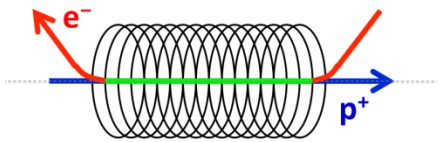
March 29, 2011

Outline



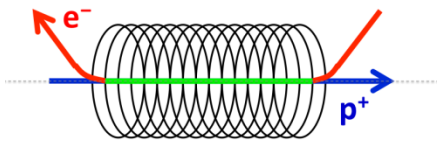
- Corrector coils
- Main solenoid coils
- Anti-Fringe field, Fringe Field coils
- Schedule

Corrector coils



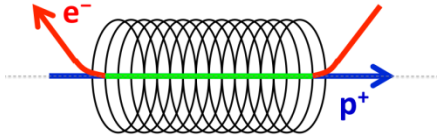
- Coil Support Tube insulation (DM)
  - Kapton complete
  - Nomex 90% complete
- Coil winding should start later this week
- Need modified tip for ultrasonic device (AM/RC)
- OVEN – need "retort" for final cure (AM/RC)

Main Solenoid Coils



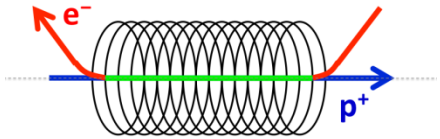
- Support tube insulated, Kapton wrinkled due to out-gassing during cure; re-insulated & cured without problem
- Internal support flanges received, being fitted, need insulating
- Lead end, NLE flanges due ~ Wednesday, need insulating
- Draft versions of winding travelers are available
- Parts deliveries started
- Winding should start ~ 4/4

AFF, FF Solenoid coils

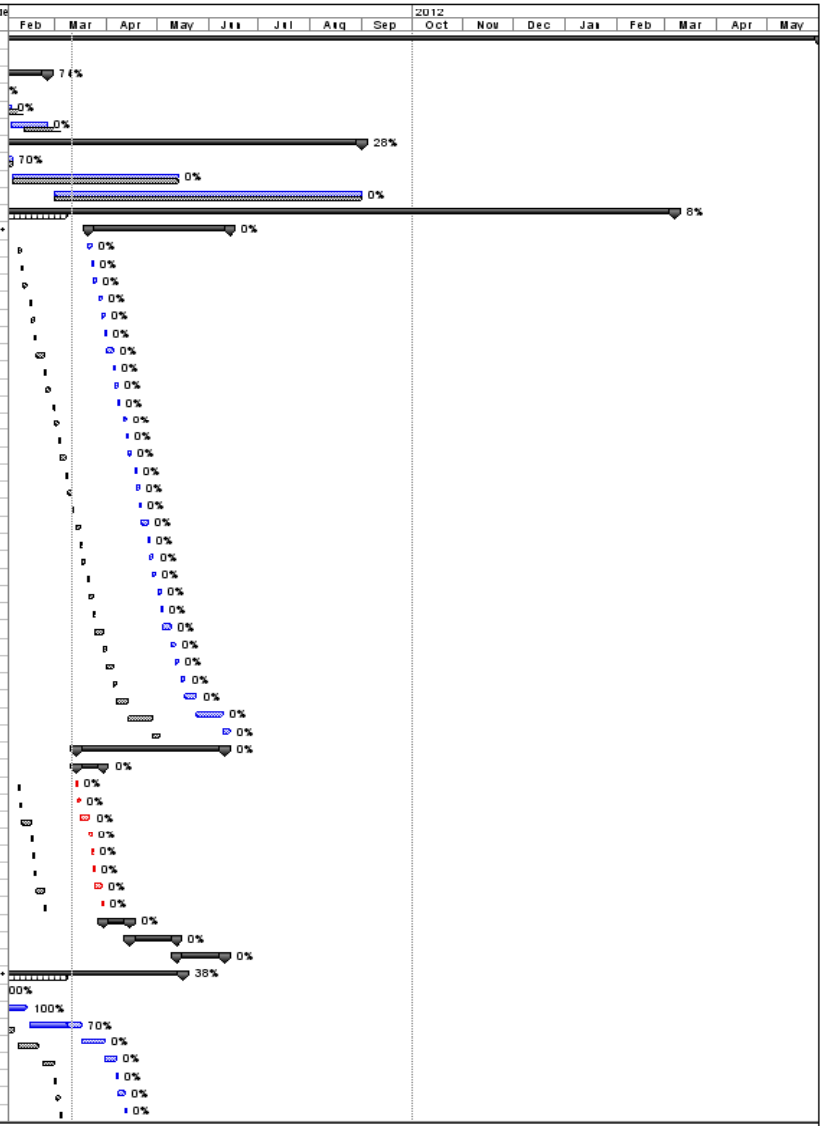


- AFF support hub, Winding machine upgrade are complete
- AFF Coil #1
  - winding is complete
  - Initial hypot is complete
  - Coil is presently being setup for over-wrap of fiberglass roving
- AFF Coil #2
  - Flange insulation is complete
  - Winding should start ~ 3/29
- FF coil #1
  - Flange material delivered to CS, work Order approved, material to be ground (by vendor) & then machined (by CS)

schedule p.1



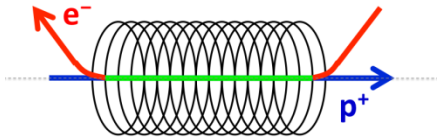
ID		Task Name	Duration	Baseline Start	Baseline Finish	Actual Start	Actual Finish	% Complete	Prede
1		electron lens solenoid	552.5 days	4/5/10	5/22/12	4/5/10	NA	23%	
2	✓	Preliminary Design	80 days	4/5/10	7/27/10	4/5/10	7/27/10	100%	
3		Final Design	143.75 days	7/28/10	3/4/11	7/28/10	NA	74%	2
4		Coils	118.75 days	7/28/10	1/27/11	7/28/10	NA	90%	
5		Cold Masses	10 days	1/28/11	2/10/11	NA	NA	0%	4
6		Magnets	15 days	2/11/11	3/4/11	NA	NA	0%	5
7		Fabrication / Procurement	276 days	7/28/10	8/31/11	7/28/10	NA	28%	2
8		Coils	130 days	7/28/10	2/3/11	7/28/10	NA	70%	
9		Cold Masses	70 days	2/4/11	5/13/11	NA	NA	0%	
10		Magnets	130 days	3/1/11	8/31/11	NA	NA	0%	
11		Magnet #1	288.5 days	1/21/11	2/10/12	1/24/11	NA	8%	
12		Solenoid Coil Assembly	60 days	2/7/11	5/2/11	3/21/11	NA	0%	7SS+
13		insulate tube / cure	2 days	2/7/11	2/8/11	3/21/11	NA	0%	
14		install cable spool, support tube	1 day	2/9/11	2/9/11	NA	NA	0%	13
15		wind double layer 1	2 days	2/10/11	2/11/11	NA	NA	0%	14
16		wrap, cure	1 day	2/14/11	2/14/11	NA	NA	0%	15
17		wind double layer 2	2 days	2/15/11	2/16/11	NA	NA	0%	16
18		wrap, cure	1 day	2/17/11	2/17/11	NA	NA	0%	17
19		wind double layer 3	2 days	2/18/11	2/22/11	NA	NA	0%	18
20		wrap, cure	1 day	2/23/11	2/23/11	NA	NA	0%	19
21		wind double layer 4	2 days	2/24/11	2/25/11	NA	NA	0%	20
22		wrap, cure	1 day	2/28/11	2/28/11	NA	NA	0%	21
23		wind double layer 5	2 days	3/1/11	3/2/11	NA	NA	0%	22
24		wrap, cure	1 day	3/3/11	3/3/11	NA	NA	0%	23
25		wind double layer 6	2 days	3/4/11	3/7/11	NA	NA	0%	24
26		wrap, cure	1 day	3/8/11	3/8/11	NA	NA	0%	25
27		wind double layer 7	2 days	3/9/11	3/10/11	NA	NA	0%	26
28		wrap, cure	1 day	3/11/11	3/11/11	NA	NA	0%	27
29		wind double layer 8	2 days	3/14/11	3/15/11	NA	NA	0%	28
30		wrap, cure	1 day	3/16/11	3/16/11	NA	NA	0%	29
31		wind double layer 9	2 days	3/17/11	3/18/11	NA	NA	0%	30
32		wrap, cure	1 day	3/21/11	3/21/11	NA	NA	0%	31
33		wind double layer 10	2 days	3/22/11	3/23/11	NA	NA	0%	32
34		wrap, cure	1 day	3/24/11	3/24/11	NA	NA	0%	33
35		wind double layer 11, including 4 l	3 days	3/25/11	3/29/11	NA	NA	0%	34
36		wrap, cure	2 days	3/30/11	3/31/11	NA	NA	0%	35
37		over-wrap fiberglass	2 days	4/1/11	4/4/11	NA	NA	0%	36
38		cure	2 days	4/5/11	4/6/11	NA	NA	0%	37
39		machine OD	5 days	4/7/11	4/13/11	NA	NA	0%	38
40		stabilize, installuts, insulate exitin	11 days	4/14/11	4/28/11	NA	NA	0%	39
41		electrical tests	2 days	4/29/11	5/2/11	NA	NA	0%	40
42		Fringe Field Solenoid Coils	64 days	2/7/11	5/18/11	3/14/11	NA	0%	
43		AFF Coil #1	12 days	2/7/11	2/23/11	3/14/11	NA	0%	
44		insulate lead	1 day	2/7/11	2/7/11	3/14/11	NA	0%	
45		splice, insulate start lead / ins	1 day	2/8/11	2/8/11	NA	NA	0%	44
46		wind 24 layers	4 days	2/9/11	2/14/11	NA	NA	0%	45
47		splice, insulate exiting lead	1 day	2/15/11	2/15/11	NA	NA	0%	46
48		cure	1 day	2/16/11	2/16/11	NA	NA	0%	47
49		overwrap / cure	1 day	2/17/11	2/17/11	NA	NA	0%	48
50		machine OD	2 days	2/18/11	2/22/11	NA	NA	0%	49
51		electrical tests	1 day	2/23/11	2/23/11	NA	NA	0%	50
52		AFF Coil #2	12 days	2/24/11	3/11/11	NA	NA	0%	
61		FF Coil #1	20 days	3/14/11	4/14/11	NA	NA	0%	
70		FF Coil #2	20 days	4/15/11	5/18/11	NA	NA	0%	
79		Block Corrector Coils	80 days	1/21/11	4/7/11	1/24/11	NA	38%	7SS+
80	✓	deburr / clean tube	0.5 days	1/21/11	1/21/11	1/24/11	1/24/11	100%	
81	✓	return to CS for rework	14 days	NA	NA	1/25/11	2/11/11	100%	80
82		insulate 0.5m/2.5m grooves (20 bl	22 days	1/24/11	2/4/11	2/14/11	NA	70%	81
83		wind 4 layer 0.5m collblocks (20)	10 days	2/7/11	2/18/11	NA	NA	0%	82
84		stabilize / insulate 40 leads	5 days	2/22/11	2/28/11	NA	NA	0%	83
85		electrical tests	1 day	3/1/11	3/1/11	NA	NA	0%	84
86		wind 1 layer 2.5m collblocks (4)	2 days	3/2/11	3/3/11	NA	NA	0%	85
87		stabilize / insulate 8 leads	1 day	3/4/11	3/4/11	NA	NA	0%	86



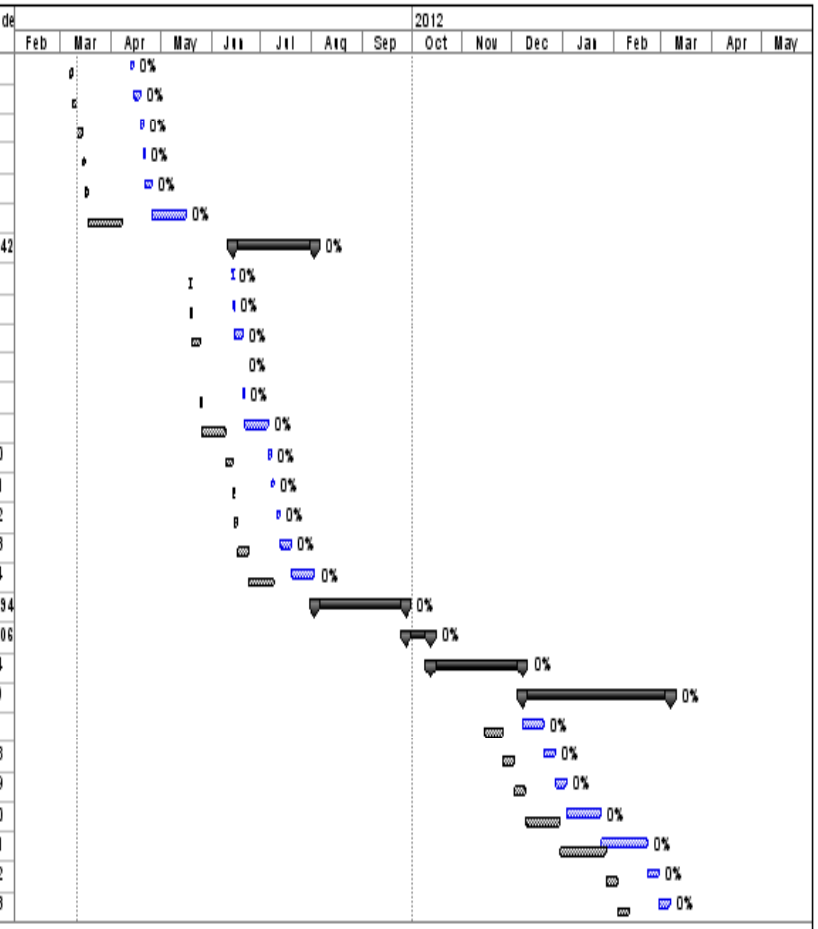
Project: electron lens solenoid baseline
Date: 3/11/11

Critical | Critical Split | Critical Progress | Task | Split | Task Progress | Baseline | Baseline Split | Baseline Milestone | Milestone | Summary Progress | Summary | Project Summary | Critical Split | Critical Progress | Task | Split | Task Progress | Baseline | Baseline Split | Baseline Milestone | Milestone | Summary Progress | Summary

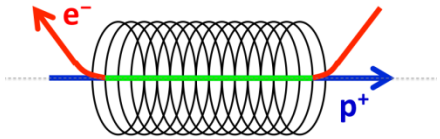
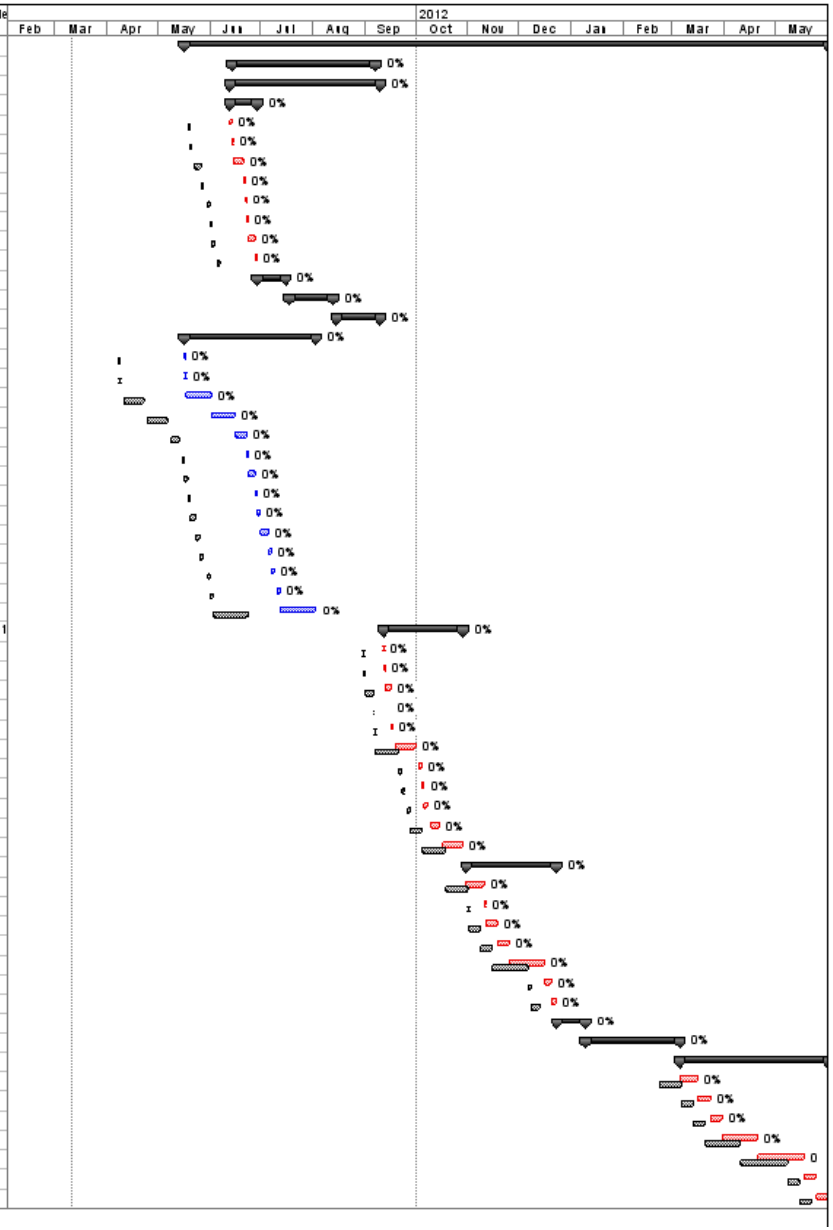
schedule p.2



ID		Task Name	Duration	Baseline Start	Baseline Finish	Actual Start	Actual Finish	% Complete	Predecessors
88		electrical tests	2 days	3/7/11	3/8/11	NA	NA	0%	87
89		kevlar wrap / core	2 days	3/9/11	3/10/11	NA	NA	0%	88
90		strip / wrap / prep for core	2 days	3/11/11	3/14/11	NA	NA	0%	89
91		final core	1 day	3/15/11	3/15/11	NA	NA	0%	90
92		electrical tests	2 days	3/16/11	3/17/11	NA	NA	0%	91
93		magnetic measurements	15 days	3/18/11	4/7/11	NA	NA	0%	92
94		Yoke Assembly	35 days	5/19/11	7/8/11	NA	NA	0%	12,42
95		install AFF coils onto support tube	0.5 days	5/19/11	5/19/11	NA	NA	0%	
96		install corrector coil assembly	0.5 days	5/19/11	5/19/11	NA	NA	0%	95
97		install yoke, outer support shell	3.5 days	5/20/11	5/25/11	NA	NA	0%	96
98		install NLE bus	0.25 days	5/25/11	5/25/11	NA	NA	0%	97
99		install wiring boards (2)	0.25 days	5/25/11	5/25/11	NA	NA	0%	98
100		wire main solenoid leads (22), vts	10 days	5/26/11	6/9/11	NA	NA	0%	99
101		wire AFF leads (4), vts (3)	2 days	6/10/11	6/13/11	NA	NA	0%	100
102		install FF coils	1 day	6/14/11	6/14/11	NA	NA	0%	101
103		wire FF leads (4), vts (3)	2 days	6/15/11	6/16/11	NA	NA	0%	102
104		electrical tests	5 days	6/17/11	6/23/11	NA	NA	0%	103
105		magnetic / polarity tests	10 days	6/24/11	7/8/11	NA	NA	0%	104
106		Vertical Cold Test	39.5 days	7/11/11	9/2/11	NA	NA	0%	12,94
114		Cold Mass Assembly	11 days	9/2/11	9/19/11	NA	NA	0%	7,106
119		Magnet Assembly	40 days	9/19/11	11/14/11	NA	NA	0%	114
137		Final Magnet Test	64 days	11/14/11	2/10/12	NA	NA	0%	119
138		power supply, helium connections	9 days	11/14/11	11/25/11	NA	NA	0%	
139		300K elect test & integ. field msmt	5 days	11/25/11	12/2/11	NA	NA	0%	138
140		cooldown	5 days	12/2/11	12/9/11	NA	NA	0%	139
141		4.5K elect, heater, quench, DC loc	15 days	12/9/11	12/30/11	NA	NA	0%	140
142		magnetic measurements	20 days	12/30/11	1/27/12	NA	NA	0%	141
143		warm up	5 days	1/27/12	2/3/12	NA	NA	0%	142
144		disconnect electrical, plumbing	5 days	2/3/12	2/10/12	NA	NA	0%	143



schedule p.3



ID		Task Name	Duration	Baseline Start	Baseline Finish	Actual Start	Actual Finish	% Complete	Prede
145		Magnet #2	271.5 days	4/8/11	5/22/12	NA	NA	0%	
146		Solenoid Coil Assembly	60 days	5/3/11	7/27/11	NA	NA	0%	12
176		Fringe Field Solenoid Coils	64 days	5/19/11	8/30/11	NA	NA	0%	70
177		AFF Coil #1	12 days	5/19/11	6/6/11	NA	NA	0%	
178		insulate lead	1 day	5/19/11	5/19/11	NA	NA	0%	
179		splice, insulate start lead / ins	1 day	5/20/11	5/20/11	NA	NA	0%	178
180		wind 24 layers	4 days	5/23/11	5/26/11	NA	NA	0%	179
181		splice, insulate exiting lead	1 day	5/27/11	5/27/11	NA	NA	0%	180
182		cure	1 day	5/31/11	5/31/11	NA	NA	0%	181
183		overwrap / cure	1 day	6/1/11	6/1/11	NA	NA	0%	182
184		machine OD	2 days	6/2/11	6/3/11	NA	NA	0%	183
185		electrical tests	1 day	6/6/11	6/6/11	NA	NA	0%	184
186		AFF Coil #2	12 days	6/7/11	6/22/11	NA	NA	0%	
195		FF Coil #1	20 days	6/23/11	7/27/11	NA	NA	0%	
204		FF Coil #2	20 days	7/28/11	8/30/11	NA	NA	0%	
213		Block Corrector Coils	54 days	4/8/11	6/23/11	NA	NA	0%	
214		deburr / clean tube	0.5 days	4/8/11	4/8/11	NA	NA	0%	79
215		form pusters	0.5 days	4/8/11	4/8/11	NA	NA	0%	214
216		insulate 0.5m/2.5m grooves (20 bl	10 days	4/11/11	4/22/11	NA	NA	0%	215
217		wind 4 layer 0.5m coilblocks (20)	10 days	4/25/11	5/6/11	NA	NA	0%	216
218		stabilize / insulate 40 leads	5 days	5/9/11	5/13/11	NA	NA	0%	217
219		electrical tests	1 day	5/16/11	5/16/11	NA	NA	0%	218
220		wind 1 layer 2.5m coilblocks (4)	2 days	5/17/11	5/18/11	NA	NA	0%	219
221		stabilize / insulate 8 leads	1 day	5/19/11	5/19/11	NA	NA	0%	220
222		electrical tests	2 days	5/20/11	5/23/11	NA	NA	0%	221
223		kevlar wrap / cure	2 days	5/24/11	5/25/11	NA	NA	0%	222
224		strip / wrap / prep for cure	2 days	5/26/11	5/27/11	NA	NA	0%	223
225		final cure	1 day	5/31/11	5/31/11	NA	NA	0%	224
226		electrical tests	2 days	6/1/11	6/2/11	NA	NA	0%	225
227		magnetic measurements	15 days	6/3/11	6/23/11	NA	NA	0%	226
228		Yoke Assembly	35 days	8/31/11	10/18/11	NA	NA	0%	213,1
229		install AFF coils onto support tube	0.5 days	8/31/11	8/31/11	NA	NA	0%	
230		install corrector coil assembly	0.5 days	8/31/11	8/31/11	NA	NA	0%	229
231		install yoke, center supports sleeve	3.5 days	9/1/11	9/6/11	NA	NA	0%	230
232		install NLE bars	0.25 days	9/6/11	9/6/11	NA	NA	0%	231
233		install wiring boards (2)	0.25 days	9/6/11	9/6/11	NA	NA	0%	232
234		wire main solenoid leads (22), vts	10 days	9/7/11	9/20/11	NA	NA	0%	233
235		wire AFF leads (4), vts (3)	2 days	9/21/11	9/22/11	NA	NA	0%	234
236		install FF coils	1 day	9/23/11	9/23/11	NA	NA	0%	235
237		wire FF leads (4), vts (3)	2 days	9/26/11	9/27/11	NA	NA	0%	236
238		electrical tests	5 days	9/28/11	10/4/11	NA	NA	0%	237
239		magnetic / polarity tests	10 days	10/5/11	10/18/11	NA	NA	0%	238
240		Vertical Cold Test	39.5 days	10/19/11	12/13/11	NA	NA	0%	228
241		wiring stand install and test	9 days	10/19/11	10/31/11	NA	NA	0%	
242		install in dewar	0.5 days	11/1/11	11/1/11	NA	NA	0%	241
243		300K elect test & integ. field msmt	5 days	11/1/11	11/8/11	NA	NA	0%	242
244		cooldown to 4.5K	5 days	11/8/11	11/15/11	NA	NA	0%	243
245		4.5K elect, heater, quench, DC loc	15 days	11/15/11	12/6/11	NA	NA	0%	244
246		warm up	2 days	12/6/11	12/8/11	NA	NA	0%	245
247		remove from dewar, test fixture	3 days	12/8/11	12/13/11	NA	NA	0%	246
248		Cold Mass Assembly	11 days	12/13/11	12/28/11	NA	NA	0%	240
253		Magnet Assembly	40 days	12/28/11	2/22/12	NA	NA	0%	248
271		Final Magnet Test	64 days	2/22/12	5/22/12	NA	NA	0%	253
272		power supply, helium connections	9 days	2/22/12	3/6/12	NA	NA	0%	
273		300K elect test & integ. field msmt	5 days	3/6/12	3/13/12	NA	NA	0%	272
274		cooldown	5 days	3/13/12	3/20/12	NA	NA	0%	273
275		4.5K elect, heater, quench, DC loc	15 days	3/20/12	4/10/12	NA	NA	0%	274
276		magnetic measurements	20 days	4/10/12	5/8/12	NA	NA	0%	275
277		warm up	5 days	5/8/12	5/15/12	NA	NA	0%	276
278		disconnect electrical, plumbing	5 days	5/15/12	5/22/12	NA	NA	0%	277