

ID	Task Name	% Comp.	Duration	Start	Finish	Predecessors
1	<b>White Beam Conditioning (WBC)</b>	<b>69%</b>	<b>144.33 wks</b>	<b>Fri 3/1/02</b>	<b>Mon 4/4/05</b>	
2	<b>Beamline Shielding Walls (BSW)</b>	<b>92%</b>	<b>103.56 wks</b>	<b>Fri 3/1/02</b>	<b>Mon 5/17/04</b>	
3	BSW Concept design proposal	100%	2 wks	Fri 3/1/02	Tue 9/24/02	
4	BSW 3D design	100%	4 wks	Fri 3/15/02	Tue 4/16/02	3
5	BSW Detailed design	100%	10 wks	Wed 9/24/03	Fri 12/12/03	4FS+2 wks
6	BSW Manufacturing	85%	18 wks	Tue 12/30/03	Mon 5/17/04	5FS+2 wks
7	<b>Beam Tube Insert</b>	<b>100%</b>	<b>93.6 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 3/3/04</b>	
8	BT Concept design proposal	100%	2 wks	Fri 3/1/02	Tue 9/24/02	
9	BT 3D design	100%	2 wks	Fri 3/15/02	Mon 4/1/02	8
10	BT Detailed design	100%	2 wks	Mon 9/29/03	Wed 10/15/03	9
11	BT Manufacturing	100%	4 wks	Mon 2/2/04	Wed 3/3/04	10FS+6 wks
12	<b>Shutter</b>	<b>91%</b>	<b>126.33 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 11/9/04</b>	
13	Shutter Concept design proposal	100%	2 wks	Fri 3/1/02	Fri 3/15/02	
14	Shutter 3D design	100%	4 wks	Fri 3/15/02	Tue 4/16/02	13
15	Shutter Dummy Detailed Design	100%	12.32 wks	Mon 3/1/04	Tue 6/1/04	14FS+3 wks
16	Shutter Dummy Manufacturing	100%	2.79 wks	Thu 6/24/04	Thu 7/15/04	15FS+3 wks
17	Shutter detailed design	100%	19.6 wks	Tue 2/17/04	Wed 7/14/04	14FS+6 wks
18	Shutter Manufacturing	80%	9.27 wks	Thu 7/22/04	Thu 9/30/04	17FS+1 wk
19	Shutter Assembly and testing	0%	3 wks	Mon 10/18/04	Tue 11/9/04	18FS+2 wks
20	<b>Cryo Filter Exchanger</b>	<b>20%</b>	<b>144.33 wks</b>	<b>Fri 3/1/02</b>	<b>Mon 4/4/05</b>	
21	CFX Concept design proposal	100%	3 wks	Fri 3/1/02	Tue 9/24/02	
22	RFQ and contract negotiations	95%	2 wks	Thu 4/15/04	Thu 4/29/04	21
23	Phase I	0%	5 wks	Fri 10/1/04	Tue 11/9/04	22FS+6 wks
24	Phase II	0%	6 wks	Thu 11/18/04	Fri 1/7/05	23FS+1 wk
25	Phase III	0%	6 wks	Fri 1/14/05	Thu 3/3/05	24FS+1 wk
26	Phase IV	0%	1 wk	Fri 3/11/05	Fri 3/18/05	25FS+1 wk
27	CFX Acceptance testing at NCNR	0%	2 wks	Fri 3/18/05	Mon 4/4/05	26
28	<b>Choke box</b>	<b>48%</b>	<b>111.28 wks</b>	<b>Tue 9/17/02</b>	<b>Tue 2/8/05</b>	
29	CB Concept design proposal	70%	1 wk	Tue 9/17/02	Tue 9/24/02	
30	CB 3D design	80%	12 wks	Fri 8/1/03	Mon 11/3/03	29
31	CB detailed design	50%	16 wks	Mon 5/24/04	Thu 9/23/04	30
32	CB manufacturing	0%	8 wks	Tue 11/9/04	Fri 1/14/05	31FS+6 wks
33	CB Installation	0%	1 wk	Tue 2/1/05	Tue 2/8/05	32FS+2 wks
34	WBC Installation	50%	10 wks	Thu 8/19/04	Thu 11/4/04	11FS+2 wks,217,6FS+1 wk,16FS+2 wks
35	Preliminary Beamline Complete	0%	0 wks	Thu 11/4/04	Thu 11/4/04	34
36	<b>Monochromator Cask (DFMC)</b>	<b>74%</b>	<b>139.62 wks</b>	<b>Fri 3/1/02</b>	<b>Fri 2/25/05</b>	
37	<b>Inline Collimator Exchanger</b>	<b>71%</b>	<b>135.44 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 1/25/05</b>	
38	ICX Concept design proposal	100%	3 wks	Fri 3/1/02	Mon 3/25/02	
39	ICX 3D design proposal	100%	2 wks	Fri 3/1/02	Fri 3/15/02	38
40	ICX Requirements review	100%	1 wk	Mon 8/18/03	Mon 8/25/03	39
41	ICX Exchanger detailed 3D design	100%	32.05 wks	Mon 9/22/03	Mon 5/31/04	40
42	ICX Collimator design and manufacturing	50%	14.96 wks	Mon 3/15/04	Mon 11/1/04	40,41
43	ICX Electrical system design	75%	16.05 wks	Tue 6/1/04	Thu 9/30/04	40FS+10 wks
44	ICX Detailed mechanical design drafting	95%	16.8 wks	Thu 4/1/04	Fri 8/6/04	41
45	ICX Mechanical manufacturing RFQ	75%	24.45 wks	Mon 3/1/04	Wed 9/1/04	
46	ICX Mechanical manufacturing	0%	7.84 wks	Wed 10/20/04	Wed 12/22/04	45FS+6 wks
47	ICX Assembly and testing at JHU	0%	10.37 wks	Mon 11/1/04	Tue 1/25/05	46,42
48	<b>Variable Beam Aperture</b>	<b>91%</b>	<b>132.33 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 12/29/04</b>	
49	VBA Concept design proposal	100%	3 wks	Fri 3/1/02	Mon 3/25/02	

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50	VBA 3D design proposal	100%	1 wk	Fri 3/1/02	Fri 3/8/02	49
51	VBA Requirements review	100%	2 wks	Fri 8/1/03	Fri 8/15/03	50
52	VBA Detailed 3D design	100%	46.48 wks	Mon 8/18/03	Fri 8/13/04	51
53	VBA Mechanical design drafting	99%	33.7 wks	Mon 12/15/03	Tue 8/31/04	52
54	VBA Mechanical manufacturing RFQ	95%	35.28 wks	Mon 12/15/03	Mon 9/13/04	53
55	VBA Mechanical manufacturing	85%	8 wks	Thu 4/1/04	Mon 10/25/04	
56	VBA Electrical system design	100%	11.01 wks	Tue 6/1/04	Mon 8/23/04	52FS+10 wks
57	VBA Electrical system fabrication	20%	0.93 wks	Fri 10/1/04	Thu 10/7/04	56
58	VBA Assembly and testing at JHU	10%	11 wks	Fri 10/1/04	Wed 12/29/04	
59	<b>Doubly Focusing Monochromator</b>	<b>66%</b>	<b>56.33 wks</b>	<b>Mon 11/3/03</b>	<b>Thu 1/20/05</b>	
60	Complete and test DFM software and electronics	90%	53.95 wks	Mon 11/3/03	Thu 12/30/04	
61	DFM wiring	0%	4 wks	Tue 7/20/04	Wed 8/18/04	
62	Machine PG crystals	10%	2 wks	Fri 8/20/04	Fri 9/3/04	
63	Mount PG crystals	0%	1 wk	Tue 9/7/04	Tue 9/14/04	62
64	Calibration/Cycle	0%	7 days	Mon 10/4/04	Thu 10/14/04	
65	Cable Takeup Rework	0%	2 wks	Thu 10/14/04	Fri 10/29/04	64
66	Pivot Rework if necessary	0%	10 wks	Fri 10/29/04	Thu 1/20/05	65
67	<b>Monochromator Transport (DTS)</b>	<b>70%</b>	<b>132.41 wks</b>	<b>Fri 3/1/02</b>	<b>Thu 12/30/04</b>	
68	DTS Concept design proposal	100%	2 wks	Fri 3/1/02	Fri 3/15/02	
69	DTS 3D design proposal	100%	2 wks	Fri 3/15/02	Mon 4/1/02	68
70	DTS Requirements review	100%	1 wk	Tue 7/1/03	Wed 7/9/03	69
71	DTS Detailed 3D design	100%	27.07 wks	Wed 10/1/03	Fri 4/30/04	70
72	DTS Mechanical design drafting	100%	16.24 wks	Mon 3/15/04	Thu 7/15/04	71
73	DTS Mechanical manufacturing RFQ	100%	4.29 wks	Thu 7/15/04	Mon 8/16/04	72
74	DTS Mechanical manufacturing	75%	19.79 wks	Tue 6/1/04	Fri 10/29/04	73
75	DTS Electrical system design	25%	13 wks	Tue 6/1/04	Wed 9/8/04	71FS+10 wks
76	DTS Electrical system fabrication	0%	0.75 wks	Fri 10/8/04	Thu 10/14/04	75
77	DTS Assembly and testing at JHU	0%	15 wks	Wed 9/1/04	Thu 12/30/04	
78	<b>DFMC Liner</b>	<b>52%</b>	<b>133.6 wks</b>	<b>Fri 3/1/02</b>	<b>Mon 1/10/05</b>	
79	DFMC Concept design proposal	100%	2 wks	Fri 3/1/02	Fri 3/15/02	
80	DFMC 3D design proposal	100%	6 wks	Fri 3/15/02	Tue 4/30/02	79
81	DFMC Requirements review	100%	1 wk	Fri 8/1/03	Fri 8/8/03	80
82	DFMC Detailed 3D design	95%	11.76 wks	Tue 6/1/04	Fri 8/27/04	81
83	DFMC Mechanical design drafting	0%	4 wks	Fri 8/13/04	Tue 9/14/04	
84	DFMC Mechanical manufacturing RFQ	5%	2 wks	Thu 9/16/04	Thu 9/30/04	83
85	DFMC Manufacturing	0%	10 wks	Thu 9/30/04	Mon 12/20/04	
86	DFMC assembly and testing at JHU	0%	1 wk	Thu 12/23/04	Mon 1/3/05	85
87	Shot/Wax Backfull at NCNR	0%	1 wk	Mon 1/3/05	Mon 1/10/05	86
88	<b>DFMC Integration</b>	<b>66%</b>	<b>24.93 wks</b>	<b>Tue 6/1/04</b>	<b>Mon 12/13/04</b>	
89	Cask support structure design	100%	11.76 wks	Tue 6/1/04	Fri 8/27/04	
90	Cask support structure fabrication	80%	3.2 wks	Wed 9/8/04	Fri 10/1/04	89
91	DTS integration	0%	1 wk	Tue 10/12/04	Tue 10/19/04	
92	DFM Integration	0%	1.5 wks	Mon 10/18/04	Thu 10/28/04	
93	VBA integration	0%	1.5 wks	Mon 10/18/04	Thu 10/28/04	
94	ICX integration	0%	1 wk	Mon 11/15/04	Mon 11/22/04	
95	Subsystem alignment	0%	1.6 wks	Wed 12/1/04	Mon 12/13/04	
96	<b>DFMC Installation</b>	<b>0%</b>	<b>6.9 wks</b>	<b>Tue 1/4/05</b>	<b>Fri 2/25/05</b>	
97	Package for shipping	0%	1.7 wks	Tue 1/4/05	Tue 1/18/05	95
98	DFMC transfer to NCNR	0%	0.2 wks	Tue 1/18/05	Wed 1/19/05	97

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99	DFMC installation at NG0	0%	4 wks	Wed 1/26/05	Fri 2/25/05	98FS+1 wk,34FS+1 wk
100	<b>Monochromatic Beam Transport (MBT)</b>	<b>38%</b>	<b>150.35 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 5/18/05</b>	
101	<b>Static MBT shielding</b>	<b>92%</b>	<b>118.26 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 9/8/04</b>	
102	MBT shielding conceptual design proposal	100%	3 wks	Fri 3/1/02	Mon 3/25/02	
103	MBT shielding 3D design	100%	3 wks	Fri 3/1/02	Mon 3/25/02	102
104	MBT shielding Detailed design	100%	6 wks	Mon 3/15/04	Wed 4/28/04	103
105	MBT shielding Manufacturing	80%	8.38 wks	Thu 6/24/04	Wed 9/8/04	104FS+6 wks
106	<b>Supermirror Guide System (SMG)</b>	<b>28%</b>	<b>139.88 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 3/1/05</b>	
107	SMG Concept design proposal	100%	3 wks	Fri 3/1/02	Mon 3/25/02	
108	SMG 3D design	90%	4 wks	Fri 3/1/02	Mon 4/1/02	107
109	SMG Detailed design	30%	8 wks	Wed 7/7/04	Fri 9/3/04	108
110	SMG Manufacturing	0%	16 wks	Tue 9/21/04	Fri 1/28/05	109FS+2 wks
111	SMG Assembly and testing	0%	1 wk	Tue 2/22/05	Tue 3/1/05	110FS+1 wk
112	MBT main shielding Installation	0%	1 wk	Wed 3/16/05	Wed 3/23/05	101FS+2 wks,106FS+2 wks,34FS+2 wks
113	<b>Pre-Sample Optics (PSO)</b>	<b>17%</b>	<b>150.35 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 5/18/05</b>	
114	Monitor	0%	4 wks	Mon 2/2/04	Wed 3/3/04	
115	<b>Attenuator exchanger</b>	<b>23%</b>	<b>129.07 wks</b>	<b>Fri 3/1/02</b>	<b>Fri 12/3/04</b>	
116	AEX Concept design proposal	80%	3 wks	Fri 3/1/02	Mon 3/25/02	
117	AEX 3D design	20%	3 wks	Mon 4/5/04	Tue 4/27/04	
118	AEX Detailed design	0%	3 wks	Mon 6/7/04	Tue 6/29/04	117
119	AEX Manufacturing	0%	4 wks	Mon 11/1/04	Fri 12/3/04	118FS+6 wks
120	<b>Monochr. Variable Beam Aperture (MVBA)</b>	<b>19%</b>	<b>29.64 wks</b>	<b>Mon 8/23/04</b>	<b>Wed 4/13/05</b>	
121	MVBA Concept design proposal	80%	3 wks	Mon 8/23/04	Wed 9/15/04	
122	MVBA 3D design	20%	3 wks	Mon 11/15/04	Thu 12/9/04	121
123	MVBA Detailed design	0%	4 wks	Thu 12/9/04	Tue 1/11/05	122
124	MVBA Manufacturing	0%	6 wks	Mon 2/28/05	Wed 4/13/05	123FS+6 wks
125	PSO Integration and testing	0%	1 wk	Thu 4/21/05	Thu 4/28/05	114FS+1 wk,115FS+1 wk,120FS+1 wk
126	PSO installation	0%	3 days	Fri 5/13/05	Wed 5/18/05	112FS+2 wks,125FS+2 wks
127	First Monochromatic Beam Out	0%	0 wks	Thu 4/7/05	Thu 4/7/05	112FS+2 wks,99FS+2 wks,186FS+1 wk,211FS+1 wk
128	<b>Sample Positioning (SPS)</b>	<b>32%</b>	<b>150.27 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 5/17/05</b>	
129	SPS conceptual design proposal	100%	3 wks	Fri 3/1/02	Mon 3/25/02	
130	SPS 3D design	80%	4 wks	Thu 4/1/04	Fri 4/30/04	129
131	SPS Detailed design	20%	3 wks	Mon 7/12/04	Tue 8/3/04	130
132	SPS Manufacturing	0%	6 wks	Mon 1/10/05	Wed 3/9/05	131FS+1 wk
133	SPS assembly and testing	0%	4 wks	Thu 3/24/05	Mon 4/25/05	132FS+2 wks
134	SPS installation at NG0 site	0%	1 wk	Tue 5/10/05	Tue 5/17/05	133FS+2 wks,205FS+2 wks,112FS+2 wks
135	<b>Neutron Detection System (NDS)</b>	<b>26%</b>	<b>160.23 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 8/3/05</b>	
136	<b>Monochr. Cryo-Filter Exchanger (MCFX)</b>	<b>13%</b>	<b>33.81 wks</b>	<b>Wed 9/1/04</b>	<b>Wed 5/25/05</b>	
137	MCFX Concept design proposal	50%	8 wks	Wed 9/1/04	Tue 11/2/04	
138	MCFX 3D design	0%	4 wks	Wed 11/10/04	Tue 12/14/04	137FS+1 wk
139	MCFX Detailed design	0%	6 wks	Tue 12/21/04	Tue 2/8/05	138FS+1 wk
140	MCFX Manufacturing	0%	10 wks	Tue 2/15/05	Tue 5/3/05	139FS+1 wk
141	MCFX Assembly and testing	0%	2 wks	Tue 5/10/05	Wed 5/25/05	140FS+1 wk
142	<b>Monochr. Collimator Exchanger (MCX)</b>	<b>12%</b>	<b>149.41 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 5/11/05</b>	
143	MCX Concept design proposal	70%	4 wks	Fri 3/1/02	Mon 4/1/02	
144	MCX 3D design	30%	3 wks	Mon 8/2/04	Tue 8/24/04	143
145	MCX Detailed design	0%	5 wks	Wed 9/1/04	Fri 10/8/04	144
146	MCX Manufacturing	0%	16 wks	Mon 11/29/04	Mon 4/4/05	145FS+6 wks
147	MCX Assembly and testing	0%	4 wks	Tue 4/12/05	Wed 5/11/05	146FS+1 wk

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148	<b>Double Crystal Analyzer (DXAL)</b>	<b>53%</b>	<b>132.07 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 12/28/04</b>	
149	DAXL Concept design proposal	100%	3 wks	Fri 3/1/02	Mon 3/25/02	
150	DAXL 3D design	100%	6 wks	Fri 3/1/02	Tue 4/16/02	149
151	DAXL Detailed design	100%	8 wks	Thu 4/1/04	Tue 6/1/04	150FS+2 wks
152	DAXL Manufacturing	0%	12 wks	Mon 7/19/04	Tue 11/16/04	151FS+6 wks
153	DAXL Assembly and testing	0%	3 wks	Fri 12/3/04	Tue 12/28/04	152FS+2 wks
154	<b>Kidney Shielding (KS)</b>	<b>22%</b>	<b>146.07 wks</b>	<b>Fri 3/1/02</b>	<b>Fri 4/15/05</b>	
155	KS Concept design proposal	100%	3 wks	Fri 3/1/02	Mon 3/25/02	
156	KS 3D design	80%	6 wks	Mon 5/3/04	Thu 6/17/04	155
157	KS Detailed design	0%	8 wks	Thu 6/24/04	Wed 8/25/04	156FS+1 wk
158	KS Manufacturing	0%	16 wks	Mon 11/1/04	Wed 3/9/05	157FS+6 wks
159	KS Assembly and testing	0%	3 wks	Thu 3/24/05	Fri 4/15/05	158FS+2 wks
160	Detectors and electronics	31%	8 wks	Mon 11/1/04	Wed 1/5/05	
161	<b>Neutron Camera (NCA)</b>	<b>25%</b>	<b>104.15 wks</b>	<b>Fri 3/1/02</b>	<b>Thu 5/20/04</b>	
162	NCA Concept design proposal	100%	2 wks	Fri 3/1/02	Fri 3/15/02	
163	NCA Detailed design completion	0%	2 wks	Mon 3/1/04	Mon 3/15/04	162FS+1 wk
164	NCA Completion Manufacturing	0%	3 wks	Wed 4/14/04	Thu 5/6/04	163FS+4 wks
165	NCA re-assembly and testing	0%	1 wk	Thu 5/13/04	Thu 5/20/04	164FS+1 wk
166	<b>NDS Actuation (NDSA)</b>	<b>40%</b>	<b>139.88 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 3/1/05</b>	
167	NDSA Concept design proposal	100%	1 wk	Fri 3/1/02	Fri 3/8/02	
168	NDSA 3D design	100%	2 wks	Fri 3/8/02	Mon 3/25/02	167
169	NDSA Detailed design	100%	3 wks	Wed 6/2/04	Thu 6/24/04	168
170	NDSA Manufacturing	0%	8 wks	Mon 11/1/04	Fri 2/4/05	169FS+6 wks
171	NDSA Assembly and testing	0%	1 wk	Tue 2/22/05	Tue 3/1/05	170FS+2 wks
172	NDS assembly and testing	0%	4 wks	Thu 6/9/05	Tue 7/12/05	136FS+2 wks,142FS+2 wks,148FS+2 wks,154FS+2 wks
173	NDS installation at NG0 site	0%	1 wk	Wed 7/27/05	Wed 8/3/05	205FS+2 wks,172FS+2 wks
174	<b>Get Lost Pipe (GLP)</b>	<b>48%</b>	<b>139.07 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 2/22/05</b>	
175	<b>Shielding Walls (GLPS)</b>	<b>40%</b>	<b>133.07 wks</b>	<b>Fri 3/1/02</b>	<b>Wed 1/5/05</b>	
176	GLPS Concept design proposal	100%	1 wk	Fri 3/1/02	Fri 3/8/02	
177	GLPS 3D design	90%	2 wks	Fri 3/8/02	Mon 3/25/02	176
178	GLPS detailed design	80%	4 wks	Mon 7/12/04	Tue 8/10/04	177
179	GLPS Manufacturing	0%	8 wks	Mon 11/1/04	Wed 1/5/05	178FS+4 wks
180	<b>GLP Helium Liner (GLPH)</b>	<b>67%</b>	<b>119.95 wks</b>	<b>Fri 3/1/02</b>	<b>Tue 9/21/04</b>	
181	GLPH Concept design proposal	100%	1 wk	Fri 3/1/02	Fri 3/8/02	
182	GLPH 3D design	100%	1 wk	Fri 3/8/02	Fri 3/15/02	181
183	GLPH detailed design	100%	3 wks	Mon 5/3/04	Tue 5/25/04	182
184	GLPH Manufacturing	50%	6 wks	Mon 6/7/04	Fri 8/20/04	183FS+6 wks
185	GLPH Assembly and testing	0%	1 wk	Tue 9/14/04	Tue 9/21/04	184FS+3 wks
186	GLP Installation at NG0 site	0%	2 wks	Mon 2/7/05	Tue 2/22/05	179FS+4 wks,34FS+4 wks
187	<b>Cross Cutting Tasks (CCT)</b>	<b>8%</b>	<b>154.15 wks</b>	<b>Fri 3/1/02</b>	<b>Thu 6/16/05</b>	
188	<b>Site preparation for Experiments</b>	<b>2%</b>	<b>33 wks</b>	<b>Thu 9/30/04</b>	<b>Thu 6/16/05</b>	
189	City Planning	10%	8 wks	Thu 9/30/04	Fri 12/3/04	
190	<b>Mezzanine</b>	<b>0%</b>	<b>24 wks</b>	<b>Mon 12/13/04</b>	<b>Thu 6/16/05</b>	
191	Mezzanine conceptual design	0%	4 wks	Mon 12/13/04	Thu 1/13/05	189FS+1 wk
192	Mezzanine 3D design	0%	4 wks	Mon 1/24/05	Wed 2/23/05	191FS+1 wk
193	Mezzanine detailed design	0%	2 wks	Wed 3/2/05	Thu 3/17/05	192FS+1 wk
194	Mezzanine manufacturing	0%	6 wks	Thu 3/24/05	Mon 5/9/05	193FS+1 wk
195	Mezzanine installation	0%	4 wks	Tue 5/17/05	Thu 6/16/05	189FS+2 wks,217,210,194FS+1 wk
196	Instrument control station	0%	6 wks	Mon 12/20/04	Mon 2/7/05	189FS+2 wks

MACS schedule v8

ID	Task Name	% Comp.	Duration	Start	Finish	Predecessors
197	<b>Central Instrument Control Hardware (CICH)</b>	0%	20 wks	Mon 10/4/04	Mon 3/14/05	
198	Choose and order CICH	0%	2 wks	Mon 10/4/04	Tue 10/19/04	
199	Delivery of CICH	0%	12 wks	Tue 10/19/04	Tue 1/25/05	198
200	Configure for use on MACS	0%	4 wks	Wed 2/9/05	Mon 3/14/05	199FS+2 wks
201	<b>Instrument Software</b>	0%	32.48 wks	Mon 8/30/04	Wed 5/11/05	
202	Software for controle of MACS	0%	24 wks	Mon 8/30/04	Wed 3/9/05	
203	Software for analysis of MACS data	0%	24 wks	Mon 8/30/04	Wed 3/9/05	
204	Deployment and testing on MACS hardware	0%	6 wks	Mon 3/28/05	Wed 5/11/05	197FS+2 wks,202FS+2 wks,203FS+2 wks
205	<b>Dance floor (DF)</b>	36%	147.27 wks	Fri 3/1/02	Mon 4/25/05	
206	DF Concept design proposal	100%	4 wks	Fri 3/1/02	Mon 4/1/02	
207	DF 3D design	100%	2 wks	Fri 10/8/04	Mon 10/25/04	206
208	DF detailed design	50%	3 wks	Mon 10/25/04	Wed 11/17/04	207
209	DF Manufacturing	0%	8 wks	Thu 1/6/05	Thu 3/10/05	208FS+6 wks
210	DF installation and testing	0%	4 wks	Fri 3/25/05	Mon 4/25/05	209FS+2 wks,217FS+2 wks
211	<b>Helium purging system (HPS)</b>	8%	139.9 wks	Fri 3/1/02	Tue 3/1/05	
212	HPS Concept design proposal	80%	1 wk	Fri 3/1/02	Fri 3/8/02	
213	HPS 3D design	0%	1 wk	Fri 3/8/02	Fri 3/15/02	212
214	HPS detailed design	0%	2 wks	Mon 10/18/04	Mon 11/1/04	213
215	HPS acquisition and manufacturing	0%	4 wks	Mon 12/20/04	Mon 1/24/05	214FS+6 wks
216	HPS Installation	0%	2 wks	Tue 2/8/05	Tue 3/1/05	215FS+2 wks
217	removal of present equipment	70%	2 wks	Mon 10/4/04	Tue 10/19/04	
218	Ready for Commisioning	0%	0 wks	Mon 9/19/05	Mon 9/19/05	187FS+6 wks,1FS+6 wks,36FS+6 wks,100FS+6 wks,128FS+6 wks,126FS+6 wks,174FS+6
219	MACS Commisioning	0%	50 wks	Wed 10/19/05	Wed 11/15/06	218FS+4 wks

- 1 **White Beam Conditioning (WBC)**  
Provide a fully installed white beam conditioning system. The WBC provides the interface between the NG0 beam tube, the monochromating system, the monochromatic beam transport system and the get lost pipe and beam dump. This project is the responsibility of the NCNR engineering group.
- 2 **Beamline Shielding Walls (BSW)**  
Provision of beam line shielding walls surrounding the shutter, CFX, and ICX.
- 7 **Beam Tube Insert**  
This is the insert that goes into the beam tube within the biological shielding. WBS 1.1 provides a complete insert and any tools that are necessary to insert and later extract it from the biological shielding.
- 12 **Shutter**  
Provide a fully tested shutter assembly ready for installation within the shielding. This is a stand along unit that includes all electronic control systems for actuating the shutter and reporting the conditions to the instrument control computer and to users.
- 20 **Cryo Filter Exchanger**  
Provide a fully tested cryo-filter exchanger that is ready for installation in the WBC shielding. All actuation and status reporting systems are included in this project for the simplest possible interface with the rest of MACS. This project will be the responsibility of JHU@NIST who plans to contract with a cryogenic supplier for most of the work.
- 23 **Phase I**  
Top Level concept models  
Analysis of Cryogenic Performance  
Tally of individual fabrication part & assembly drawings  
Explanation of fabrication techniques  
Projected performance of all proposed assemblies  
Project Schedule to the accuracy of a week preferably in MS project format
- 24 **Phase II**  
Individual fabrication part & assembly drawings complying with ANSI Y14.5  
Materials selection  
Paint and finish selection  
Electrical, and pneumatic system design to industry standard and ready for manufacturing
- 25 **Phase III**  
Digital images of the CFX system  
Vacuum, thermal, and mechanical test results that demonstrate performance to specifications  
Regular and preventive maintenance schedules  
Delivery, inspection and installation procedures
- 26 **Phase IV**  
Delivery of CFX to NCNR
- 28 **Choke box**  
Provide an aperture that fits into the WBC shielding. The choke is basically a simple aperture in the shielding. However, it can be replaced by other devices at a later stage if needed. The choke can be extracted vertically.
- 29 **CB Concept design proposal**  
Need to confirm thickness and material composition (Broholm) to achieve 100% completion.
- 32 **CB manufacturing**  
Fabrication will involve shops or BOA followed by filling at NCNR
- 34 **WBC Installation**  
The WBC installation goes from a conditioned NG0 area (all previous items removed) to a fully operational WBC system that is safe for occupants of C-100. This means that in case the mating parts of the shielding are not ready the WBC installation shall provide temporary shielding in their place.  
  
Comment from D. Pierce July 2004: Phase 1 will be performed in Fall 04, completion in early January (worst case)  
  
need to confirm thickness/composition of beam dump (Broholm), completion will take 10 days following receipt of this information
- 35 **Preliminary Beamline Complete**  
MACS beam line has been built up to the point that further development of it does not require an extended shutdown of the reactor. Further service occurs in regular shutdowns.
- 37 **Inline Collimator Exchanger**  
Provide a fully tested radial collimation system for installation in the DFM Cask. Includes all actuation systems so that the device can really be connected to standard utilities and to the instrument control computer from where actuation is initiated and monitored.
- 48 **Variable Beam Aperture**  
Provide a fully tested variable aperture for the white beam. Includes all actuation systems so the device readily interfaces with the rest of the DFM cask.
- 59 **Doubly Focusing Monochromator**  
The famous doubly focusing monochromator fully tested and with its own control system in a rack that will be mounted outside the shielding, possible on top of it. This item includes provision of all rotation and translation stages so that WBS 2.3 can be mounted directly onto the main monochromator translation stage.  
  
8/30/03 The main device has been complete for a while. Lacking is still completion of the software for control of the device and mounting the PG.
- 67 **Monochromator Transport (DTS)**  
Fully tested and functional DFM main translation stage ready for installation in the DFM cask. Note that installation will just have a dummy drive axis that the DTS external drive mechanism can hook on to.
- 78 **DFMC Liner**  
Encompasses all parts of the DFM cask needed to hold the internal devices in alignment and to provide mechanical and electrical connectivity. Also includes the helium containment but not the actual helium supply system which is part of the overall MACS system integration.
- 88 **DFMC Integration**  
Packing, shipping, and transit of the DFM cask and all the content to the NCNR.
- 98 **DFMC transfer to NCNR**  
Packing, shipping, and transit of the DFM cask and all the content to the NCNR.
- 99 **DFMC installation at NG0**  
The WBC and the monochromatic beam transport system will be fully installed before the DFMC installation. This item includes connecting to or preparing to connect to utilities that are part of the MACS site.
- 100 **Monochromatic Beam Transport (MBT)**  
Shielding surrounding the monochromating system and the beam delivery system from monochromator to sample. Includes installation starting from a completed WBC installation.
- 101 **Static MBT shielding**  
The static part of the MBT shielding. This is everything but the supermirror guide drum from the floor to the roof around the monochromator.
- 106 **Supermirror Guide System (SMG)**  
The rotating part of the MBT shielding system. Includes the actual variable supermirror guide. This is a complete functional system that can be controlled from the instrument control computer. This item also includes the actuation system for affecting and registering the rotation of the super-mirror guide drum.
- 113 **Pre-Sample Optics (PSO)**  
Provides the fully functioning beam optics package between the supermirror guide and the sample. All actuation is included with the simplest possible interface to the control computer.
- 127 **First Monochromatic Beam Out**  
Will be able to open the beam for the first time and steer a monochromatic beam to the sample position. At this point we will make a monochromatic flux measurement.
- 128 **Sample Positioning (SPS)**  
Provides the full stack of sample positioning equipment including parts needed to affectuate the combined motion of this object. All actuation hardware is included to that this item can readily be connected to the instrument control computer.
- 133 **SPS assembly and testing**  
The sample positioning system will be assembled and tested in the high bay area so that when it arrives there we will know that everything fits and works.
- 135 **Neutron Detection System (NDS)**  
Provision of everything that is needed to detect neutron that are scattered from or transmitted through the sample. Full installation is also included. Each sub-project is assembled and tested independently before integration and installation in C-100.
- 136 **Monochr. Cryo-Filter Exchanger (MCFX)**  
Provision of exchangeable filtering capabilities for the instrument fully interfaced with the instrument control computer. The system will be cryogenically tested before integration with the rest of the

neutron detection system.

- 142 Monochr. Collimator Exchanger (MCX)**  
Provision of collimation exchange system for 20 channels. Actuation systems unique to the device are included with the simplest possible interface with the instrument control hardware.
- 148 Double Crystal Analyzer (DXAL)**  
Provision of 20 double crystal analyzer with all unique actuation electronics included. The devices interface with the instrument control computer. They will be fully tested prior to assembling in the combined detection system.
- 9/2/03 The PG for the analyzer system is now being produced by Advanced Ceramics. WBS 5.3 includes mounting of these crystals.
- 154 Kidney Shielding (KS)**  
This subproject provides the bulk shielding of the detection system for NGO.
- 161 Neutron Camera (NCA)**  
A neutron camera is provided for use during sample alignment. A prototype has been built by engineering students at JHU. More work is however, needed to enhance sensitivity and to make the device easier to use on MACS.
- 166 NDS Actuation (NDSA)**  
Provides everything that is needed to rotate the detection system around the sample table initiated through commands from the instrument control computer. This includes airpads but not the dance floor. Provision of the latter is included as part of the site preparation.
- 174 Get Lost Pipe (GLP)**  
Provision of fully installed systems for dealing with the beam that is not reflected to the sample. This means beam stop and all shielding around it. There is also a helium filled flight path to reduce airscattering and activation of the intense reactor beam that remains after the monochromator.
- 175 Shielding Walls (GLPS)**  
Provision of fully installed shielding walls surrounding the past monochromator flight path and the beam stop.
- 179 GLPS Manufacturing**  
out to BOA, expect delivery late August, early September
- 180 GLP Helium Liner (GLPH)**  
Provision of fully installed helium flight path for the post monochromator beam. This does not include the helium supply system, which is considered a cross cutting task because it feeds several helium systems in MACS.
- 187 Cross Cutting Tasks (CCT)**  
This group of tasks cross the boundaries between MACS sub-projects. They are characterized by intricate interfaces of various sorts.
- 197 Central Instrument Control Hardware (CICH)**  
Provision of all hardware for centralized electronic control systems. Most of this will be in the form of purchases of standard equipment. When possible standardized NCCR solutions will be used.
- 201 Instrument Software**  
Provision of software systems that provide an efficient interface for a wide range of users and experiments. Most of these systems are standard packages provided by NCCR. The tasks accounted for here are associated with tailoring these systems to MACS as needed.
- 205 Dance floor (DF)**  
MACS moves on airpads across an innovative new type of dance floor developed at NIST. This sub-project covers the floor in C-100 where needed with this dance floor.
- 211 Helium purging system (HPS)**  
Provision of fully installed helium purging system that brings helium to the part of the instrument that have a helium filled flight path. Includes monitoring systems that report the status to the instrument control computer.