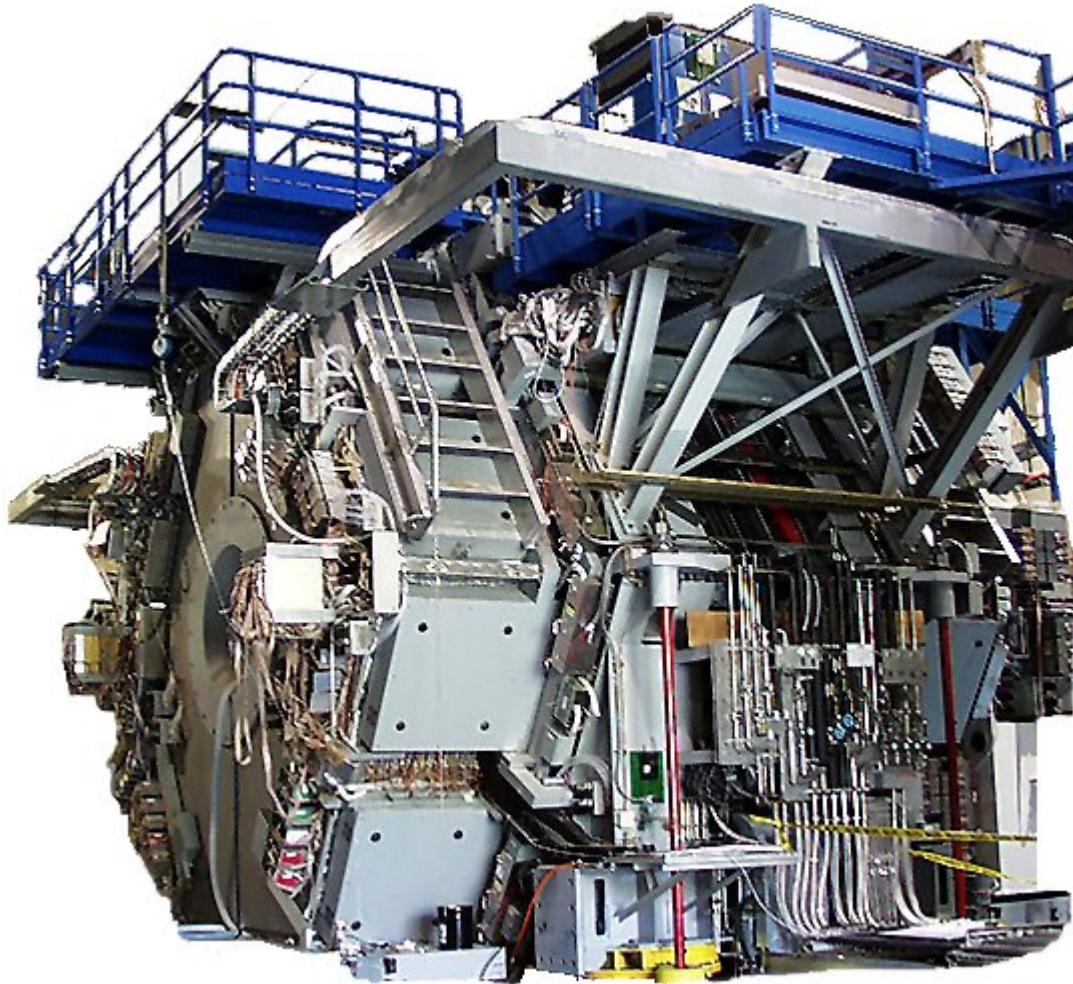


BaBar Disassembly and Disposal



H. James Krebs
August 6, 2007

August 6, 2007

H.J. Krebs

Agenda

- Overview of BaBar Detector, it's systems, and associated equipment and structures affected by Disposal and Disassembly
- Overview of the BaBar D&D project plan
- Overview of the BaBar D&D cost estimate
- Recommended next steps

Concrete Radiation Shield Wall



August 6, 2007

H.J. Krebs

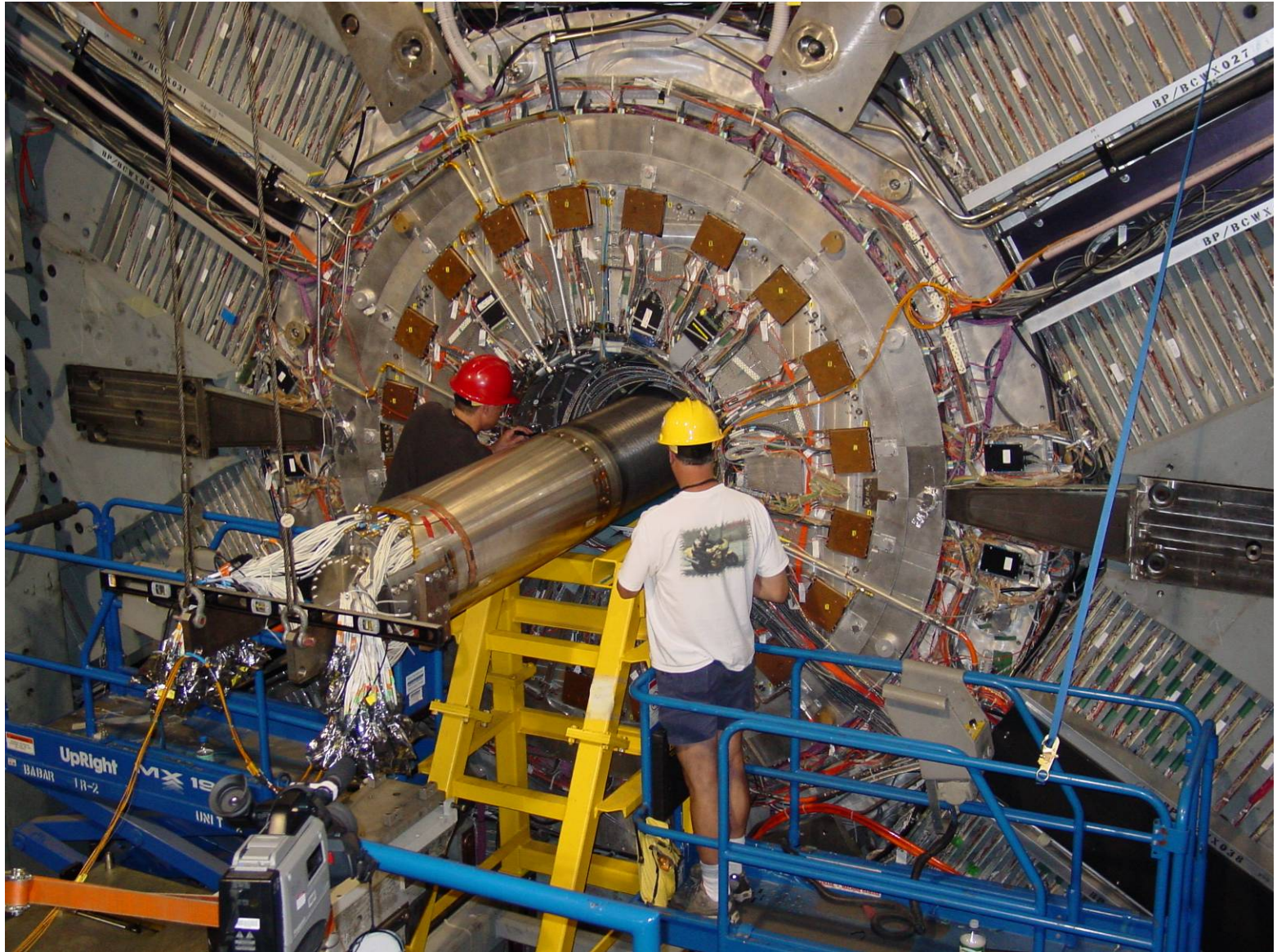


IFR Background Shield Wall

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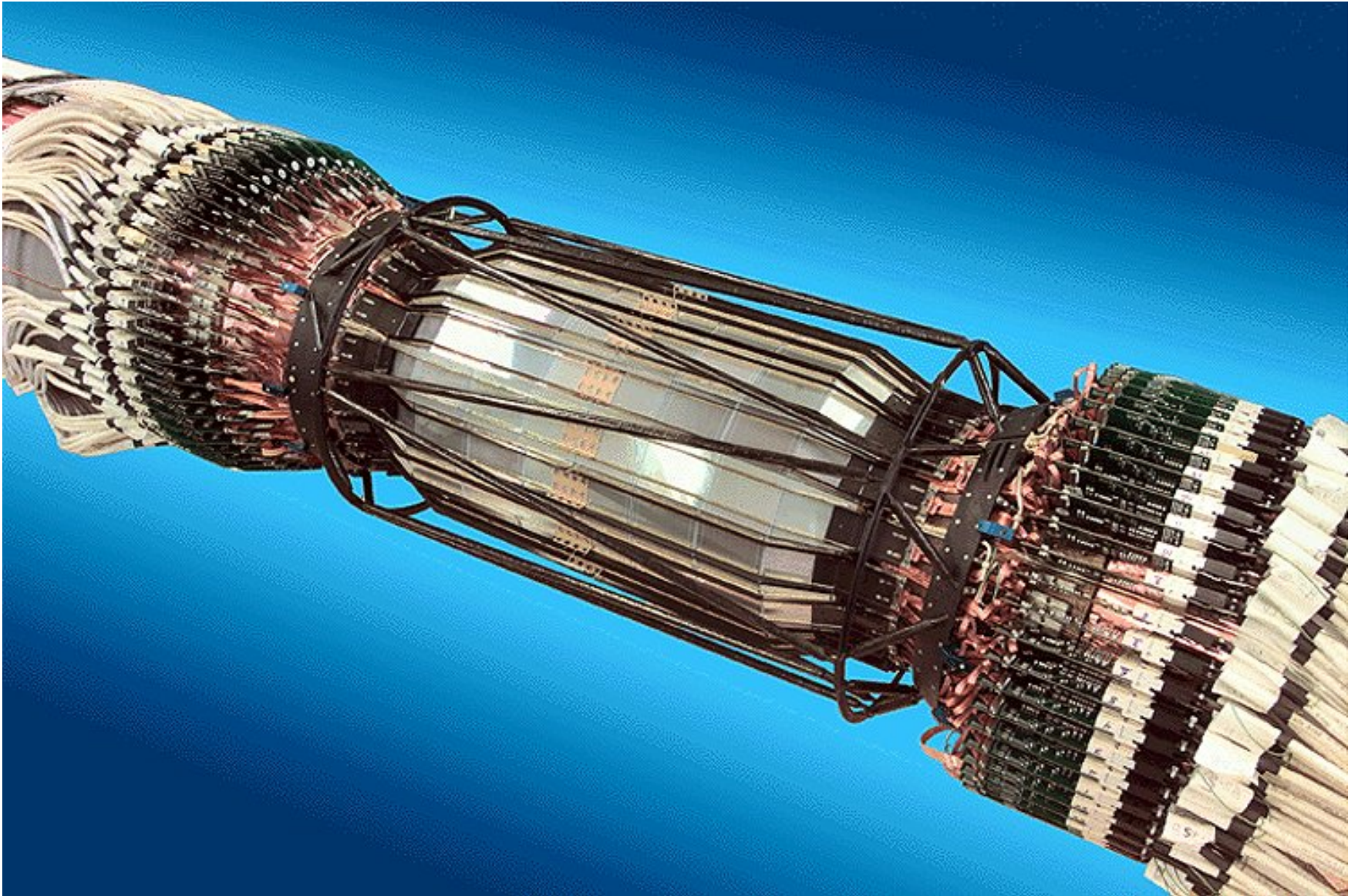
SVT & PEP Support Tube Installation



August 6, 2007

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Silican Vertex Tracker (SVT)



August 6, 2007

H.J. Krebs

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Silican Vertex Tracker (SVT)

- The SVT Detector and the PEP Support Tube are a married assembly
 - This system was extracted from BaBar in 2002
 - Removed from the forward end on beamline
 - A detailed project plan exists including schedule and resource estimates
 - Extraction/insertion tooling exists in good working condition
- It is assumed that the SVT detector will end up on display at a lab or university
- Reusable items
 - Very few - electronics racks

Forward SVT MUX Racks

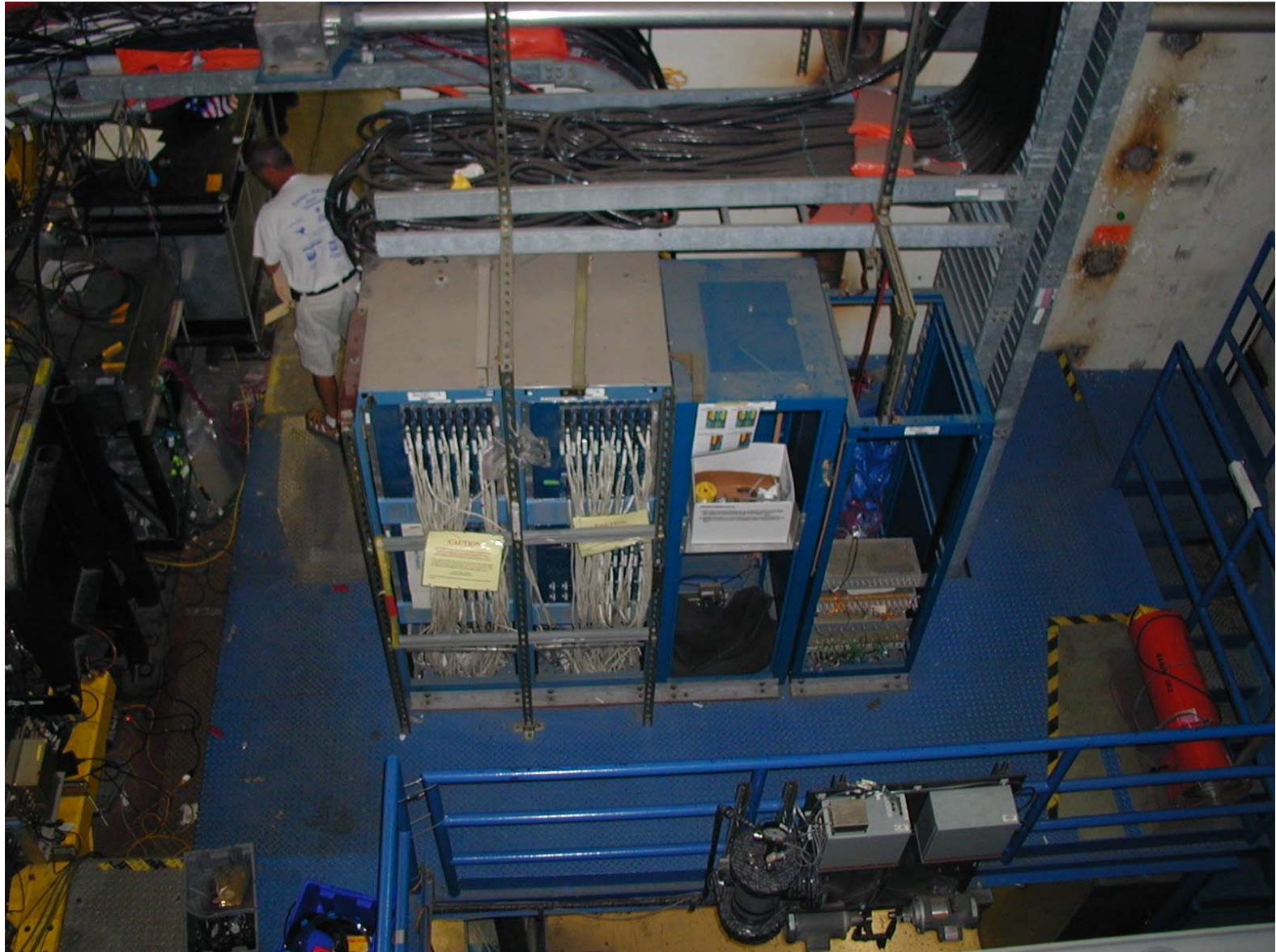


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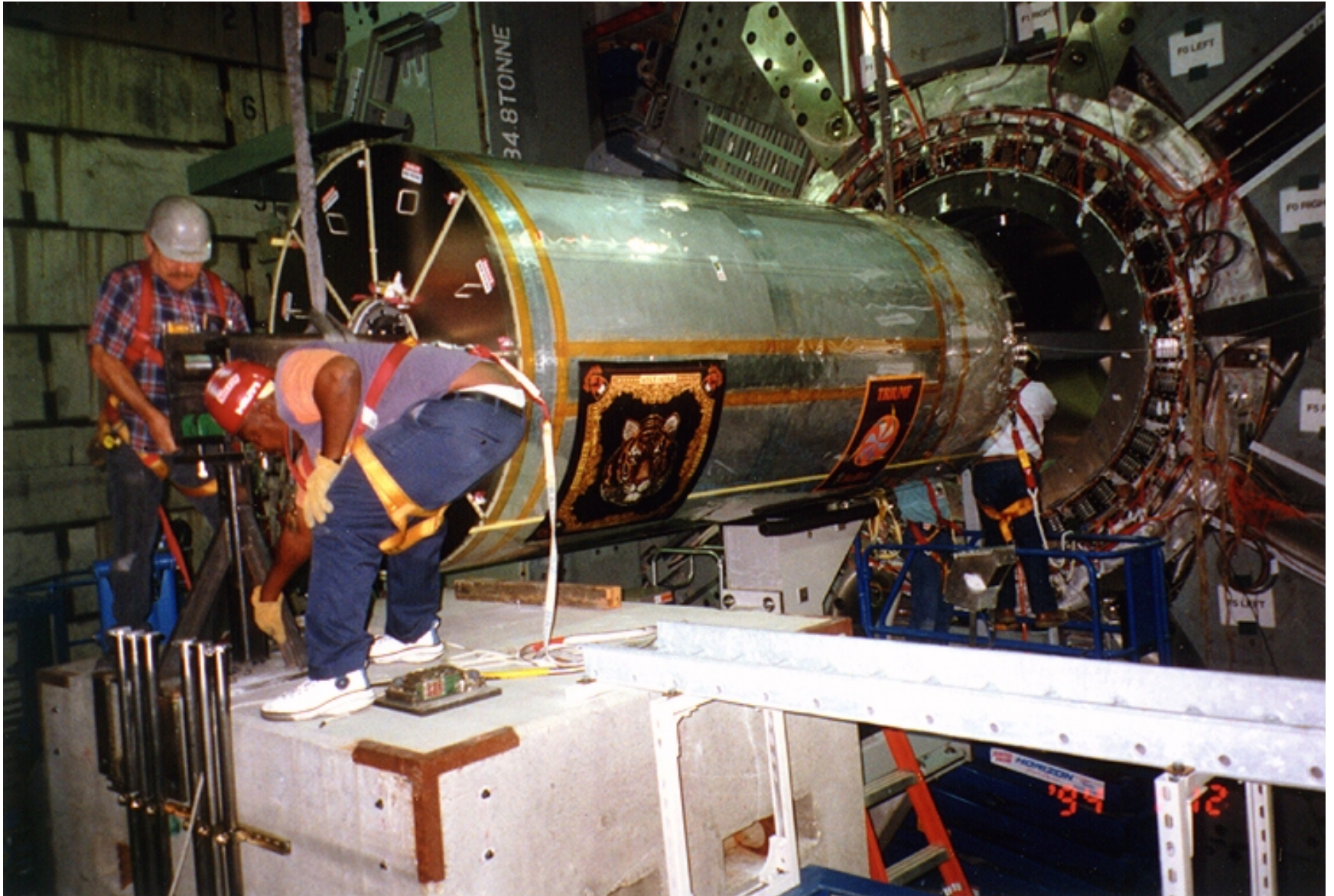
Backward SVT MUX Racks



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Drift Chamber



August 6, 2007

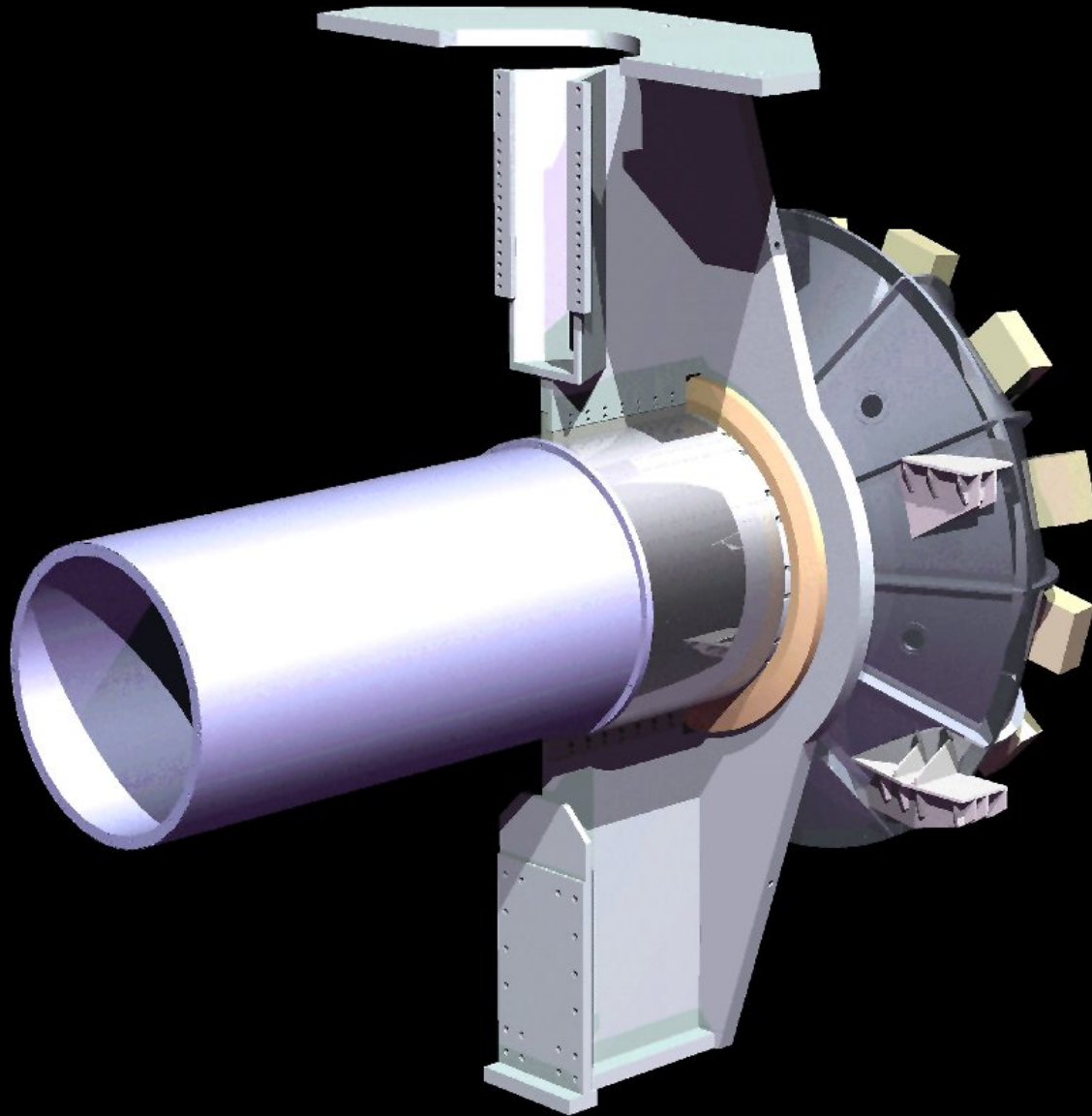
H.J. Krebs

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Drift Chamber

- Supported by the DIRC Central Support Tube
 - Removed from the forward end in main disassembly area
- It is assumed that the Drift Chamber will end up on display at a lab or university
- If disposed of:
 - Beryllium inner tube
 - Gold plated wires
- Gas system racks
 - Ship to Annecy and disassemble
- Reusable items
 - Most items considered obsolete by 2015
- Extraction tooling exists - Somewhat scattered
 - Good condition (stored inside)
 - Needs to be gathered to one location

DIRC PARTICLE IDENTIFICATION DETECTOR



Modeled by Daryl Oshatz • Berkeley Lab

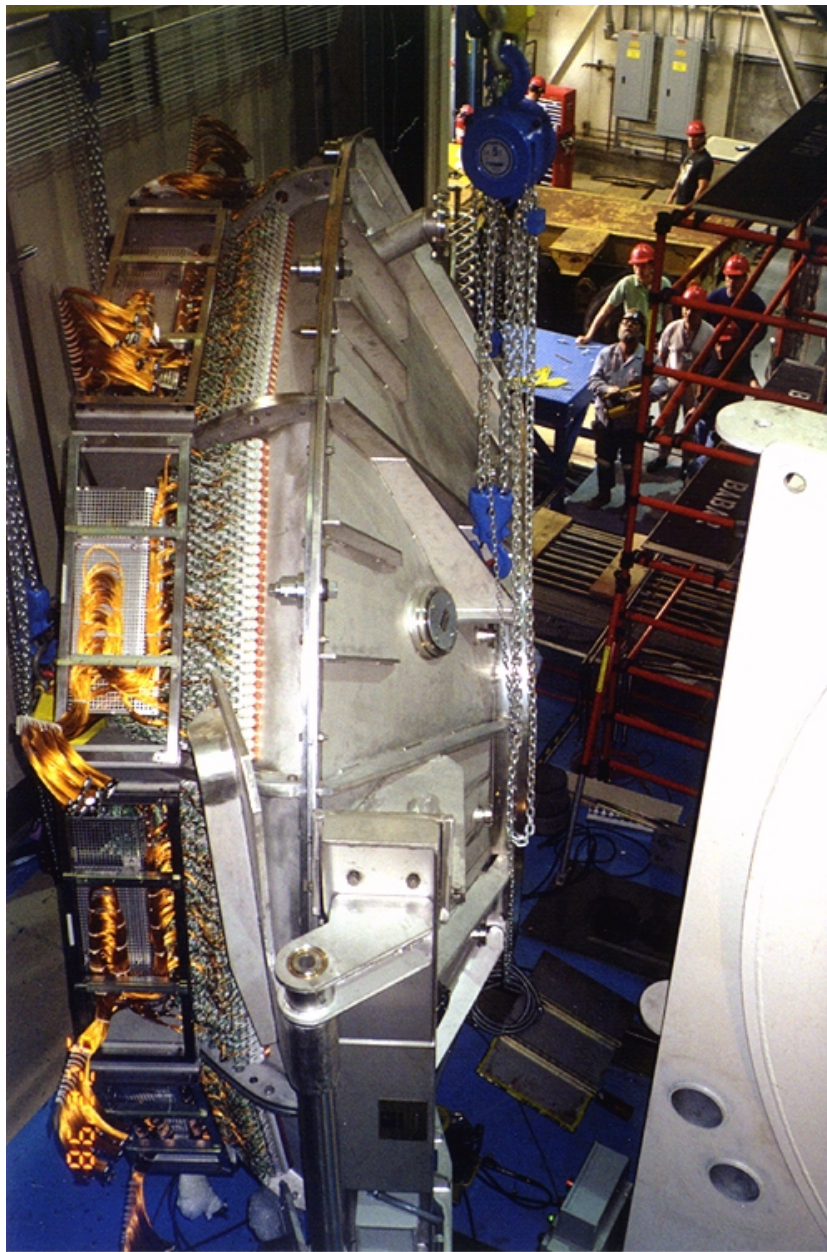
DIRC Central/Strong Support Tube Assembly



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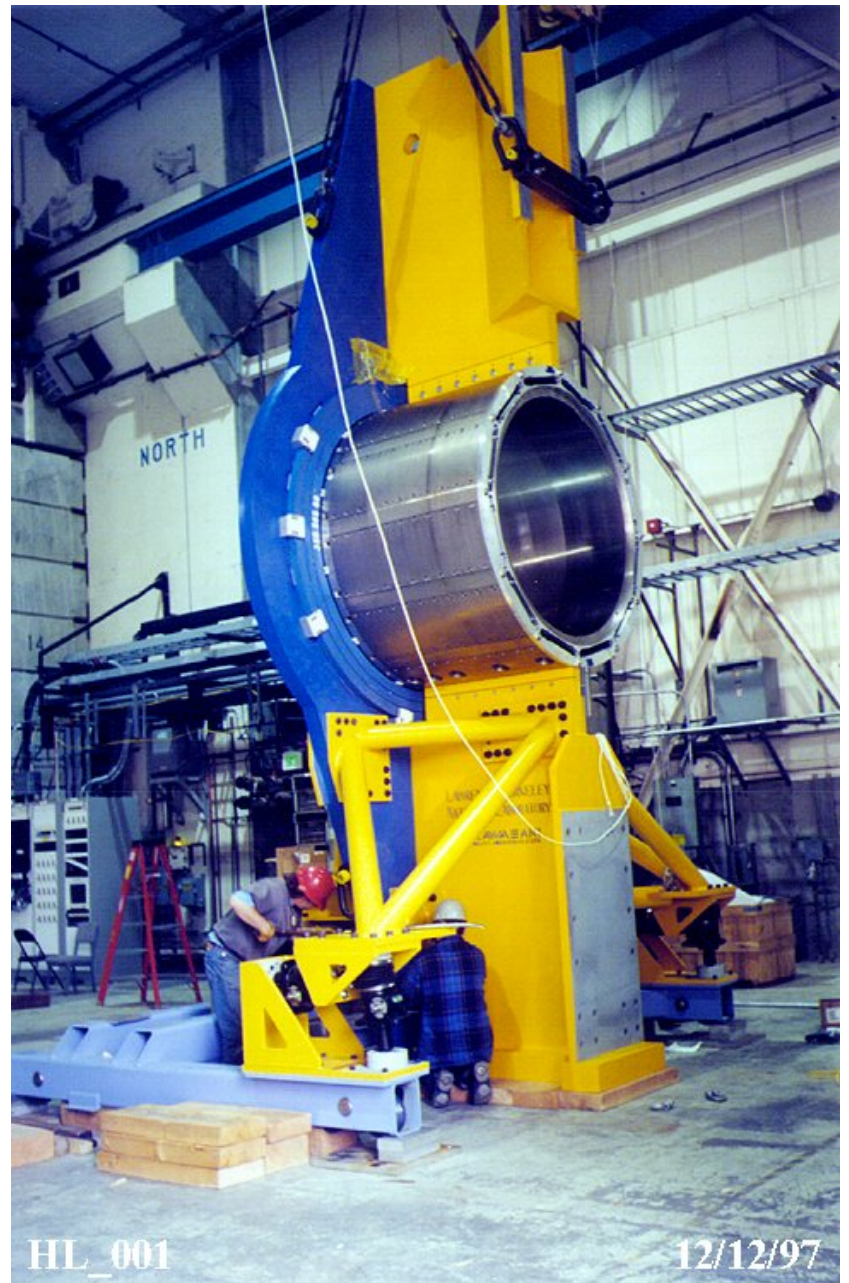


BR_048

SOB Installation

9/22/98

August 6, 2007



HL_001

12/12/97

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DIRC Magnetic Shield Cylinder

DR_107

BaBar Detector - Prepares for Roll-On

03/11/99

August 6, 2007

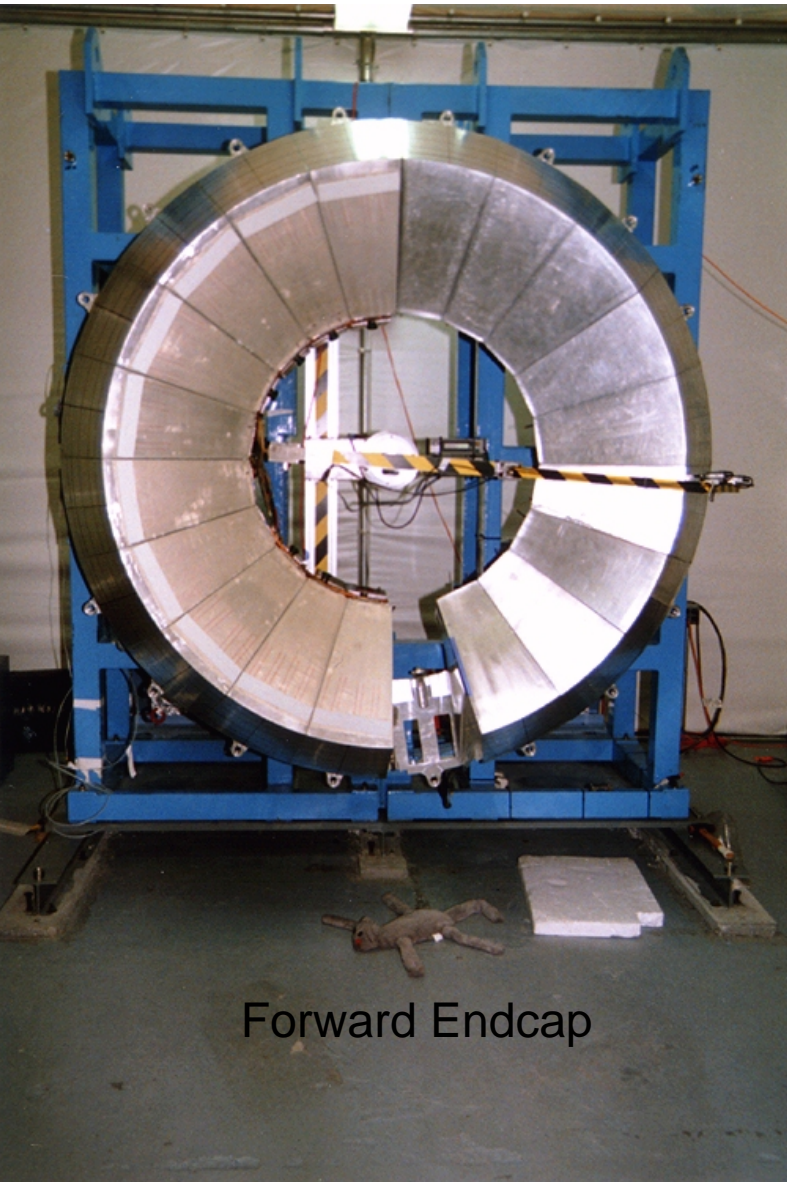
H.J. Krebs

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DIRC

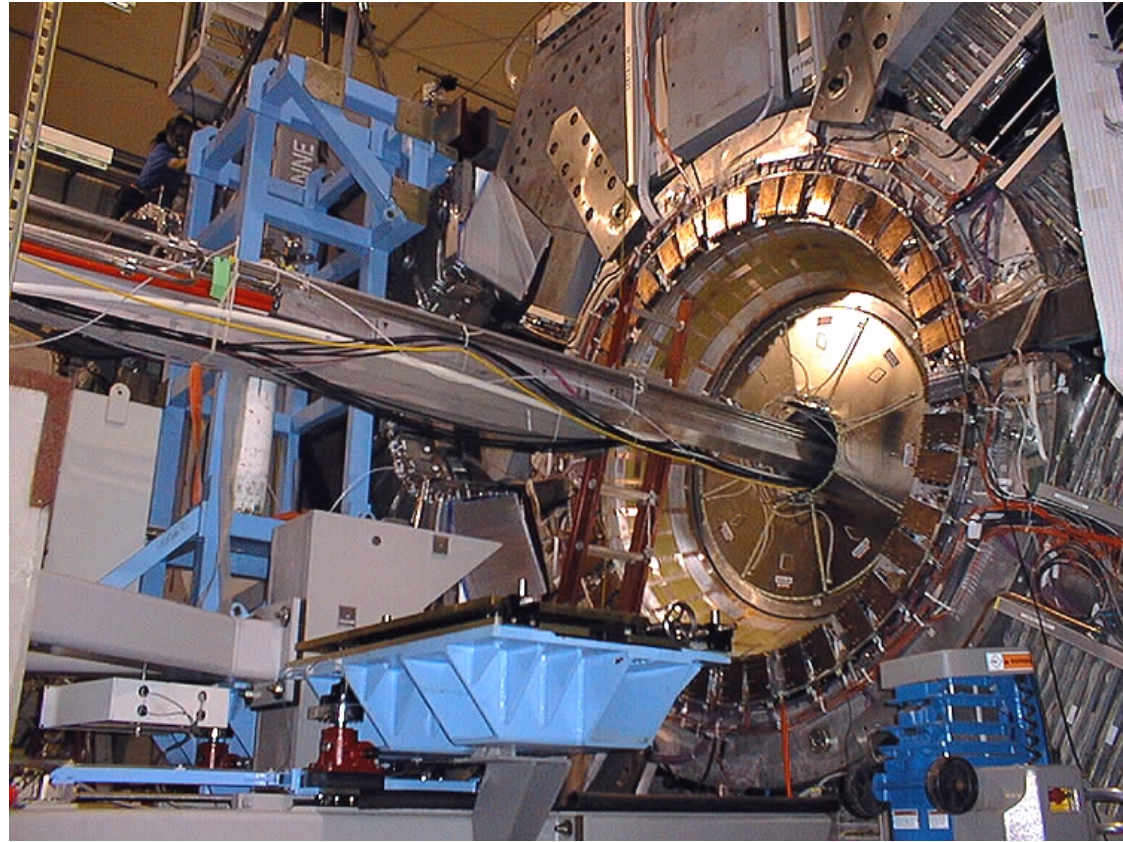
- Major detector components
 - Stand off box with 11,000 phototubes
 - Quartz Bar Boxes
 - Central/Strong Support Tube with Horsecollar and Magnet Bucking Coil
 - DIRC Magnetic Shield
- All major components removed from backward end in main disassembly area
 - Ship to IR-12 for final disassembly
- Reusable items
 - Quartz bars will be stored
 - Store in existing bar boxes?
 - Magnet Bucking Coil
- Most extraction equipment exists
 - Good condition (stored inside)

End Cap Calorimeter



Forward Endcap

August 6, 2007



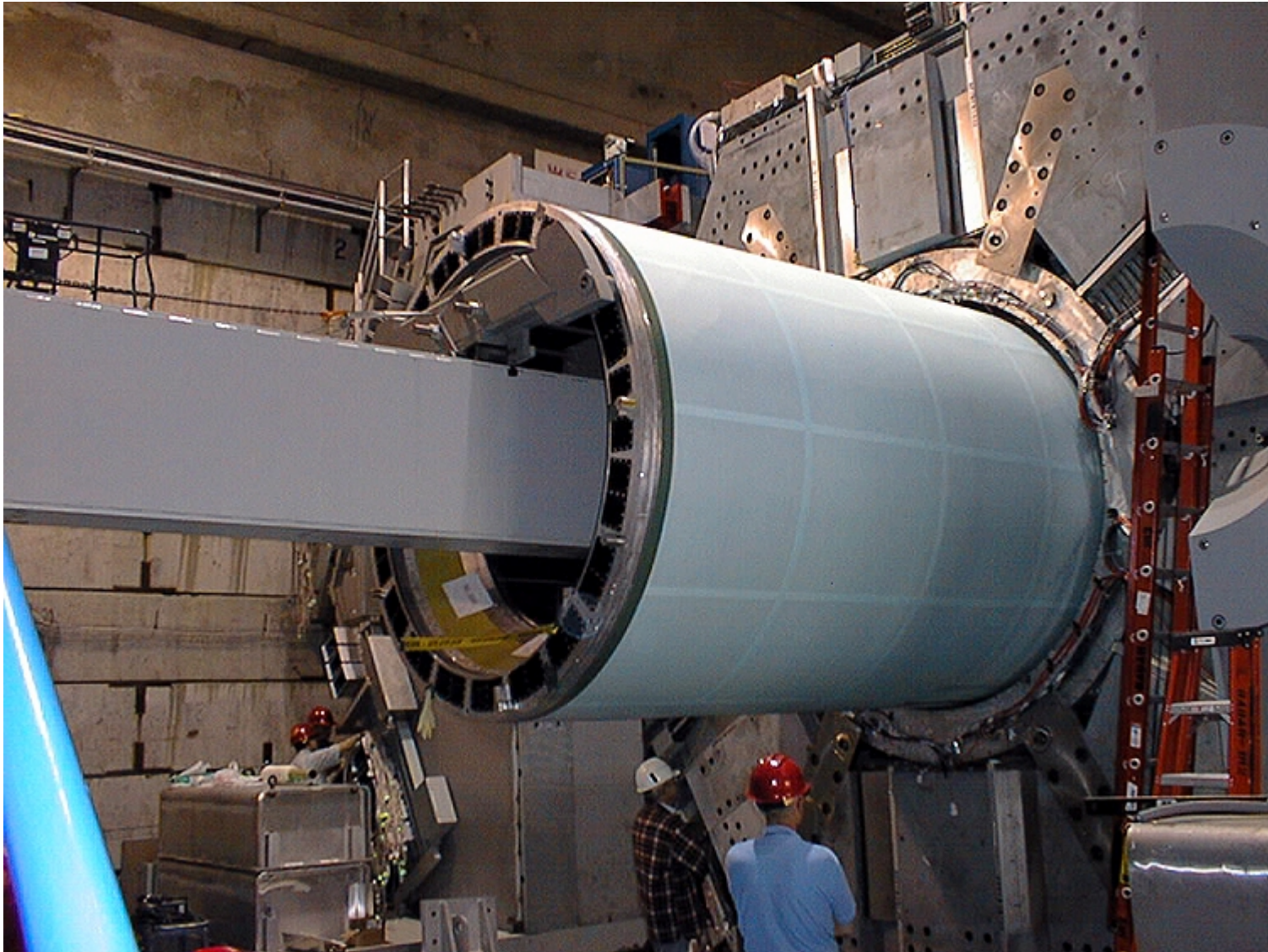
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End Cap Calorimeter

- All major components removed from forward end in main disassembly area
 - Ship to IR-12 for final disassembly
- Reusable items
 - Crystals
 - Build a storage container
 - May have excessive damage
- Most extraction equipment exists
 - Good Condition
 - Items stored inside but somewhat scattered
 - Some items will need to be replaced

Barrel Electromagnetic Calorimeter



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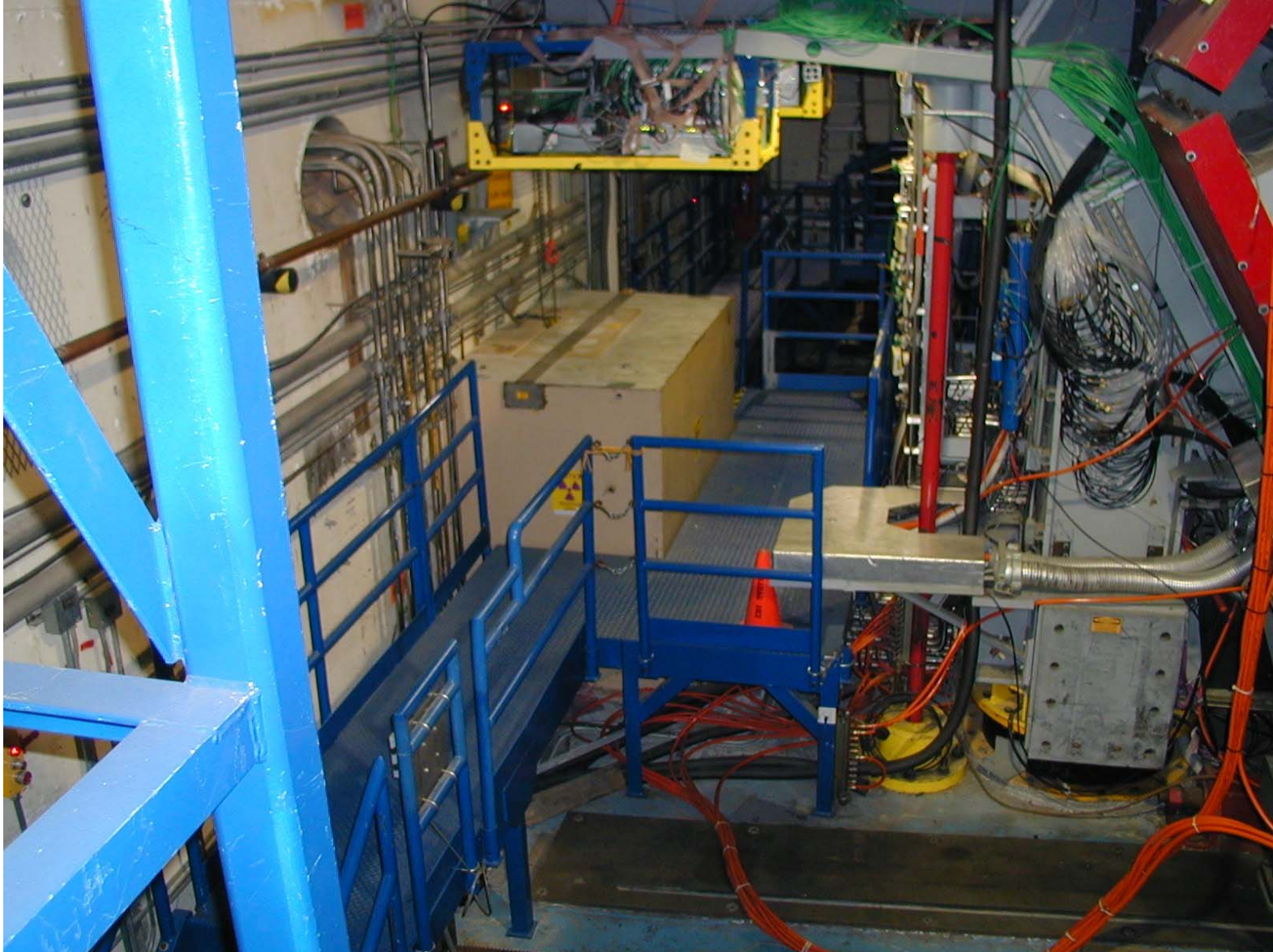
H.J. Krebs

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Barrel Electromagnetic Calorimeter

- Removed from forward end in main disassembly area
 - Ship to IR-12 for final disassembly
- Reusable items
 - Crystals
 - Build a storage container
- Most extraction equipment exists
 - Condition varies
 - Some items stored inside
 - Large items stored outside
 - Items are somewhat scattered
 - Some items will need to be replaced

EMC Calibration Source Bunker



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BaBar Magnet System



TO_293

Inserting the Solenoid into the Flux Return

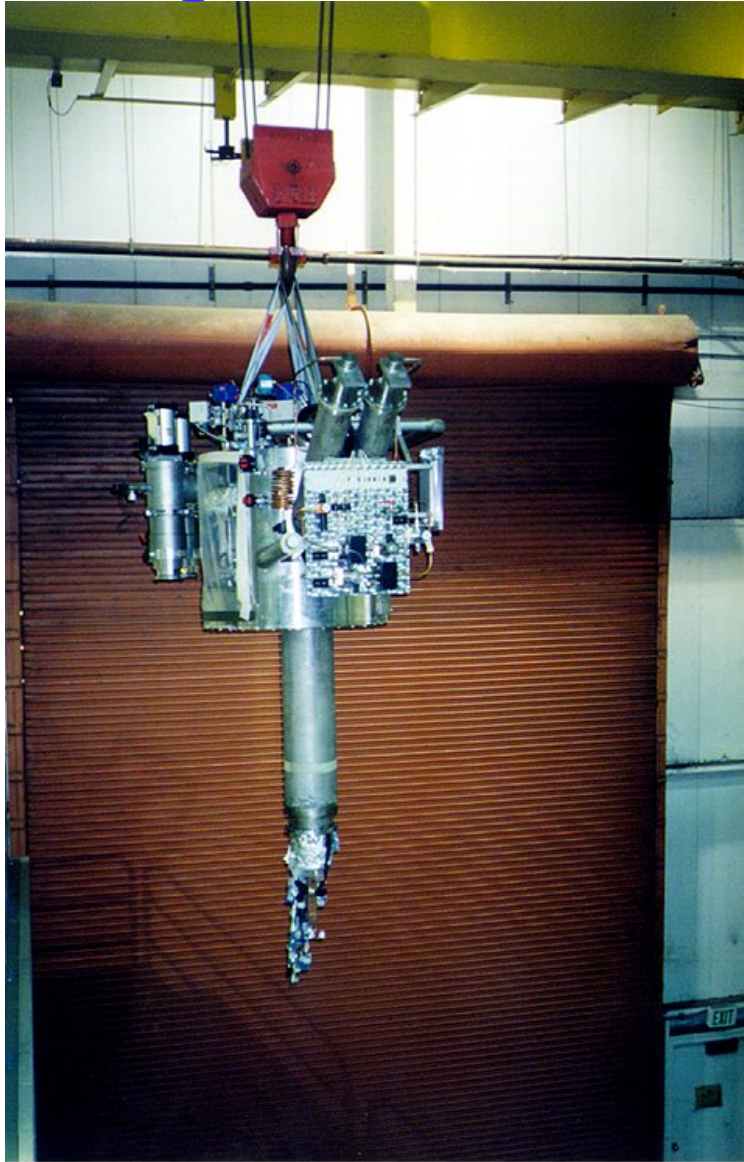
12/04/97

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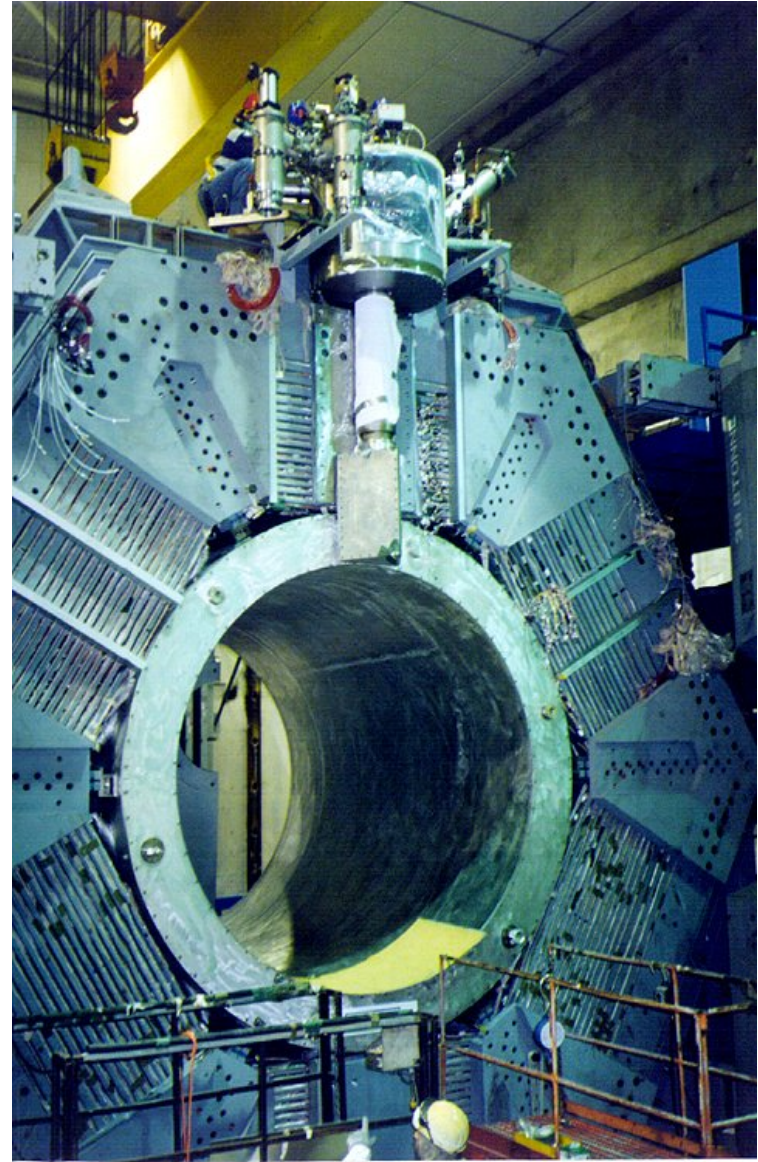
Magnet Valve Box With Current Leads



TO_299

Valve Box Assembly

12/12/97



TO_300

Valve Box Assembly

12/12/97

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IR-2 Helium Liquefier



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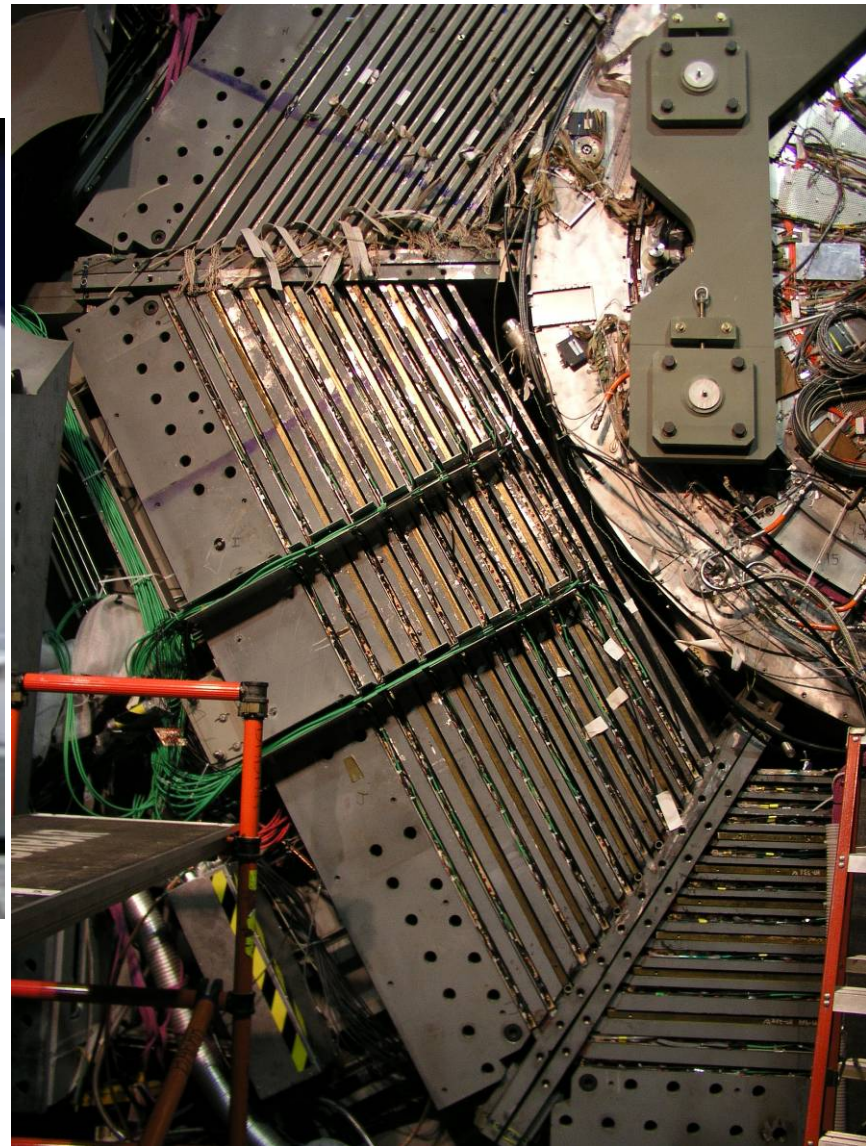
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BaBar Magnet System

- Solenoid is removed from backward side in main assembly area
- Uses EMC extraction beam assembly with magnet-specific tooling
- Most extraction equipment exists
 - Stored outside
 - Needs refurbishment
- Reusable items
 - Solenoid and Valve Box
 - Power Supply plus spare
 - Helium Liquefier and controls
 - Could also be used to provide a source for LHe at SLAC
 - LN₂ Dewar

Instrumented Flux Return (LSTs) Barrel

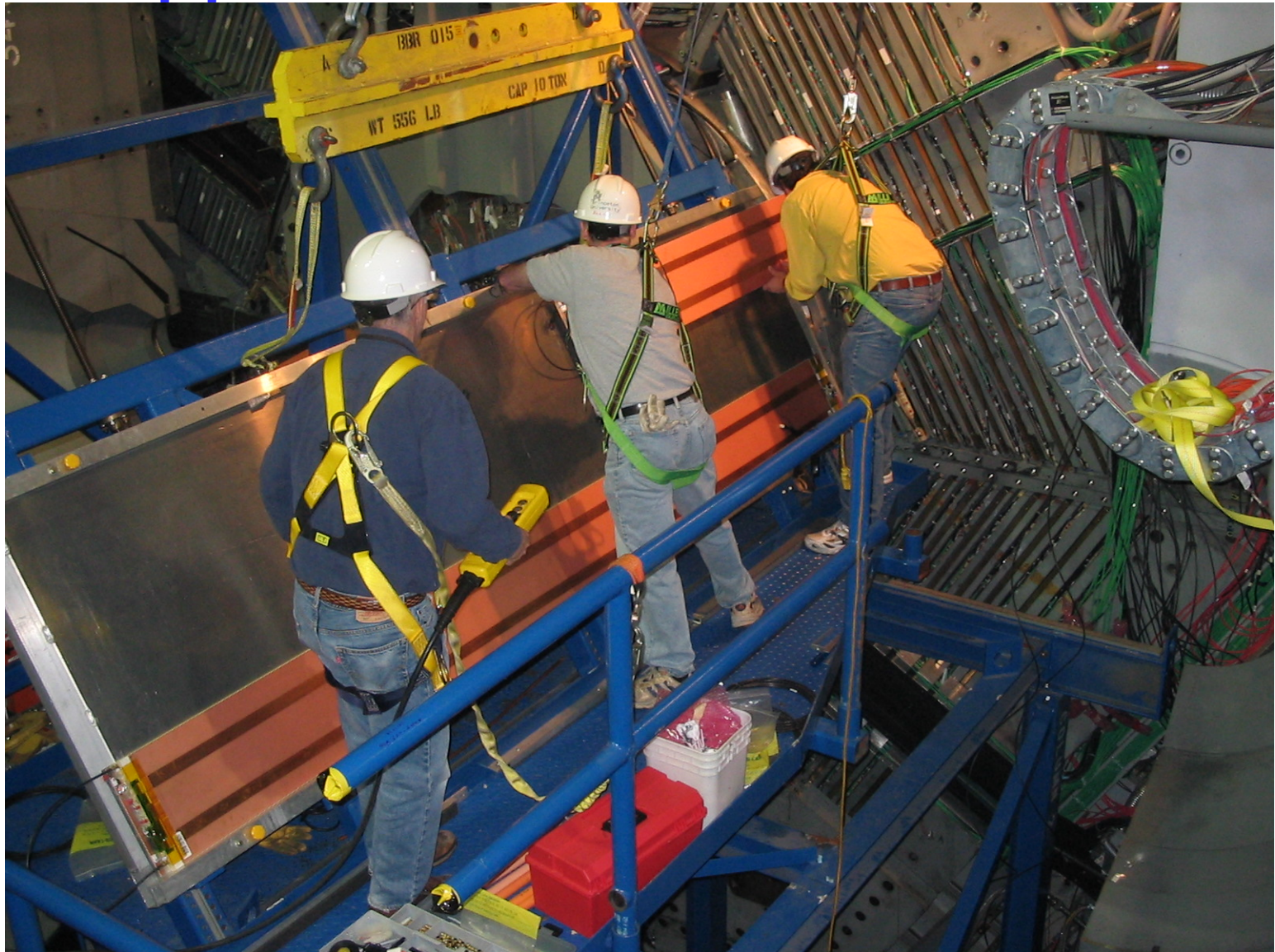


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Upper Barrel LST Removal



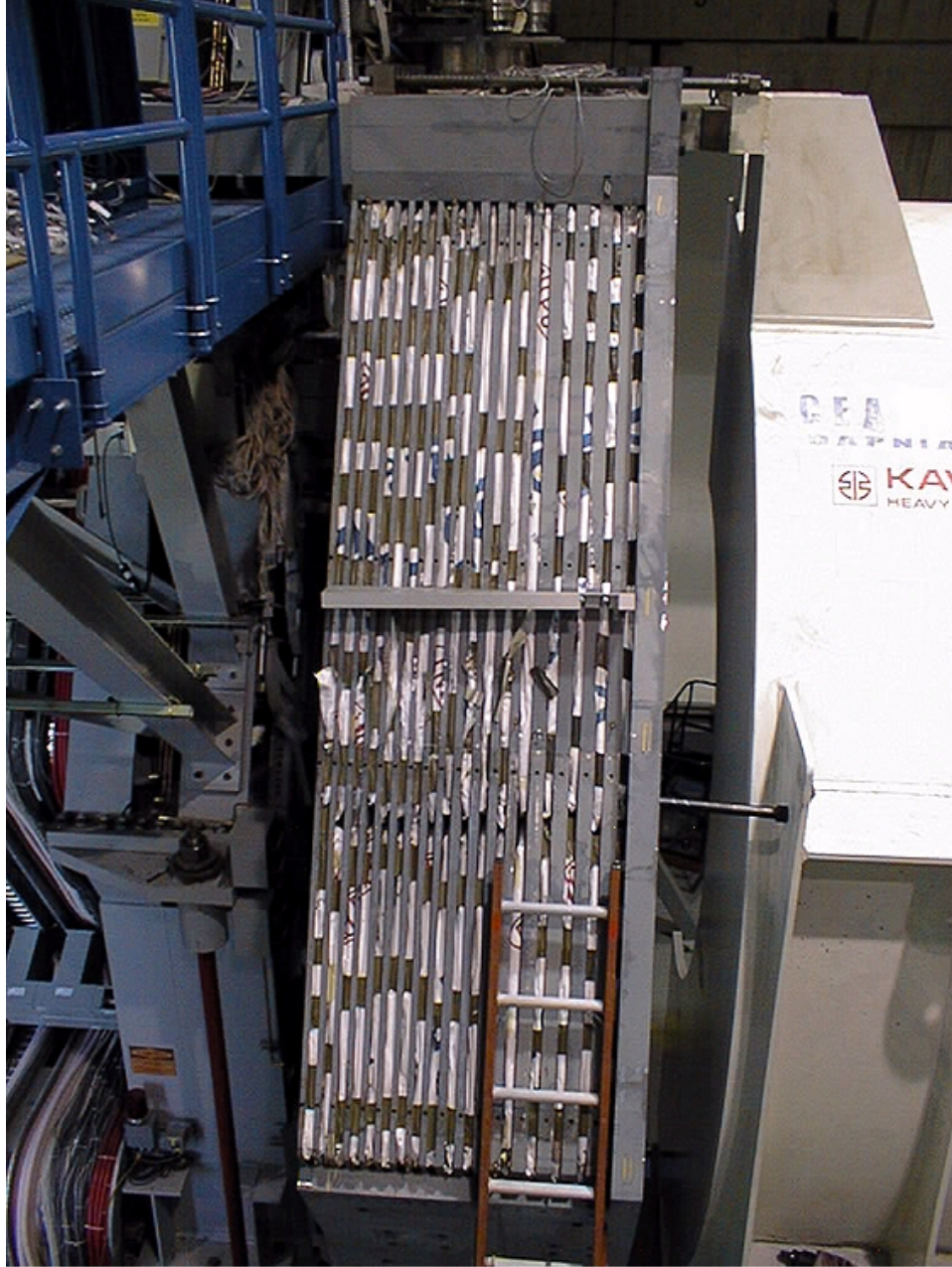
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Instrumented Flux Return

- Limited Streamer Tubes (LSTs)
 - Removed from detector on beam line
 - Most extraction equipment exists in good condition
 - Outer layers will be stored for possible future application
 - Inner layers to be disposed of
- 75 tons of brass absorber plates
 - Removed from detector on beam line
 - Most extraction equipment exists
 - Needs refurbishment
 - Affected by metals moratorium

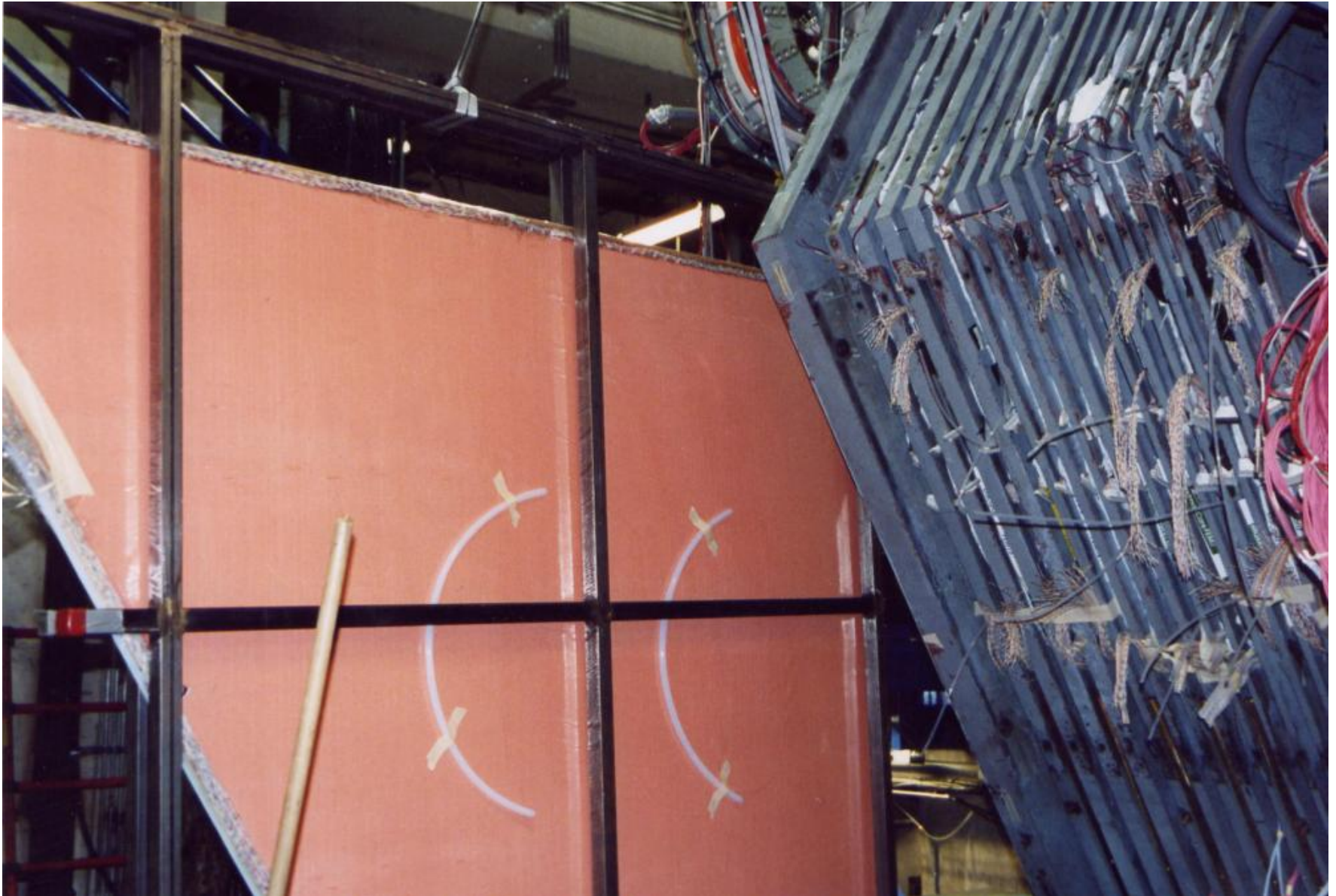


Instrumented Flux Return Backward End Door RPCs

SM_011 Back Door and Magnetic Shielding
August 6, 2007

06/30/98
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Instrumented Flux Return (RPCs) End Door



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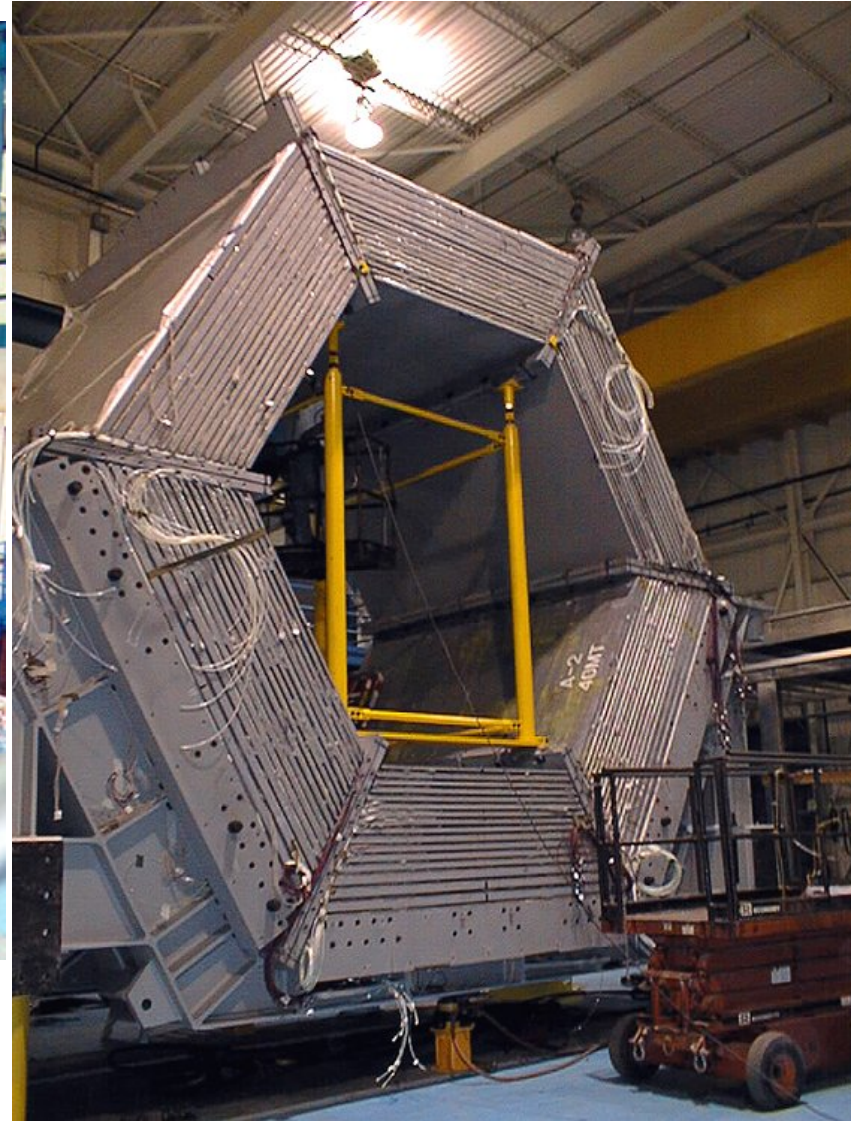
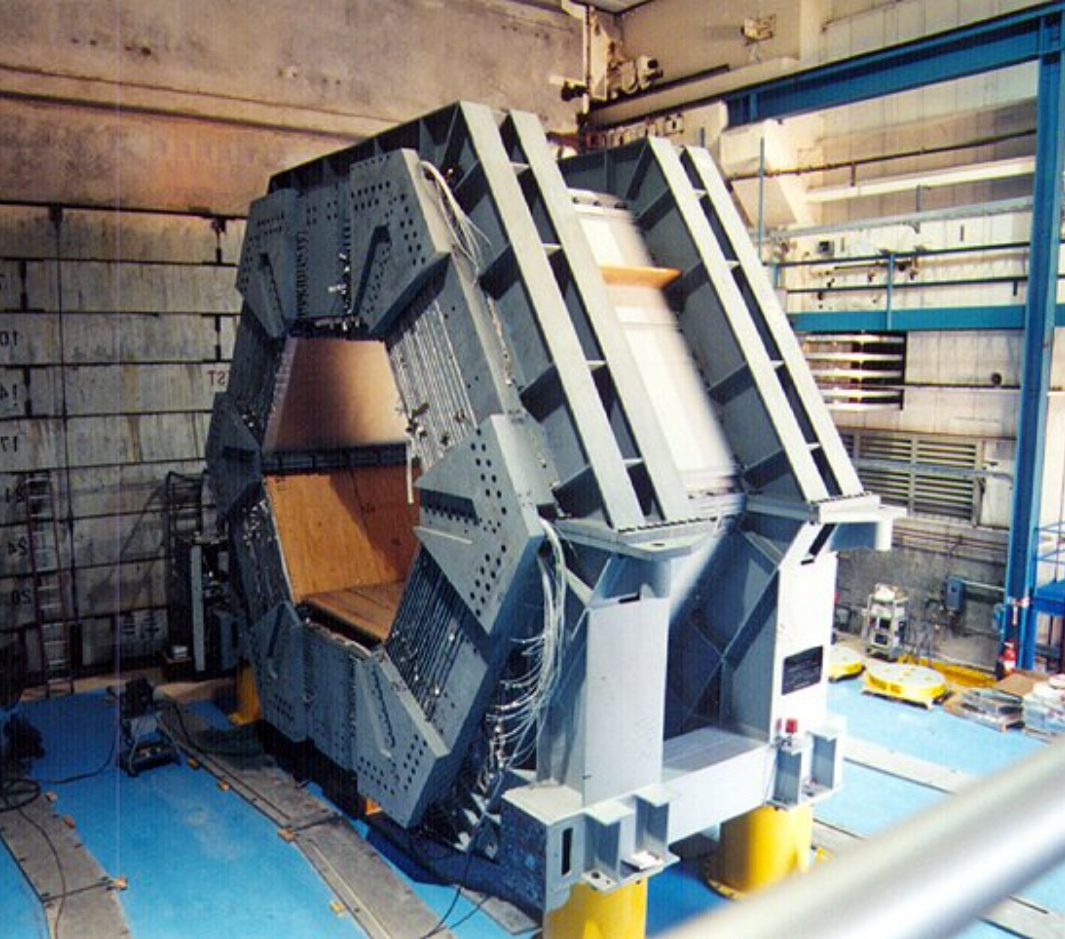
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Instrumented Flux Return (RPCs)

- **Resistive Plate Chambers (RPCs)**
 - Barrel
 - 6 RPCs in Barrel (Layer 19)
 - Approx 250 lbs each
 - Must disassemble barrel steel and support structure to remove these chambers
 - Forward End Doors
 - 16 layers, 3 modules high, both east and west
 - 96 total chambers
 - » Approx. 150 lbs each
 - Removed from detector on beam line
 - RPCs shall be disposed of
 - Backward End Doors
 - 18 layers, 3 modules high, both east and west
 - 108 total chambers
 - » Approx. 150 lbs each
 - Removed from detector on beam line
 - Most extraction equipment exists
 - Needs some refurbishment
- **30 tons of brass absorber plates**
 - Removed from detector on beam line
 - Most extraction equipment exists
 - Needs refurbishment
 - Affected by metals moratorium

Barrel Flux Return

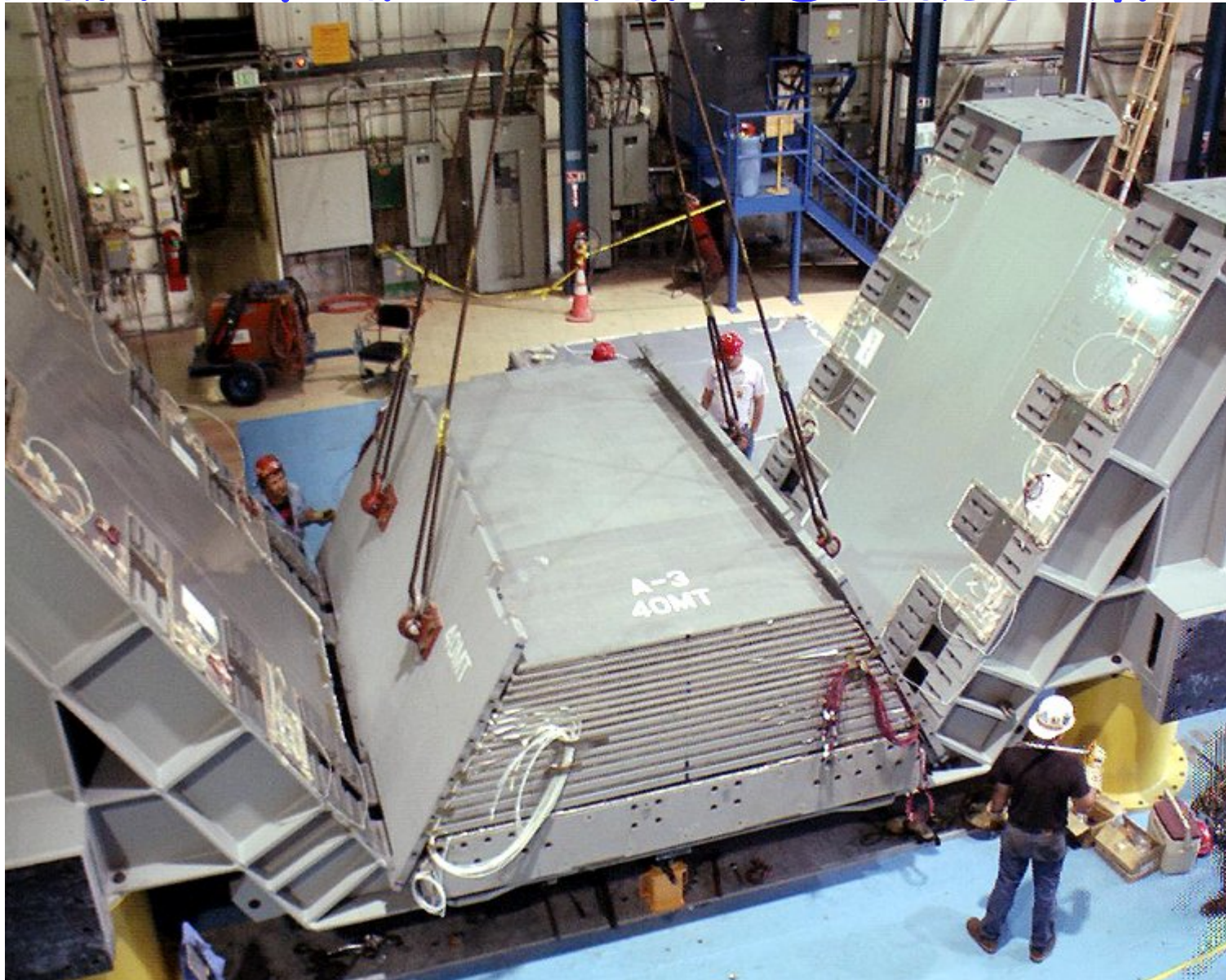


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Barrel Flux Return Disassembly

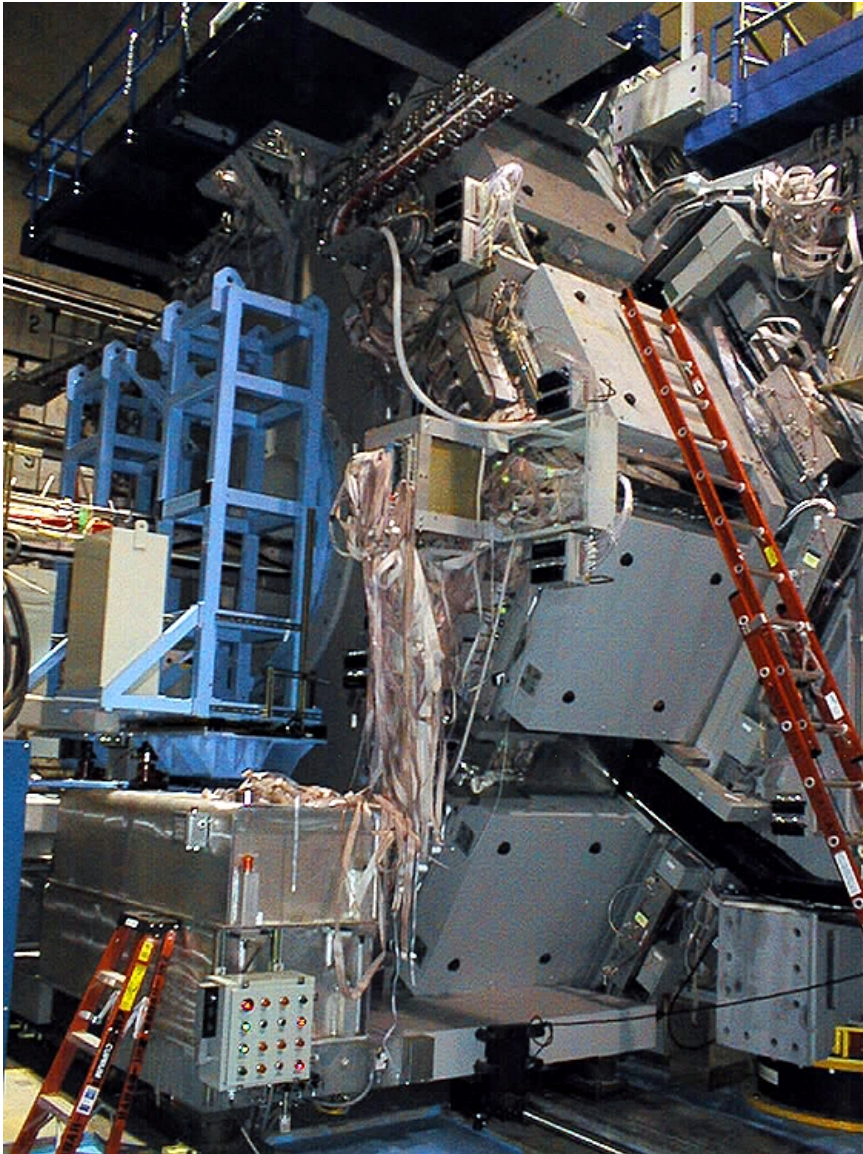


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End Door Flux Return



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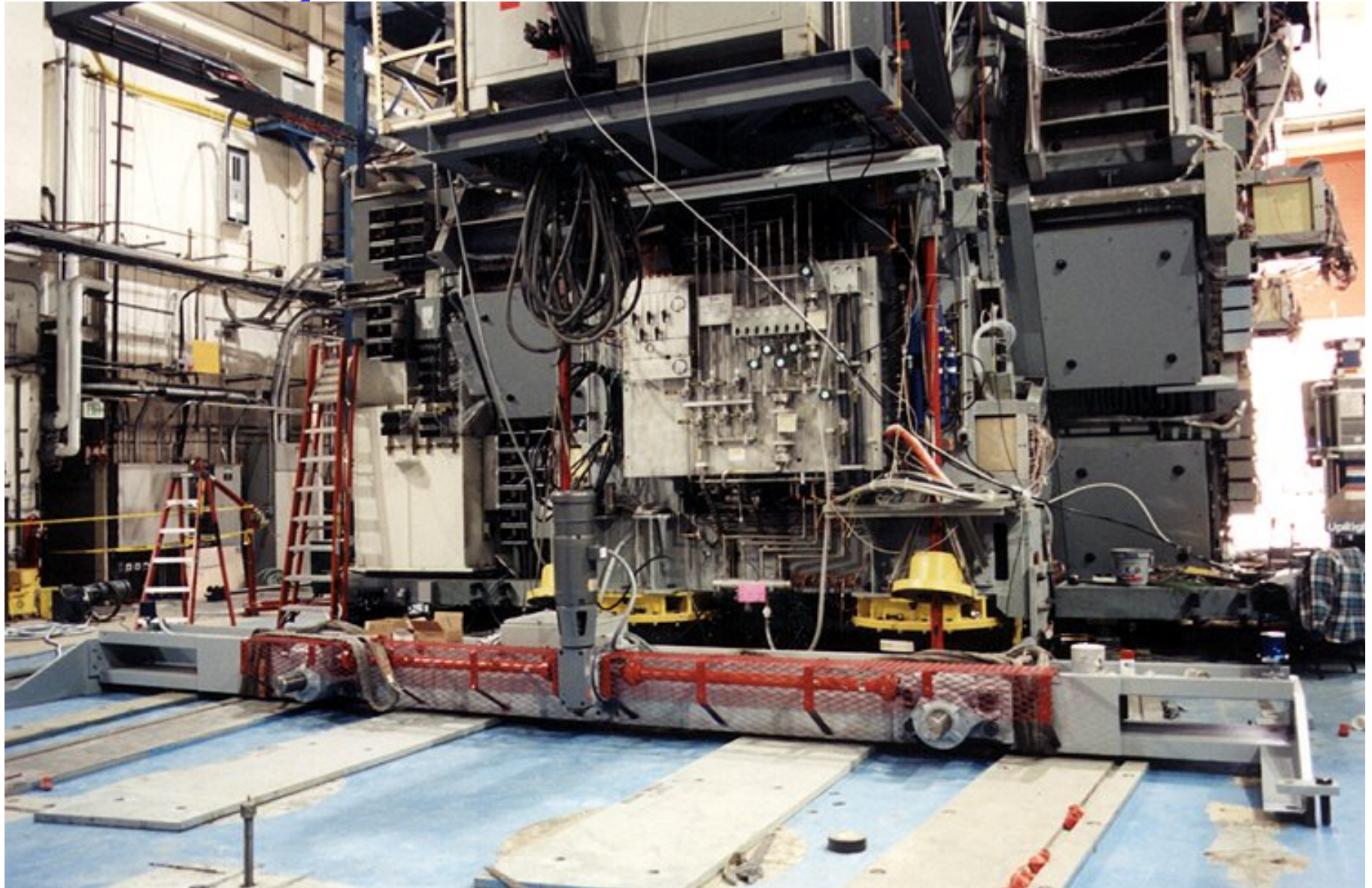
TO_298 Forward Door Assembly 12/12/97

34

Flux Return

- 962 tons of steel (not including end plugs)
 - Heaviest items 46.2 tons
- Disassembled in main disassembly area
- Most tooling exists
 - Needs refurbishment (stored outside)
- Affected by metals moratorium

Moving the Detector Off Beam Line



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Miscellaneous Stairs & Walkways



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East Detector Platform Electronics Racks

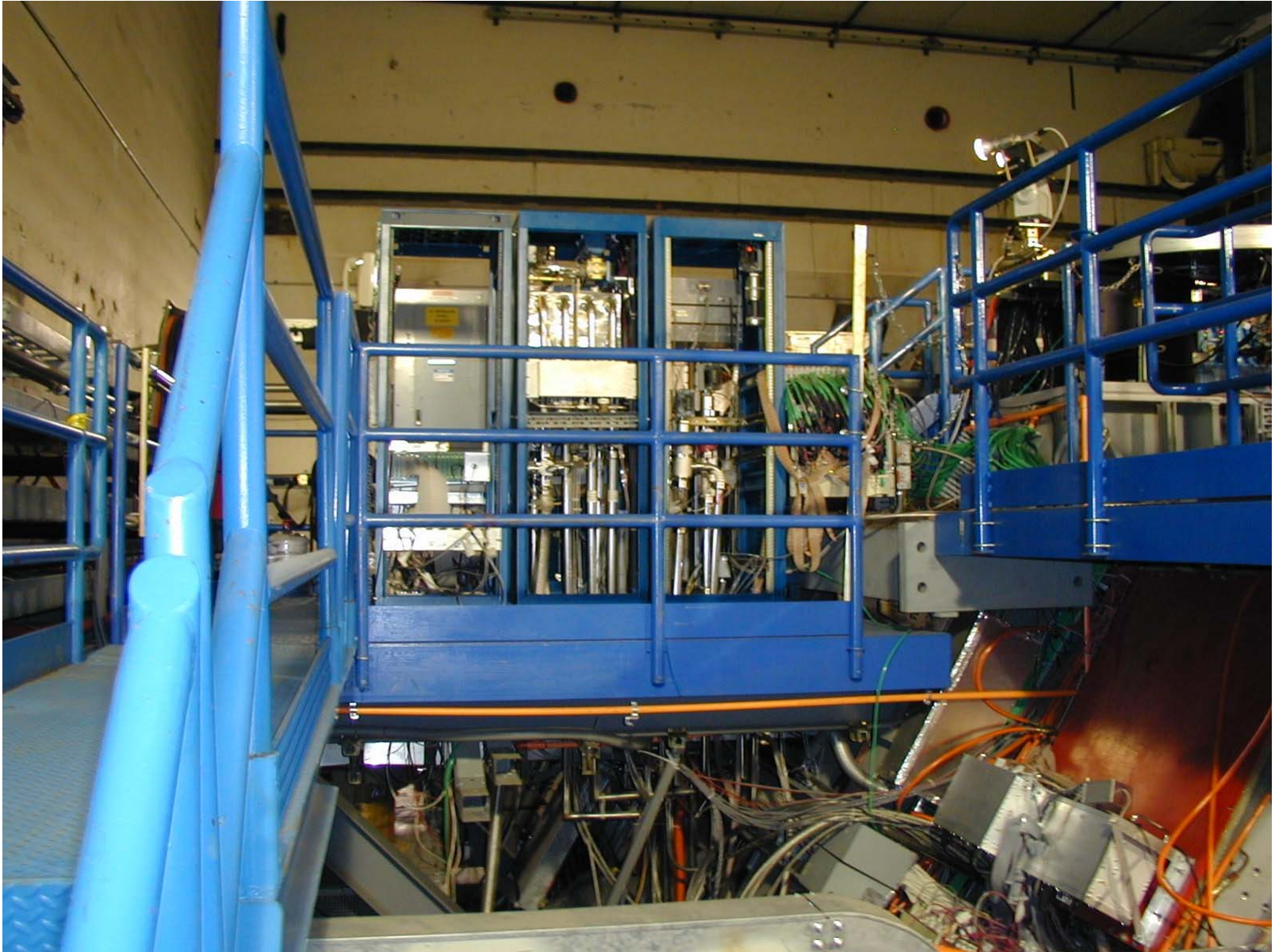


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West Detector Platform Electronics Racks

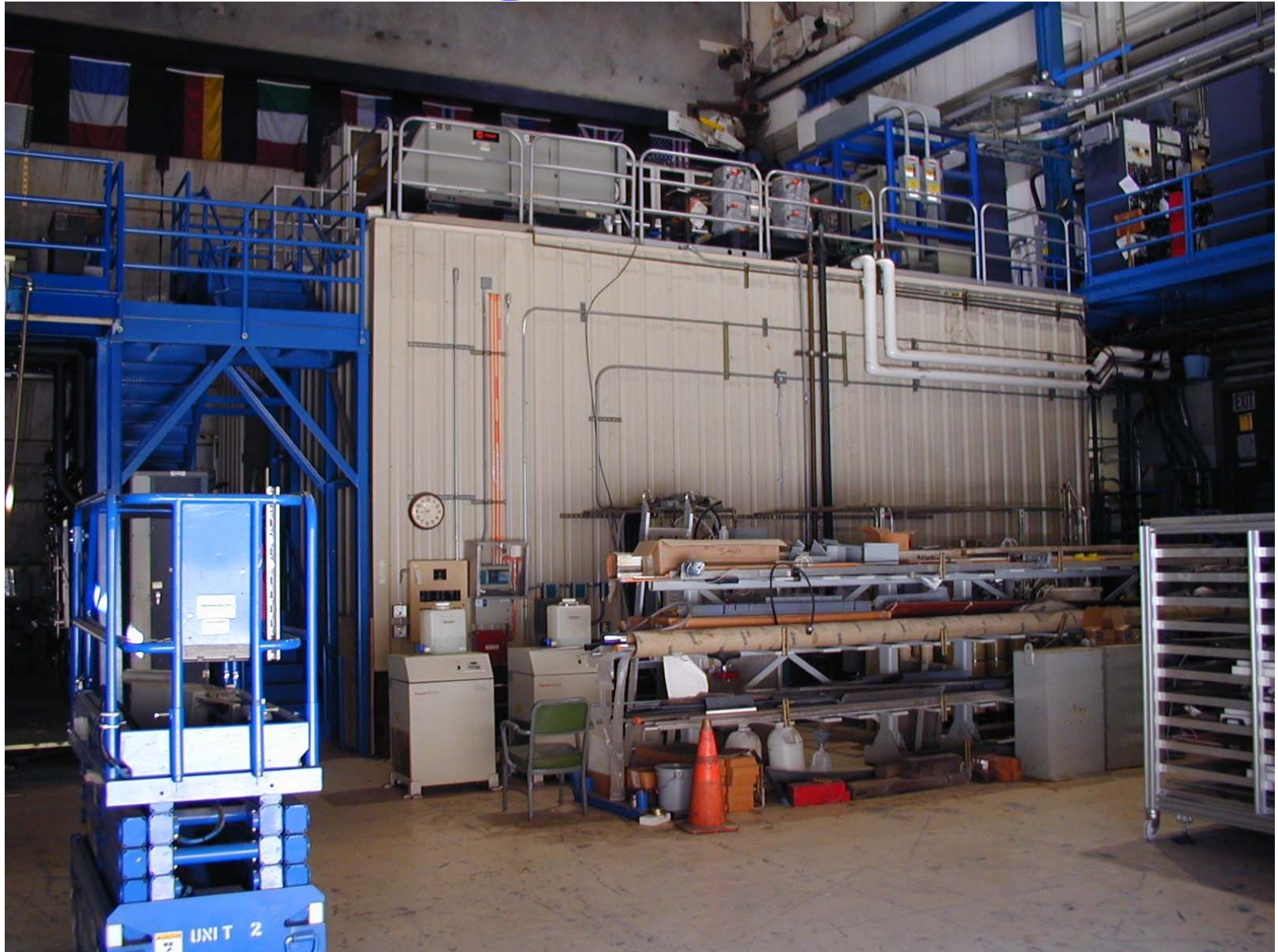


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BaBar Electronics House



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BaBar Electronics House - First Floor



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BaBar Electronics House - Second Floor



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Building 621 Control Room



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Shop Building 620A



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Storage Containers 628,629,632



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Upper IR-2 Storage Containers



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Building 636 (BaBar Gas Shack)



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LN2 Dewar, Storage Container 439

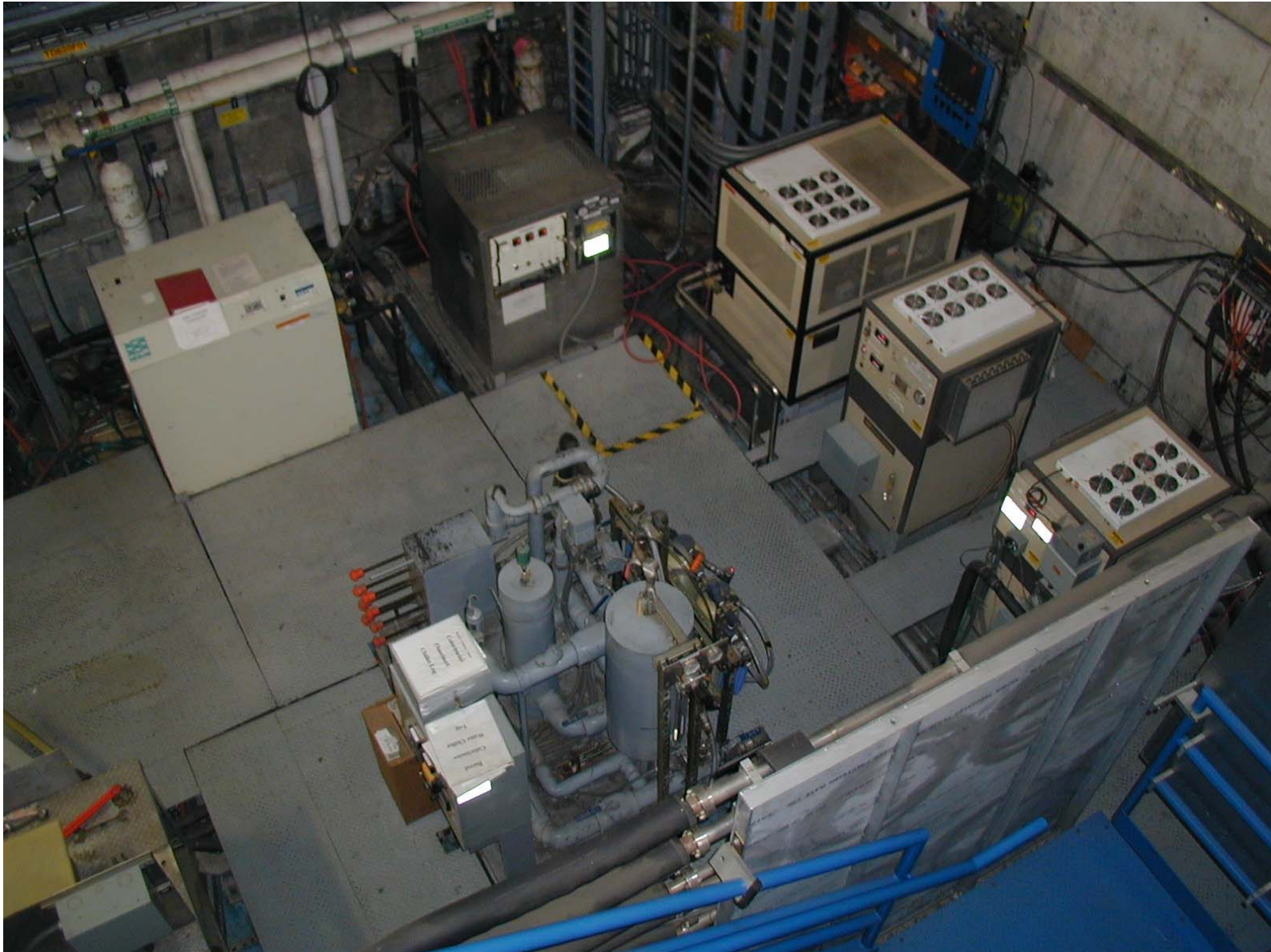


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Chiller Land



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Project Schedule

- 45 months duration
- Assumptions
 - Project start date January 1, 2015
 - Tasks performed sequentially
 - Can be optimized with additional work crews
 - Experienced supervision may not exist for multiple crews
 - Use of personnel knowledgeable in the disassembly of BaBar
 - Items hauled away are assumed to be trash
 - Ending location TBD
 - Metals are stored in Metals Moratorium Purgatory (MMP)
 - Location TBD

Project Schedule (Cont'd)

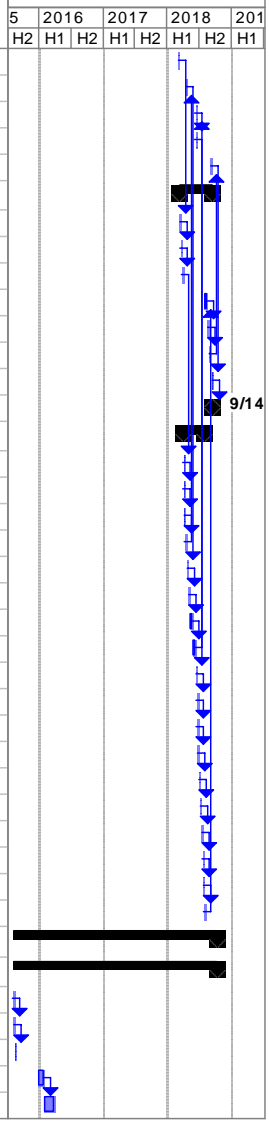
ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names	2015	2016	2017	2018
							H1 H2	H1 H2	H1 H2	H1 H2
1	BABAR DISASSEMBLY AND DISPOSAL	196.3 wks	Thu 1/1/15	Fri 10/5/18						
2	IR-2 SITE WORK	193.3 wks	Thu 1/1/15	Fri 9/14/18						
3	BUILDING 620 WORK	191.3 wks	Thu 1/1/15	Fri 8/31/18						
4	Miscellaneous Prep for Detector Removal	1 wk	Thu 1/1/15	Wed 1/7/15						
5	Remove Concrete Shield Wall/Transport to Sector 20	1 wk	Thu 1/8/15	Wed 1/14/15	4					
6	Remove IFR Background Shield Wall and Supporting Structure	0.5 wks	Thu 1/15/15	Mon 1/19/15	5					
7	Transport Shield Wall and Supports to MMP	0.2 wks	Mon 1/19/15	Tue 1/20/15	6					
8	Remove PEP Rafts and Support Tube	6 wks	Tue 1/20/15	Tue 3/3/15	7					
9	Transport PEP Rafts and Support Tube to MMP	0.6 wks	Tue 3/3/15	Fri 3/6/15	8					
10	Remove DIRC Water Purification Plant	0.2 wks	Fri 3/6/15	Mon 3/9/15	9					
11	Transport DIRC Water Plant to MMP	0.2 wks	Mon 3/9/15	Tue 3/10/15	10					
12	Remove Backup Cooling System - Transport to MMP	0.4 wks	Tue 3/10/15	Thu 3/12/15	11					
13	Remove BCS Support Platform	0.2 wks	Thu 3/12/15	Fri 3/13/15	12					
14	Transport BCS Support Platform to MMP	0.2 wks	Fri 3/13/15	Mon 3/16/15	13					
15	Remove Equipment from Electronics House Second Floor	2 wks	Mon 3/16/15	Mon 3/30/15	14					
16	Remove Equipment from Inside Electronics House	3 wks	Mon 3/30/15	Mon 4/20/15	15					
17	Transport Electronics House Equipment to MMP	0.2 wks	Mon 4/20/15	Tue 4/21/15	16					
18	Remove Electronics House Stairs and Walkways	0.4 wks	Tue 4/21/15	Thu 4/23/15	17					
19	Transport Electronics House Stairs and Walkways to MMP	0.2 wks	Thu 4/23/15	Fri 4/24/15	18					
20	Disconnect and Roll Back Electronics House	2 wks	Fri 4/24/15	Fri 5/8/15	9,19					
21	Remove E.H. 1st Raised Floor, Cables and Trays	1 wk	Fri 5/8/15	Fri 5/15/15	20					
22	Remove E.H. 2nd Raised Floor, Cables and Trays	1 wk	Fri 5/15/15	Fri 5/22/15	21					
23	Haul Away E.H. Raised Floors, Cables and Trays	0.2 wks	Fri 5/22/15	Mon 5/25/15	22					
24	Dismantle Electronics House Structure	1 wk	Mon 5/25/15	Mon 6/1/15	23					
25	Remove Electronics House Debris	0.4 wks	Mon 6/1/15	Wed 6/3/15	24					
26	Remove Chillers, Heat Exchangers & Piping	2 wks	Wed 6/3/15	Wed 6/17/15	25					
27	Transport Chillers, Heat Exchangers & Piping to MMP	0.4 wks	Wed 6/17/15	Fri 6/19/15	26					
28	Remove Platforms, Walkways & Stairs	2 wks	Fri 6/19/15	Fri 7/3/15	27					
29	Transport Platforms, Walkways & Stairs to MMP	0.4 wks	Fri 7/3/15	Tue 7/7/15	28					
30	Remove Solenoid DC Power Cables - Valve Box to West Wall Penetration	1 wk	Tue 7/7/15	Tue 7/14/15	29					
31	Remove Bucking Coil Cables - Coil to West Wall Penetration	0.2 wks	Tue 7/14/15	Wed 7/15/15	30					
32	Remove FWD IFR Layer 13-16 Modules & End Plug Components	2 wks	Wed 7/15/15	Wed 7/29/15	31					
33	Transport FWD IFR Layer 13-16 Modules to IR-12	0.4 wks	Wed 7/29/15	Fri 7/31/15	32					
34	Remove LST FEC Crates and Transition Boxes - Haul Away	1 wk	Tue 8/11/15	Tue 8/18/15	118					
35	Remove Barrel LSTs and Brass	17 wks	Tue 8/18/15	Tue 12/15/15	34					
36	Dispose of Inner Barrel LSTs	0.4 wks	Tue 12/15/15	Thu 12/17/15	35					
37	Transport Outer Barrel LSTs to Storage	1 wk	Thu 12/17/15	Thu 12/24/15	36					
38	Transport Barrel Brass to MMP	0.2 wks	Thu 12/24/15	Fri 12/25/15	37					
39	Remove FWD End Cap EMC	2 wks	Fri 3/25/16	Thu 4/7/16	120					
40	Transport FWD End Cap EMC to IR-12	0.2 wks	Fri 4/8/16	Fri 4/8/16	39					

Project Schedule (Cont'd)

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names	6	2017		2018		2019		202
							H2	H1	H2	H1	H2	H1	H2	H1
41	Remove End Door RPCs and Brass	9 wks	Mon 7/4/1	Mon 9/5/1	121									
42	Dispose of End Door RPCs	0.4 wks	Mon 9/5/1	Wed 9/7/1	41									
43	Transport FWD End Door Brass to MMP	0.2 wks	Wed 9/7/1	Thu 9/8/1	42									
44	Connect End Doors to Barrel	2 wks	Thu 9/8/1	Thu 9/22/1	43									
45	Remove Main Cable Trays, Pipes Between BaBar and E.H.	0.4 wks	Thu 9/22/1	Mon 9/26/1	44									
46	Haul Away Main Cable Trays, Cables & Pipes	0.2 wks	Mon 9/26/1	Tue 9/27/1	45									
47	Roll Out BaBar Detector	2 wks	Tue 9/27/1	Tue 10/11/1	46									
48	Open EMC Source Bunker/Remove Generator	0.2 wks	Tue 10/11/1	Wed 10/12/1	47									
49	Dismantle and Remove Bunker	0.4 wks	Wed 10/12/1	Fri 10/14/1	48									
50	Disassemble End Doors	8 wks	Fri 10/14/1	Fri 12/9/1	49									
51	Transport End Door Materials to MMP	1 wk	Fri 12/9/1	Fri 12/16/1	50									
52	Remove East & West Barrel Platform Electronics - Haul Away	2 wks	Fri 12/16/1	Fri 12/30/1	51									
53	Disconnect and Remove SVT Barrel MUX Racks - Haul Away	0.4 wks	Fri 12/30/1	Tue 1/3/1	52									
54	Disc & Remove North SVT MUX Racks - Haul Away	0.4 wks	Tue 1/3/1	Thu 1/5/1	53									
55	Remove NE Platform and Stair - Take to MMP	0.2 wks	Thu 1/5/1	Fri 1/6/1	54									
56	Remove Barrel Cabling - Take Away	3 wks	Fri 1/6/1	Fri 1/27/1	55									
57	Remove Barrel Piping - Take to MMP	2 wks	Fri 1/27/1	Fri 2/10/1	56									
58	Remove Barrel Platforms and Side Valve Panels	2 wks	Fri 2/10/1	Fri 2/24/1	57									
59	Transport Barrel Platforms and Side Valve Panels to MMP	0.4 wks	Fri 2/24/1	Tue 2/28/1	58									
60	Remove DIRC Stand Off Box	2 wks	Tue 2/28/1	Tue 3/14/1	59									
61	Transport DIRC Standoff Box to IR-12	0.2 wks	Tue 3/14/1	Wed 3/15/1	60									
62	Remove DIRC Bar Boxes - Package Same	2 wks	Mon 4/3/1	Mon 4/17/1	124									
63	Transport DIRC Bar Boxes to Storage	0.4 wks	Mon 4/17/1	Wed 4/19/1	62									
64	Remove DIRC Central/Strong Support Tube Assembly	3 wks	Wed 4/19/1	Wed 5/10/1	63									
65	Transport DIRC Central/Strong Support Tube Assembly to IR-12	0.2 wks	Wed 5/10/1	Thu 5/11/1	64									
66	Remove Barrel EMC	3 wks	Tue 4/18/1	Tue 5/9/1	130									
67	Transport Barrel EMC to IR-12	0.2 wks	Tue 5/9/1	Wed 5/10/1	66									
68	Remove Cylindrical RPC - Dispose of Same	1 wk	Fri 10/20/1	Fri 10/27/1	131									
69	Remove Valve Box, Vacuum Pumps and S.C. Solenoid	3 wks	Fri 10/27/1	Fri 11/17/1	68									
70	Transport Valve Box, Vacuum Pumps and S.C. Solenoid to Storage	0.4 wks	Fri 11/17/1	Tue 11/21/1	69									
71	Remove Barrel Crossover, Arches and Top 3 Iron Sextants	3 wks	Tue 11/21/1	Tue 12/12/1	70									
72	Transport Crossover, Arches and Top 3 Iron Sextants to MMP	0.4 wks	Tue 12/12/1	Thu 12/14/1	71									
73	Remove Bottom 3 Barrel Iron Sextants and Cradle	3 wks	Thu 12/14/1	Thu 1/4/1	72									
74	Transport Bottom 3 Barrel Iron Sextants and Cradle to MMP	0.4 wks	Thu 1/4/1	Mon 1/8/1	73									
75	Remove EMC Calibration Source Bunker - Haul Away	0.5 wks	Mon 1/8/1	Wed 1/10/1	74									
76	Remove IR-2 PEP Cables - Haul Away	3 wks	Thu 1/11/1	Wed 1/31/1	75									
77	Remove Cryo Transfer Lines and Cables - Haul Away	0.5 wks	Thu 2/1/1	Mon 2/5/1	76									
78	Remove PEP Cable Trays and Supports - Haul Away	1 wk	Mon 2/5/1	Mon 2/12/1	77									
79	Remove Grouted Steel Floor Plates - Take to MMP	0.5 wks	Mon 2/12/1	Wed 2/14/1	78									
80	Remove Wall Mounted Piping - Haul Away	1 wk	Thu 2/15/1	Wed 2/21/1	79									

Project Schedule (Cont'd)

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names	5	2016	2017	2018	201
							H2	H1	H2	H1	H2
81	Remove Wall Mounted Conduits - Haul Away	1 wk	Thu 2/22/1	Wed 2/28/1	80						
82	Remove Piping - West Wall Penetrations - Haul Away	1 wk	Fri 4/6/1	Fri 4/13/1	99						
83	Remove Water Cooled Cables - West Penetration - Haul Away	0.5 wks	Fri 6/1/1	Tue 6/5/1	103						
84	Remove Bucking Coil Cables - West Penetration - Haul Away	0.2 wks	Wed 6/6/1	Wed 6/6/1	83						
85	Clean Out Building 620	1 wk	Fri 8/24/1	Fri 8/31/1	92						
86	LOWER SITE WORK	28.3 wks	Thu 3/1/18	Fri 9/14/18							
87	Disconnect and Remove Cryo Helium Refrigerator	2 wks	Thu 3/1/1	Wed 3/14/1	81						
88	Transport Helium Refrigerator to Storage	0.4 wks	Thu 3/15/1	Fri 3/16/1	87						
89	Remove Equipment from Cryo Control Room - Haul Away	1 wk	Mon 3/19/1	Fri 3/23/1	88						
90	Empty Storage Containers 628,629,632	2 wks	Fri 7/27/1	Fri 8/10/1	113						
91	Remove Storage Containers 628,629,632	1 wk	Fri 8/10/1	Fri 8/17/1	90						
92	Empty Buildings 305,306	1 wk	Fri 8/17/1	Fri 8/24/1	91						
93	Remove Remaining Tooling and Debris From IR-2 Area	2 wks	Fri 8/31/1	Fri 9/14/1	85						
94	IR-2 Site Cleared of BaBar Related Equipment	0 w ks	Fri 9/14/1:	Fri 9/14/1:	93						
95	UPPER SITE WORK	17.9 wks	Mon 3/26/18	Fri 7/27/18							
96	Disconnect N2 Dewar and Interconnect Piping	0.2 wks	Mon 3/26/1	Mon 3/26/1	89						
97	Transport N2 Dewar to Storage	0.2 wks	Tue 3/27/1	Tue 3/27/1	96						
98	Remove Cryo Interconnect Piping - Haul Away	1 wk	Wed 3/28/1	Tue 4/3/1	97						
99	Remove Gas Piping - Building 620 Roof - Haul Away	0.5 wks	Wed 4/4/1	Fri 4/6/1	98						
100	Remove Piping - Building 620 to Building 636 - Haul Away	2 wks	Fri 4/13/1	Fri 4/27/1	82						
101	Remove Piping Supports - Bldg 620 to Bldg 636 - Haul Away	1 wk	Fri 4/27/1	Fri 5/4/1	100						
102	Disassemble LST Gas System	2 wks	Fri 5/4/1	Fri 5/18/1	101						
103	Disassemble Drift Chamber Gas System	2 wks	Fri 5/18/1	Fri 6/1/1	102						
104	Remove Water Cooled Cables - Buildings 620 to 625 - Haul Away	0.5 wks	Thu 6/7/1	Mon 6/11/1	84						
105	Rem Bucking Coil Cables Buildings 620 to 625 - Haul Away	0.2 wks	Mon 6/11/1	Tue 6/12/1	104						
106	Remove BaBar Magnet Power Supplies - Building 625	0.5 wks	Tue 6/12/1	Thu 6/14/1	105						
107	Transport BaBar Magnet Power Supplies to Storage	0.4 wks	Fri 6/15/1	Mon 6/18/1	106						
108	Empty Upper North Storage Containers	2 wks	Tue 6/19/1	Mon 7/2/1	107						
109	Remove Upper North Storage Containers	1 wk	Tue 7/3/1	Mon 7/9/1	108						
110	Empty Trailer 627	1 wk	Tue 7/10/1	Mon 7/16/1	109						
111	Remove Trailer 627	0.2 wks	Tue 7/17/1	Tue 7/17/1	110						
112	Empty Upper South Storage Containers	1 wk	Wed 7/18/1	Tue 7/24/1	111						
113	Remove Upper South Storage Containers	0.5 wks	Wed 7/25/1	Fri 7/27/1	112						
114	IR-12 SITE WORK	166 wks	Fri 7/31/15	Fri 10/5/18							
115	BUILDING 720 WORK	166 wks	Fri 7/31/15	Fri 10/5/18							
116	Disassemble FWD IFR Layer 13-16 Modules	1 wk	Fri 7/31/1	Fri 8/7/1	33						
117	Dispose of FWD IFR Layer 13-16 RPCs	0.2 wks	Fri 8/7/1	Mon 8/10/1	116						
118	Transport FWD IFR Layer 13-16 Module Steel to MMP	0.2 wks	Mon 8/10/1	Tue 8/11/1	117						
119	Construct Dry Room for EMC Disassembly	4.3 wks	Fri 12/25/1	Mon 1/25/1	38						
120	Construct Dry Room for EMC Crystal Storage	8.6 wks	Tue 1/26/1	Thu 3/24/1	119						



Project Schedule (Cont'd)

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names	2016		2017		2018		2019	
							H1	H2	H1	H2	H1	H2	H1	H2
121	Disassemble End Cap EMC - Store Crystals	12.1 wks	Mon 4/11/1	Mon 7/4/1	40									
122	Dissassemble DIRC Stand Off Box Into Sectors	2 wks	Wed 3/15/1	Wed 3/29/1	61									
123	Load DIRC SOB Sectors into Transport Containers	0.4 wks	Wed 3/29/1	Fri 3/31/1	122									
124	Transport DIRC SOB Containers to MMP	0.2 wks	Fri 3/31/1	Mon 4/3/1	123									
125	Remove Drift Chamber from DIRC Central Support Tube	2 wks	Tue 3/14/1	Tue 3/28/1	60									
126	Transport Drift Chamber to Temporary Storage	0.2 wks	Tue 3/28/1	Wed 3/29/1	125									
127	Separate DIRC Central Support Tube from Strong Support Tube	0.8 wks	Wed 3/29/1	Tue 4/4/1	126									
128	Transport DIRC Central Support Tube to MMP	0.2 wks	Tue 4/4/1	Wed 4/5/1	127									
129	Disassemble DIRC Strong Support Tube and Horsecollar	1.4 wks	Wed 4/5/1	Fri 4/14/1	128									
130	Transport DIRC Structural Components to MMP	0.4 wks	Fri 4/14/1	Tue 4/18/1	129									
131	Dissassemble Barrel EMC - Store Crystals	23.4 wks	Wed 5/10/1	Fri 10/20/1	67									
132	Clean Out Building 720	1 wk	Fri 9/14/1	Fri 9/21/1	93									
133	Remove Remaining Tooling and Debris From IR-12 Area	2 wks	Fri 9/21/1	Fri 10/5/1	132									
134	IR-12 Site Cleared of BaBar Related Equipment	0 w ks	Fri 10/5/1	Fri 10/5/1	133									

Project Cost

- Total \$9.39M in FY2007 dollars
 - \$3.19M ED&I
 - Includes \$1.34M for Safety Oversight
 - \$1.69M M&S
 - \$4.51M SLAC Labor
- Assumes existence of experienced personnel
- Bottom - Up estimate
- Assumes 30% Contingency
- Some double counting probable
 - BaBar and PEP-II both share IR-2
 - Expect that this is a very minor effect
- Some missing items almost a certainty
 - Expect this is very minor

Project Cost (Cont'd)

Schedule ID No.	Description	Engineering Man Weeks	Designer Man Weeks	Tech Supt Supv Man Weeks	Sr Mech Tech Man Weeks	Rigger Man Weeks	Sr Elect Tech Man Weeks	Electrician Man Weeks	Cable Puller Man Weeks	Safety Oversight Man Weeks	M&S K\$
4	Miscellaneous Prep for Detector Removal	1	0	1	3	0	2	2	0	1	
5	Remove Concrete Shield Wall/Transport to Sector 20	1	0	1	3	4	0	0	0	1	
6	Remove IFR Background Shield Wall and Supporting Structure	0.5	0	0.5	1.5	1	0	0	0	0.5	
7	Transport Shield Wall and Supports to MMP	0.2	0	0.2	0.6	0.8	0	0	0	0.2	
8	Remove PEP Rafts and Support Tube	10	4	6	18	12	0	0	0	6	50
9	Transport PEP Rafts and Support Tube to MMP	0.6	0	0.6	1.8	1.2	0	0	0	0.6	
10	Remove DIRC Water Purification Plant	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
11	Transport DIRC Water Plant to MMP	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
12	Remove Backup Cooling System - Transport to MMP	0.4	0	0.4	1.2	0.4	0	0	0	0.4	
13	Remove BCS Support Platform	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
14	Transport BCS Support Platform to MMP	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
15	Remove Equip from Electronics House 2nd Floor	2	0	2	6	4	4	4	0	2	
16	Remove Equip from Inside Electronics House	3	0	3	9	6	6	3	0	3	
17	Transport Electronics House Equipment to MMP	0	0	0.2	0.6	0.4	0	0	0	0.2	
18	Remove Electronics House Stairs and Walkways	0.4	0	0.4	1.2	0.4	0	0	0	0.4	
19	Transport Electronics House Stairs and Walkways to MMP	0	0	0.2	0.6	0.4	0	0	0	0.2	
20	Disconnect and Roll Back Electronics House	2	0	2	6	4	0	0	0	2	15
21	Remove E.H. 1st Raised Floor, Cables and Trays	1	0	1	3	0	0	0	0	1	
22	Remove E.H. 2nd Raised Floor, Cables and Trays	1	0	1	3	0	0	0	0	1	
23	Haul Away E.H. Raised Floors, Cables and Trays	0	0	0.2	0.6	0	0	0	0	0.2	
24	Dismantle Electronics House Structure	1	0	1	3	2	0	0	0	1	
25	Remove Electronics House Debris	0	0	0.4	1.2	0.4	0	0	0	0.4	
26	Remove Chillers, Heat Exchangers & Piping	2	0	2	6	4	0	0	0	2	
27	Transport Chillers, Heat Exchangers & Piping to MMP	0	0	0.4	1.2	0.8	0	0	0	0.4	
28	Remove Platforms, Walkways and Stairs	2	0	2	6	4	0	0	0	2	
29	Transport Platforms, Walkways and Stairs to MMP	0	0	0.4	1.2	0.8	0	0	0	0.4	
30	Remove Solenoid DC Power Cables - Valve Box to West Wall Penetration	0	0	1	3	0	0	0	0	1	
31	Remove Bucking Coil Cables - Coil to West Wall Penetration	0	0	0.2	3	0	0	0	0	0.2	
32	Remove FWD IFR Layer 13-16 Modules & End Plug Components	2	0	2	6	4	0	0	0	2	
33	Transport FWD IFR layer 13-16 Modules to IR-12	0	0	0.4	1.2	0.4	0	0	0	0.4	
34	Remove LST FEC Crates and Transition Boxes - Haul Away	1	0	1	3	0	0	0	0	1	
35	Remove Barrel LSTs and Brass	17	12	17	51	34	12	0	0	17	100
36	Dispose of Inner Barrel LSTs	0	0	0.4	1.2	0.8	0	0	0	0.4	
37	Transport Outer Barrel LSTs to Storage	0	0	1	3	2	0	0	0	1	
38	Transport Barrel Brass to MMP	0	0	0.2	0.6	0.4	0	0	0	0.2	
39	Remove FWD End Cap EMC	2	12	2	6	4	0	0	0	2	50
40	Transport FWD End Cap EMC to IR-12	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
41	Remove End Door RPCs and Brass	9	4	9	27	18	0	0	0	9	50
42	Dispose of End Door RPCs	0	0	0.4	1.2	0.8	0	0	0	0.4	
43	Transport FWD End Door Brass to MMP	0	0	0.2	0.6	0.4	0	0	0	0.2	
44	Connect End Doors to Barrel	2	0	2	6	0	0	0	0	2	
45	Remove Main Cable Trays, Pipes Between BaBar and E.H.	0.4	0	0.4	1.2	0	0	0	1.2	0.4	
46	Haul Away Main Cable Trays, Cables & Pipes	0	0	0.2	0.6	0	0	0	0	0.2	
47	Roll Out BaBar Detector	2	12	2	6	4	0	0	0	2	30
48	Open EMC Source Bunker/Remove Generator	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
49	Dismantle and Remove Bunker	0.4	0	0.4	1.2	0.8	0	0	0	0.4	
50	Disassemble End Doors	8	4	8	24	32	0	0	0	8	100
51	Transport End Door Materials to MMP	1	0	1	3	4	0	0	0	1	
52	Remove East and West Barrel Platform Electronics - Haul Away	2	0	2	3	0	0	0	0	2	

Project Cost (Cont'd)

Schedule ID No.	Description	Engineering Man Weeks	Designer Man Weeks	Tech Supt Supv Man Weeks	Sr Mech Tech Man Weeks	Rigger Man Weeks	Sr Elect Tech Man Weeks	Electrician Man Weeks	Cable Puller Man Weeks	Safety Oversight Man Weeks	M&S K\$
53	Disc & Remove Barrel SVT MUX Racks - Haul Away	0.4	0	0.4	1.2	0.4	0	0	0	0.4	
54	Disc & Remove North SVT MUX Racks - Haul Away	0.4	0	0.4	1.2	0.4	0	0	0	0.4	
55	Remove NE Platform and Stair - Take to MMP	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
56	Remove Barrel Cabling - Haul Away	0	0	3	0	0	0	0	12	3	
57	Remove Barrel Piping - Take to MMP	0	0	2	6	0	0	0	0	2	
58	Remove Barrel Platforms and Side Valve Panels	2	0	2	6	4	0	0	0	2	
59	Transport Barrel Platforms and Side Valve Panels to MMP	0	0	0.4	1.2	0.8	0	0	0	0.4	
60	Remove DIRC Stand Off Box	2	12	2	6	4	0	0	0	2	100
61	Transport DIRC Stand Off Box to IR-12	0.2	0	0.2	0.6	0.8	0	0	0	0.2	
62	Remove DIRC Bar Boxes - Package Same	2	8	2	6	4	0	0	0	2	75
63	Transport DIRC Bar Boxes to Storage	0.4	0	0.4	1.2	0.8	0	0	0	0.4	
64	Remove DIRC Central/Strong Support Tube Assembly	3	12	3	9	6	0	0	0	3	50
65	Transport DIRC Central/Strong Support Tube Assembly to IR-12	0.2	0	0.2	0.6	0.8	0	0	0	0.2	
66	Remove Barrel EMC	3	12	3	9	6	0	0	0	3	75
67	Transport Barrel EMC to IR-12	0.2	0	0.2	0.6	0.8	0	0	0	0.2	
68	Remove Cylindrical RPC - Dispose of Same	1	4	1	3	2	0	0	0	1	10
69	Remove Valve Box, Vacuum Pumps and S.C. Solenoid	3	12	3	9	6	0	0	0	3	50
70	Transport Valve Box, Vacuum Pumps and S.C. Solenoid to Storage	0.4	0	0.4	1.2	1.6	0	0	0	0.4	
71	Remove Barrel Crossover, Arches and Top 3 Iron Sextants	3	0	3	9	12	0	0	0	3	100
72	Transport Barrel Crossover, Arches and Top 3 Iron Sextants to MMP	0.4	0	0.4	1.2	0.8	0	0	0	0.4	
73	Remove Bottom 3 Iron Sextants and Cradle	3	0	3	9	12	0	0	0	3	25
74	Transport Bottom 3 Iron Sextants and Cradle to MMP	0.4	0	0.4	1.2	0.8	0	0	0	0.4	
75	Remove EMC Calibration Source Bunker - Haul Away	0.5	0	0.5	1.5	1	0	0	0	0.5	
76	Remove IR-2 PEP Cables - Haul Away	0	0	3	0	0	0	0	12	3	
77	Remove Cryo Transfer Lines and Cables - Haul Away	0.5	0	0.5	1.5	0	0	0	0	0.5	
78	Remove PEP Cable trays and Supports - Haul Away	0	0	1	3	2	0	0	0	1	
79	Remove Grouted Steel Floor Plates - Take to MMP	0	0	0.5	1.5	1	0	0	0	0.5	
80	Remove Wall mounted Piping - Haul Away	0	0	1	3	2	0	0	0	1	
81	Remove Wall mounted Conduits - Haul Away	0	0	1	3	0	0	0	0	1	
82	Remove Piping - West Wall Penetrations - Haul Away	0	0	1	3	2	0	0	0	1	
83	Remove Water Cooled Cables - West Wall Penetration - Haul Away	0	0	0.5	0	0	0	0	2	0.5	
84	Remove Bucking Coil Cables - West Wall Penetration - Haul Away	0	0	0.2	0	0	0	0	0.8	0.2	
85	Clean Out Building 620	0	0	1	3	0	0	0	0	1	
87	Disconnect and Remove Cryo Helium Refrigerator	2	0	2	6	2	0	0	0	2	20
88	Transport Helium Refrigerator to Storage	0.4	0	0.4	1.2	1.6	0	0	0	0.4	
89	Remove Equipment from Cryo Control Room - Haul Away	1	0	1	3	0	0	0	0	1	
90	Empty Storage Containers 628,629,632	0	0	2	6	0	0	0	0	2	
91	Remove Storage Containers 628,629,632	0	0	1	3	2	0	0	0	1	
92	Empty Buildings 305,306	0	0	1	3	0	0	0	0	1	
93	Remove Remaining Tooling and Debris from IR-2 Area	0	0	2	6	6	0	0	0	2	
96	Disconnect N2 Dewar and Interconnect Piping	0.2	0	0.2	0.6	0	0	0	0	0.2	10
97	Transport N2 Dewar to Storage	0.2	0	0.2	0.6	0.8	0	0	0	0.2	
98	Remove Cryo Interconnect Piping - Haul Away	1	0	1	3	0	0	0	0	1	
99	Remove Gas Piping - Building 620 Roof - Haul Away	0	0	0.5	1.5	0	0	0	0	0.5	
100	Remove Piping - Building 620 to Building 635 - Haul Away	0	0	2	6	0	0	0	0	2	
101	Remove Piping Supports - Bldg 620 to Bldg 635 - Haul Away	0	0	1	3	2	0	0	0	1	
102	Disassemble LST Gas System	2	0	2	4	0	0	0	0	2	
103	Disassemble Drift Chamber Gas System	2	0	2	4	0	0	0	0	2	
104	Remove Water Cooled Cables - Buildings 620 to 625 - Haul Away	0	0	0.5	0	0	0	0	2	0.5	

Project Cost (Cont'd)

Schedule ID No.	Description	Engineering Man Weeks	Designer Man Weeks	Tech Supt Supv Man Weeks	Sr Mech Tech Man Weeks	Rigger Man Weeks	Sr Elect Tech Man Weeks	Electrician Man Weeks	Cable Puller Man Weeks	Safety Oversight Man Weeks	M&S K\$
105	Remove Bucking Coil Cables - Buildings 620 to 625 - Haul Away	0	0	0.2	0	0	0	0	0.8	0.2	
106	Remove BaBar Magnet Power Supplies - Building 625	0.5	0	0.5	1.5	2	0	0.5	0	0.5	
107	Transport BaBar Magnet Power Supplies to Storage	0	0	0.2	0.6	0.8	0	0	0	0.2	
108	Empty Upper North Storage Containers	0	0	2	6	0	0	0	0	2	
109	Remove Upper North Storage Containers	0	0	1	3	2	0	0	0	1	
110	Empty Trailer 627	0	0	1	3	0	0	0	0	1	
111	Remove Trailer 627	0	0	0.2	0.6	0.4	0	0	0	0.2	
112	Empty Upper South Storage Containers	0	0	1	3	0	0	0	0	1	
113	Remove Upper South Storage Containers	0	0	0.5	1.5	1	0	0	0	0.5	
116	Disassemble FWD IFR Layer 13-16 Modules	1	0	1	3	2	0	0	0	1	
117	Dispose of FWD IFR Layer 13-16 RPCs	0	0	0.2	0.6	0	0	0	0	0.2	
118	Transport FWD IFR Layer 13-16 Module Steel to MMP	0	0	0.2	0.6	0.4	0	0	0	0.2	
119	Construct Dry Room for EMC Disassembly	4.3	0	4.3	12.9	0	0	0	0	4.3	
120	Construct Dry Room for EMC Crystal Storage	8.6	0	8.6	25.8	0	0	0	0	8.6	
121	Disassemble End Cap EMC - Store Crystals	12.1	12	12.1	36.3	0	0	0	0	12.1	100
122	Disassemble DIRC Stand Off Box into Sectors	2	4	6	4	0	0	0	0	2	
123	Load DIRC SOB Sectors into Transport Containers	0.4	0	0.4	1.2	0.8	0	0	0	0.4	
124	Transport DIRC SOB Containers to MMP	0	0	0.2	0.6	0.4	0	0	0	0.2	
125	Remove Drift Chamber from DIRC Central Support Tube	2	4	2	6	0.8	0	0	0	2	30
126	Transport Drift Chamber to Temporary Storage	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
127	Separate DIRC Central Support Tube from Strong Support Tube	0.8	0	0.8	2.4	0.4	0	0	0	0.8	
128	Transport DIRC Central Support Tube to MMP	0.2	0	0.2	0.6	0.4	0	0	0	0.2	
129	Disassemble DIRC Strong Support Tube and Horsecollar	1.4	4	1.4	4.2	0.8	0	0	0	1.4	
130	Transport DIRC Structural Components to MMP	0	0	0.4	1.2	0.8	0	0	0	0.4	
131	Disassemble Barrel EMC - Store Crystals	23.4	20	23.4	70.2	6	0	0	0	23.4	300
132	Clean Out Building 720	0	0	1	3	0	0	0	0	1	
133	Remove Remaining Tooling and Debris from IR-12 Area	0	0	2	6	6	0	0	0	2	

Total BaBar Disassembly (Man Weeks)	168	152	208.5	584.7	266.8	12	9.5	30.8	204.5	
Direct Labor Cost per Hour	91	69	65	54	54	54	69	69	91	
Direct Labor Cost	611.52	419.52	542.1	1262.952	576.288	25.92	26.22	85.008	744.38	
M&S										1340
Indirect Costs	232.3776	159.4176	205.998	479.92176	218.98944	9.8496	9.9636	32.30304	282.8644	66.598
Contingency at 30%	253.16928	173.68128	224.4294	522.862128	238.583232	10.73088	10.85508	35.193312	308.17332	281.32
Total K\$ (in FY2007 K\$)	1097.06688	752.61888	972.5274	2265.735888	1033.860672	46.50048	47.03868	152.504352	1335.41772	1687.92

Total 9391.188552

Where Should We Go From Here?

- Review cost estimate for omissions and double counting
 - Should add cost of project management
- Review estimate for use of electricians & cable pullers
 - \$47K estimated for electricians
 - Probably a fairly large underestimate
- Prepare a database of reusable items
- Compile disassembly tooling and documentation
 - Inspect existing tooling
 - Determine what's missing
 - Begin to refurbish tooling as allowed by available resources
 - Test tooling as possible
- Create BaBar Disassembly Organization
 - Assign responsibilities
- Await clarity on metals moratorium