

US LHC Accelerator Project		Baseline Change Request
BCR Number	58	
WBS	1.1 Interaction Regions 1.2 RF Region	
Title	Update delivery milestones	
Change Control Level	2	
Originator	J. Strait	
Date	30 October 2003	

Description of change

This baseline change updates the level 2 milestones for delivery of equipment to CERN for installation in the LHC Insertion Regions. This set of milestones also forms Appendix 2 of the Implementing Arrangement, which will be updated together with the level 2 controlled milestone table.

Reason for change

The current delivery milestones were established in October 2002, with the approval of BCR 48 and the approval of the current version of Appendix 2 of the Implementing Arrangement. They were based on the version of LHC installation schedule then current. This BCR updates the milestones to correspond to the current LHC installation schedule, constrained by the U.S. LHC Project end-of-project milestone date of 30 September 2005.

Impact on other sub-systems

None

Impact on cost

None.

Impact on schedule

The milestones changed here are set according to the CERN installation schedule, and represent the latest date by which all equipment for a given region of the LHC must be received in CERN to ensure that installation can proceed according to schedule. The US Project schedule is not changed by this BCR. The current production schedule is consistent with the new set of milestones given here.

Old Milestones The delivery milestones covered by this BCR, with their current baseline dates, are shown in Table 1. The current set of milestones for the magnets and absorbers is based on the installation periods shown in the previous version of the LHC schedule.

LHC Installation Schedule The current LHC installation and hardware commissioning schedule is given in LHC Project Document Number LHC-PM-MS-0005 rev. 1.7, 28 March 2003. The installation schedules for the insertions is, however, less certain than the hardware commissioning schedule. Therefore the new set of milestones is based on the latter. In particular, the milestones have been set to be seven months before the start of

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Table 1. Current baseline milestones for delivery of equipment to CERN.

Milestone No.		Baseline Date
	WBS 1.1 Interaction Regions	
2 -1.1- 13a C	Delivery of inner triplet magnets for IR8 left (MQX, D1, D2)	19 Dec 2003
2 -1.1- 13b C	Delivery DFBX for IR8 left	13 Aug 2004
2 -1.1- 16a C	Delivery of inner triplet magnets for IR8 right (MQX, D1, D2)	8 Oct 2004
2 -1.1- 16b C	Delivery DFBX for IR8 right	25 Feb 2005
2 -1.1- 19a C	Delivery of inner triplet magnets and absorbers for IR1 left (MQX, D2, TAS, TAN)	6 Aug 2004
2 -1.1- 19b C	Delivery of DFBX for IR1 left	25 Feb 2005
2 -1.1- 23a C	Delivery of inner triplet magnets and absorbers for IR5 left (MQX, D2, TAS, TAN)	31 Aug 2005
2 -1.1- 23b C	Delivery of DFBX for IR5 left	31 Aug 2005
2 -1.1- 25a C	Delivery of inner triplet magnets and absorbers for IR5 right (MQX, D2, TAS, TAN)	29 Apr 2005
2 -1.1- 25b C	Delivery of DFBX for IR5 right	31 Aug 2005
2 -1.1- 26a C	Delivery of inner triplet magnets for IR2 right (MQX, D1, D2)	30 Apr 2004
2 -1.1- 26b C	Delivery of DFBX for IR2 right	1 Oct 2004
2 -1.1- 27a C	Delivery of inner triplet magnets and absorbers for IR1 right (MQX, D2, TAS, TAN)	21 Jan 2005
2 -1.1- 27b C	Delivery of DFBX for IR1 right	12 Aug 2005
2 -1.1- 32a C	Delivery of inner triplet magnets for IR2 left (MQX, D1, D2)	4 Feb 2005
2 -1.1- 32b C	Delivery of DFBX for IR2 left	12 Aug 2005
	WBS 1.2 RF Region	
2 -1.2- 4 C	Delivery of D3, D4 for IR4 right	24 Jun 2005
2 -1.2- 6 C	Delivery of D3, D4 for IR4 left	31 Aug 2005

hardware commissioning of the relevant sectors. This allows three months for incoming inspections, measurements and tests, and integration of CERN-provided equipment, plus four months for installation.

New Milestones Table 2 shows the hardware commissioning start dates and the proposed new milestones for the deliveries of US provided equipment. In the previous version, separate milestones were specified for the DFBX and for the other equipment. Now a single set of milestones will be used. For the latest three milestones – IR5R, IR1R and IR2L – the date has been set to be the end-of-project milestone on 30 Sep 2005, rather than at the dates derived from the LHC installation schedule. Shown also are the projected dates on which the milestone will be met. For IRs 1, 2, 5, and 8 the last projected delivery is, in all cases, a DFBX; the last quadrupole delivery for each IR is projected to be 2-3 months earlier in most cases. For IR4 the projected completion depends on the delivery of the D3 dipoles. The current milestones are also shown. Note the different order of installation than in the previous schedule.

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Table 2. Proposed milestones for delivery of IR magnets, feedboxes and absorbers.

IR	Proposed Milestones				Current Milestones		
	Hardware Commissioning	- 7 months	Milestone	Projected Completion	IR	Magnets & Absorbers	DFBX
8L	25 Apr 05	24 Sep 04	24 Sep 04	15 Sep 04	8L	19 Dec 03	13 Aug 04
2R	30 May 05	29 Oct 04	29 Oct 04	15 Sep 04	2R	30 Apr 04	1 Oct 04
8R	10 Oct 05	11 Mar 05	11 Mar 05	15 Jan 05	1L	6 Aug 04	25 Feb 05
1L	10 Oct 05	11 Mar 05	11 Mar 05	15 Jan 05	8R	8 Oct 04	25 Feb 05
5L	20 Feb 06	22 Jul 05	22 Jul 05	15 May 05	1R	21 Jan 05	12 Aug 05
5R	7 Aug 06	6 Jan 06	30 Sep 05	15 May 05	2L	4 Feb 05	12 Aug 05
1R	8 Jan 07	9 Jun 06	30 Sep 05	15 Aug 05	5R	29 Apr 05	31 Aug 05
2L	8 Jan 07	9 Jun 06	30 Sep 05	15 Aug 05	5L	31 Aug 05	31 Aug 05
4R	20 Feb 06	22 Jul 05	22 Jul 05	30 Nov 04	4R	24 Jun 05	
4L	24 Apr 06	23 Sep 05	23 Sep 05	15 Feb 05	4L	31 Aug 05	

New Baseline Milestones The proposed new baseline milestones are shown in Table 3. The definition of the completion of each milestone remains the arrival on the CERN loading dock of the last component in each list. Since the order of installation is different from that when the Project was baselined, the milestones are not in chronological order.

A copy of the proposed new Appendix 2 of the Implementing Arrangement, which contains the new milestone list, is included as Attachment 1 to this BCR.

Table 3. Proposed new baseline milestones for delivery of equipment to CERN.

Milestone No.		Baseline Date
	WBS 1.1 Interaction Regions	
2 -1.1- 13 C	Delivery of inner triplet components for IR8 left (MQX, D1, D2, DFBX)	24 Sep 2004
2 -1.1- 16 C	Delivery of inner triplet components for IR8 right (MQX, D1, D2, DFBX)	11 Mar 2005
2 -1.1- 19 C	Delivery of inner triplet components for IR1 left (MQX, D2, DFBX, DFBX, TAS, TAN)	11 Mar 2005
2 -1.1- 23 C	Delivery of inner triplet components for IR5 left (MQX, D2, DFBX, TAS, TAN)	22 Jul 2005
2 -1.1- 25 C	Delivery of inner triplet components for IR5 right (MQX, D2, DFBX, TAS, TAN)	30 Sep 2005
2 -1.1- 26 C	Delivery of inner triplet components for IR2 right (MQX, D1, D2, DFBX)	29 Oct 2004
2 -1.1- 27 C	Delivery of inner triplet components for IR1 right (MQX, D2, DFBX, TAS, TAN)	30 Sep 2005
2 -1.1- 32 C	Delivery of inner triplet components for IR2 left (MQX, D1, D2, DFBX)	30 Sep 2005
	WBS 1.2 RF Region	
2 -1.2- 4 C	Delivery of D3, D4 for IR4 right	22 Jul 2005
2 -1.2- 6 C	Delivery of D3, D4 for IR4 left	23 Sep 2005

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Other impacts (ES&H, etc.)

None

Change Control Board recommendation (if required)

Approvals

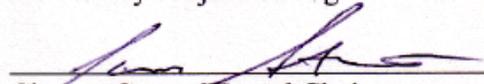
To change these milestones, and to change Appendix 2 of the Implementing Arrangement requires "the approval of the U.S. Project Manager and of the LHC Project Leader or his designee" [Implementing Arrangement, section IV, May 2002]. Philip Bryant has been designated the official CERN liaison to the US Project (see Appendix 1 of the Implementing Arrangement). His approval of this change is given in Attachment 2.

WBS Level 3 Manager

Date

Laboratory Project Manager

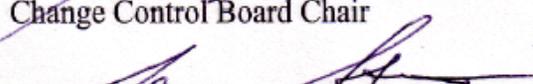
Date



Change Control Board Chair

20 Nov 03

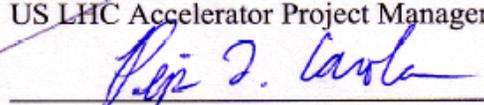
Date



US LHC Accelerator Project Manager

20 Nov 03

Date



DOE LHC Project Manager

21 Nov 03

Date

Director, DOE Division of High Energy Physics

Date

BCR 58 Attachment 1
Proposed new Appendix 2 to the Implementing Arrangement

Implementing Arrangement to the Accelerator Protocol
Between CERN and the U.S. DOE
Concerning Scientific and Technical Cooperation on the LHC

Appendix 2
Principal Milestones
(Revised November 2003)

<u>Action</u>	<u>Date</u>
Decision as to whether or not the U.S. Project includes RF region quadrupoles	1 Jul 2001
Delivery of inner triplet components for IR8 left (MQX, D1, D2, DFBX)	24 Sep 2004
Delivery of inner triplet components for IR2 right (MQX, D1, D2, DFBX)	29 Oct 2004
Delivery of inner triplet components for IR8 right (MQX, D1, D2, DFBX)	11 Mar 2005
Delivery of inner triplet components for IR1 left (MQX, D2, DFBX, TAS, TAN)	11 Mar 2005
Delivery of D3, D4 for IR4 right	22 Jul 2005
Delivery of inner triplet components for IR5 left (MQX, D2, DFBX, TAS, TAN)	22 Jul 2005
Delivery of D3, D4 for IR4 left	23 Sep 2005
Delivery of inner triplet components for IR5 right (MQX, D2, DFBX, TAS, TAN)	30 Sep 2005
Delivery of inner triplet components for IR1 right (MQX, D2, DFBX, TAS, TAN)	30 Sep 2005
Delivery of inner triplet components for IR2 left (MQX, D1, D2, DFBX)	30 Sep 2005

From: "Philip Bryant" <Philip.Bryant@cern.ch>
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Sent: Thursday, November 20, 2003 7:51 AM
Subject: Current Status III. BCR_0058

I have circulated the draft BCR_0058 and there have been no adverse reactions.

CERN now gives its approval to the changes.

Phil.

11/20/2003