

ID	Task Name	Duration	Start	Finish	Predecessors	10/17
1	Design - Magnet Modification	21 days	11/15/10	12/15/10		
2	Design new tower assembly	3 wks	11/15/10	12/7/10		
3	Internal design review	1 day	12/8/10	12/8/10	2	
4	Tower design accepted	5 days	12/9/10	12/15/10	3	
5	Engineering Drawings	60 days	11/8/10	2/9/11		
6	Sort drawing file from Wang	2 wks	11/8/10	11/19/10		
7	Produce part models	2 mons	11/22/10	1/26/11	6	
8	Produce assembly models	1 mon	1/13/11	2/9/11	7FS-2 wks	
9	Fabrication and Assembly	139 days	10/28/10	5/20/11		
10	Fabrication	136 days	10/28/10	5/17/11		
11	Cold Mass for Solenoid 1	39.5 days	11/15/10	1/19/11		
12	Open cold mass and stabalise leads	1 wk	11/15/10	11/19/10		
13	Machine 5 holes for the cryo coolers	1 wk	12/16/10	12/22/10	12,4	
14	Insert Bimetal inserts into holes	2 days	12/23/10	12/24/10	13	
15	Weld cooler tubes and bellow	2 days	1/4/11	1/5/11	14	
16	Upgrade vent and fill line	3 days	1/6/11	1/10/11	15	
17	Install top fill line	2 days	1/11/11	1/12/11	16	
18	Install heat intercept to main fill line	4 hrs	1/11/11	1/11/11	16	
19	Install 4K lead heat intercepts	1 day	1/11/11	1/12/11	18	
20	Vacuum leak check	2 days	1/11/11	1/13/11	18	
21	Cold mass ready for installation	0 days	1/19/11	1/19/11	149	
22	Radiation Shield for Solenoid 1	12 days	1/19/11	2/4/11		
23	Remove LN2 resevoir	2 days	1/19/11	1/21/11	21	
24	Add holes for extra cryo coolers	3 days	1/21/11	1/26/11	23	
25	Remove origional cooler connections	1 day	1/26/11	1/27/11	24	
26	Weld copper to Aluminium transition strips	1 day	1/27/11	1/28/11	25	
27	Weld on copper plates	1 day	1/28/11	1/31/11	26	
28	Weld Aluminium banding for intercepts	3 days	1/31/11	2/3/11	27	
29	Check / machine split for Eddy currents	1 day	2/3/11	2/4/11	28	
30	Radiation Shield ready for installation	0 days	2/4/11	2/4/11	29	
31	Cooler Tower	22.5 days	3/2/11	4/1/11		
32	Manufacture new tower plates	1 wk	3/2/11	3/9/11	88	
33	Weld top and end plates to Vacuum vessel	3 days	3/9/11	3/14/11	32	
34	Install cooler sleeves and copper plates	2 days	3/14/11	3/16/11	33	
35	Weld cooler sleeves to cold mass	2 days	3/16/11	3/18/11	34	

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External Tasks

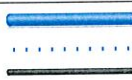
External Milestone

Deadline

ID	Task Name	Duration	Start	Finish	Predecessors	10/17
36	Install Copper straps between 1st stage and Copper plates	1 day	3/21/11	3/22/11	77	
37	Install the warm leads and HV feedthroughs	1 day	3/22/11	3/23/11	36	
38	Install the heat intercepts to Copper plates	4 hrs	3/23/11	3/23/11	37	
39	Install thermal connection from 1st stage Copper plates to Shield	1 day	3/25/11	3/25/11	71	
40	Weld plates front and back	2 days	3/31/11	4/1/11	56	
41	Fill and Vent Tower	9 days	4/26/11	5/6/11		
42	Install and weld lower sections of tower to Vacuum vessel	2 days	4/26/11	4/27/11	93	
43	Install instrumentation feedthrough	1 day	4/28/11	4/28/11	42	
44	Check all instrumentation lines for activity	1 day	4/29/11	4/29/11	43	
45	Weld the upper portion of the tower	2 days	5/2/11	5/3/11	44	
46	Complete assembly of fill and vent tower and install	3 days	5/4/11	5/6/11	45	
47	MLI	69.5 days	1/13/11	4/20/11		
48	Wrap cold mass 1 with MLI	4 days	1/13/11	1/19/11	20	
49	Sign off quality of MLI layers on cold mass 1	0 days	1/19/11	1/19/11	48	
50	Wrap radiation shield 1 with MLI	3 days	2/7/11	2/10/11	69	
51	Sign off quality of MLI layers on radiation shield 1	0 days	2/10/11	2/10/11	50	
52	Wrap cold mass supports with MLI	2 days	2/14/11	2/16/11	82	
53	Sign off quality of MLI wrap around supports	0 days	2/16/11	2/16/11	52	
54	Wrap upper and lower tower area with MLI	2 days	3/28/11	3/29/11	39	
55	Wrap 1st stage Copper plates to shield connections	1 day	3/30/11	3/30/11	54	
56	Sign off Tower MLI wrapping	0 days	3/30/11	3/30/11	55	
57	Apply MLI to Shield and cold mass bore	3 days	4/4/11	4/6/11	40	
58	Sign off Shield and cold mass bore wrapping	0 days	4/6/11	4/6/11	57	
59	Integrate cold mass MLI with bore MLI	1 day	4/12/11	4/12/11	90	
60	Sign off cold mass to bore MLI connection	0 days	4/12/11	4/12/11	59	
61	Apply MLI to shield ends	2 days	4/13/11	4/14/11	91	
62	Apply MLI between warm bore and shield bore	2 days	4/15/11	4/18/11	61	
63	Sign off shield MLI and warm bore MLI	0 days	4/18/11	4/18/11	62,61	
64	Integrate MLI between warm bore and shield ends	1 day	4/20/11	4/20/11	92	
65	Sign off MLI at warm bore / shield connection	0 days	4/20/11	4/20/11	64	
66	Instrumentation	94 days	11/23/10	4/13/11		
67	Install level sensor cold mass 1 - new fill line / vent line	4 hrs	1/13/11	1/13/11	17	
68	Install external temp sensors cold mass 1	4 hrs	11/23/10	11/23/10	74	
69	Install temp sensors radiation shield 1	1 day	2/4/11	2/7/11	29	
70	Add temp sensors to cold mass supports	1 day	2/14/11	2/15/11	82	

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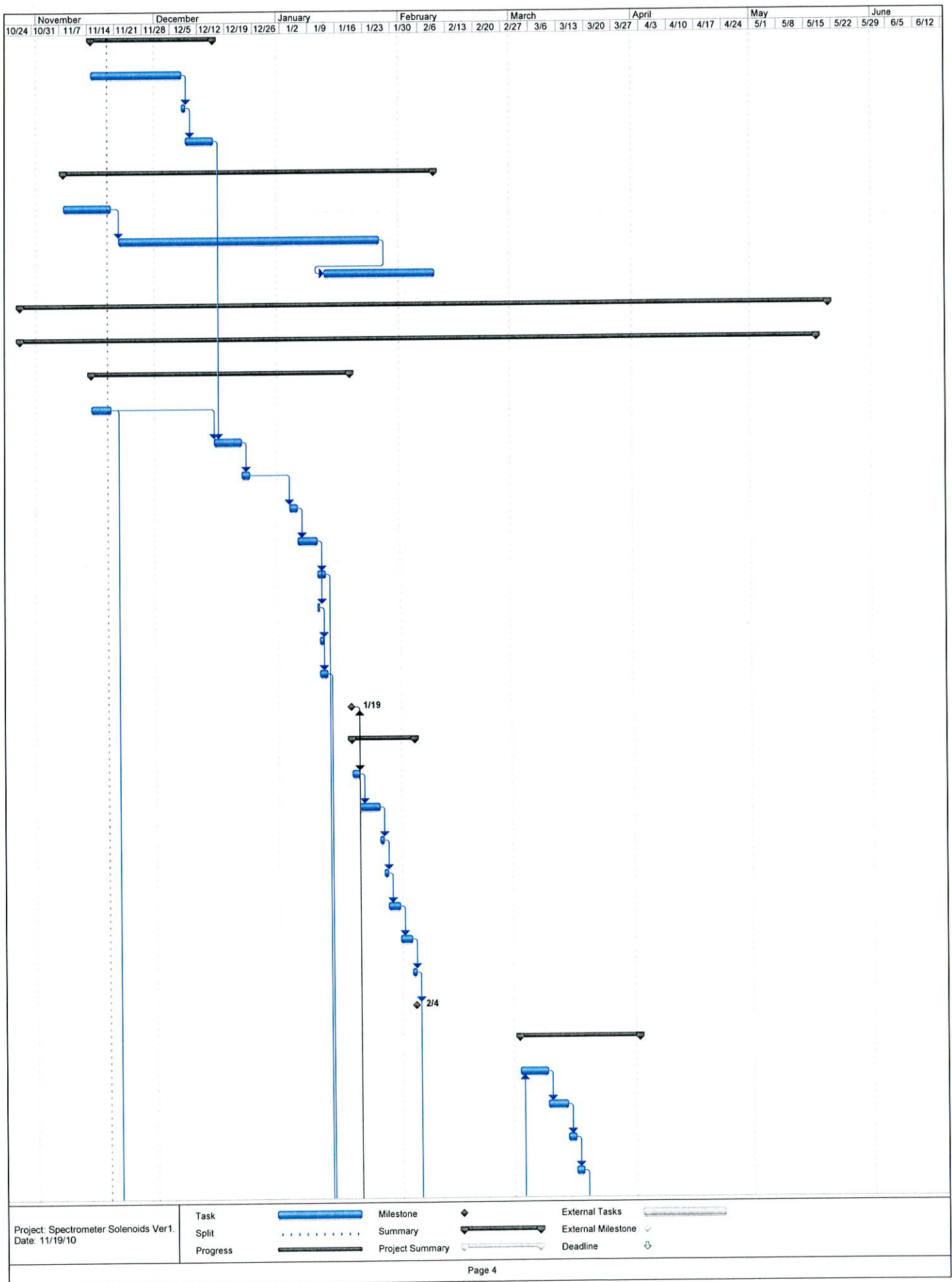
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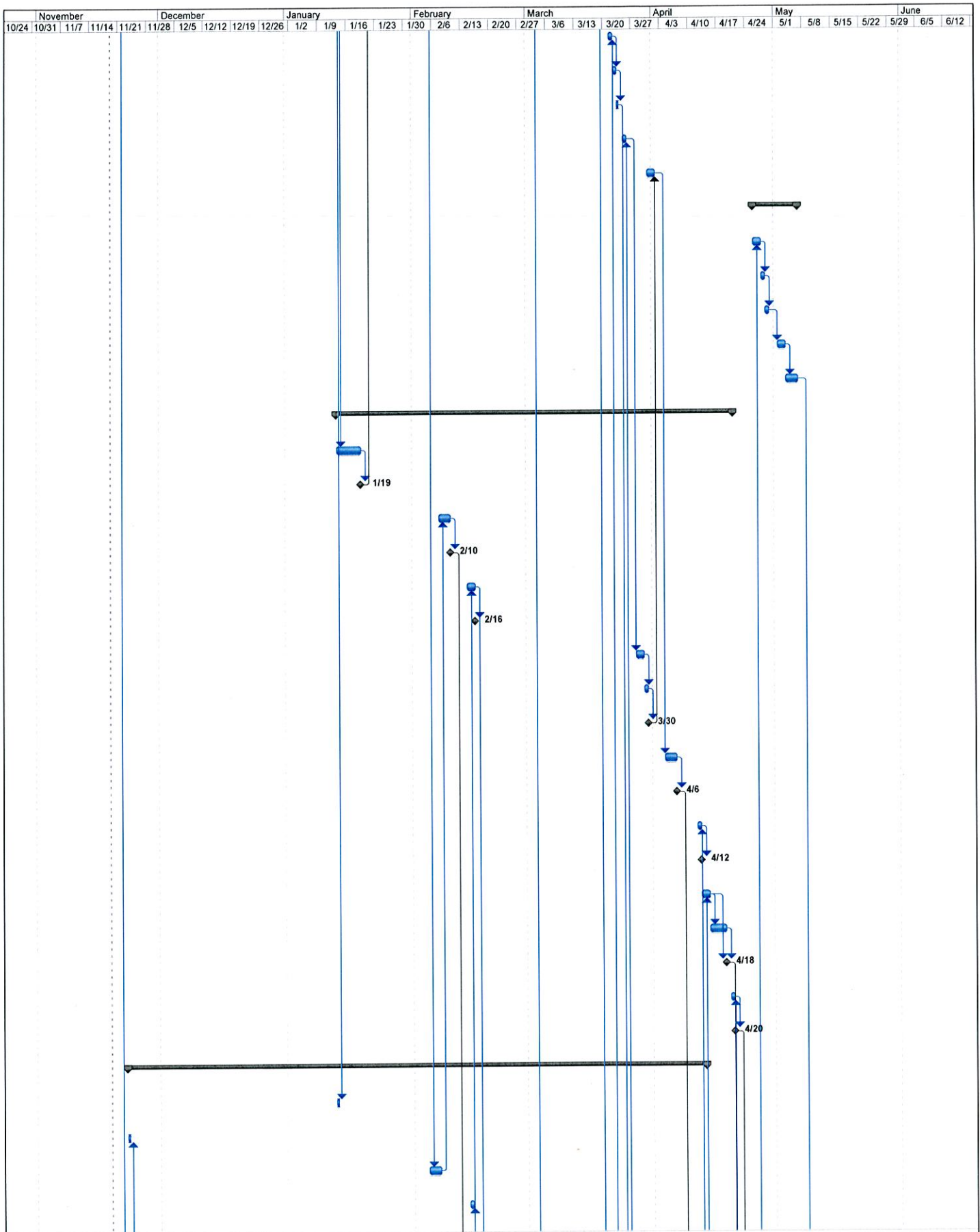


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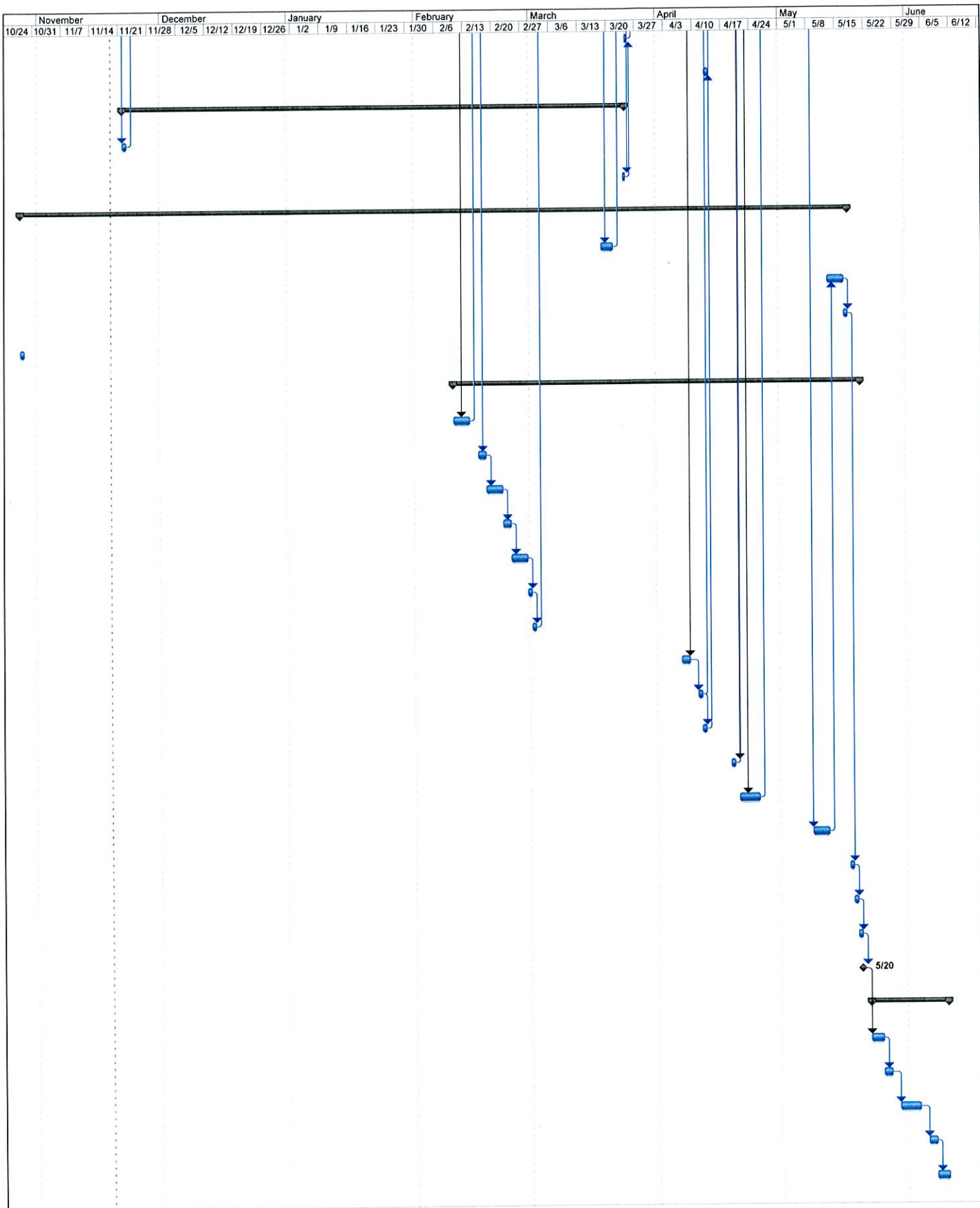
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71	Attach thermal sensors to the Copper plates	4 hrs	3/24/11	3/24/11	75	
72	Apply thermal instrumentation top shield	1 day	4/13/11	4/13/11	91	
73	Current Leads	80.5 days	11/22/10	3/24/11		
74	Connect external power leads to heat sink cold mass 1	1 day	11/22/10	11/22/10	12	
75	Install HTS leads with upper and lower voltage taps	4 hrs	3/24/11	3/24/11	38	
76	Coolers	136 days	10/28/10	5/17/11		
77	Install Single stage cooler to Tower	1 day	3/18/11	3/21/11	35	
78	Install the 2 stage coolers to sleeves	2 days	5/13/11	5/16/11	94	
79	Install cro cooler hoses	1 day	5/17/11	5/17/11	78	
80	Recharge for UK operation	1 day	10/28/10	10/28/10		
81	Assembly	71.5 days	2/10/11	5/20/11		
82	Suspend shield around the cold mass	2 days	2/10/11	2/14/11	51	
83	Install cold mass supports to Vacuum vessel	2 days	2/16/11	2/18/11	52	
84	Move vacuum vessel over the shield / cold mass assembly	2 days	2/18/11	2/22/11	83	
85	Connect the supports to the cold mass	2 days	2/22/11	2/24/11	84	
86	Suspend the shield inside the vacuum vessel	2 days	2/24/11	2/28/11	85	
87	Connect cold mass support intercepts to the shield	1 day	2/28/11	3/1/11	86	
88	Add copper sheet to the holes in the shield	1 day	3/1/11	3/2/11	87	
89	Align Vacuum vessel end plate to the cold mass bore	2 days	4/7/11	4/8/11	58	
90	Install shield bore tube	1 day	4/11/11	4/11/11	89	
91	Weld shield end plates	1 day	4/12/11	4/12/11	90	
92	Install warm bore	1 day	4/19/11	4/19/11	63	
93	Weld end plates to the Vacuum vessel	3 days	4/21/11	4/25/11	65	
94	Detailed leak checking of the Vacuum vessel and cold mass	4 days	5/9/11	5/12/11	46	
95	Install vacuum system to solenoid	1 day	5/18/11	5/18/11	79	
96	Connect power leads from feedthroughs to vacuum vessel terminal block	1 day	5/19/11	5/19/11	95	
97	Connect all instrumentation cables	1 day	5/20/11	5/20/11	96	
98	Solenoid ready for cool down and training	0 days	5/20/11	5/20/11	97	
99	Training and Operations	15 days	5/23/11	6/10/11		
100	LN2 Cooldown	3 days	5/23/11	5/25/11	98	
101	He Cooldown	2 days	5/26/11	5/27/11	100	
102	Coil Training	5 days	5/30/11	6/3/11	101	
103	Operation for Acceptance Testing	2 days	6/6/11	6/7/11	102	
104	Magnet Warm-up	3 days	6/8/11	6/10/11	103	





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