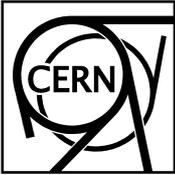


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Local Access Restrictions in LHC below 80 K or during flushing with Helium

Abstract

This document defines the authorisation chain for work in areas with an accrued risk of Helium spillage once the accelerator and QRL are filled with liquid Helium

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HISTORY OF CHANGES

REV. NO.	DATE	PAGES	DESCRIPTIONS OF THE CHANGES
0.1	20.8.2014	All	Very first draft for comments
1.0	26.8.2014	1,3,4	<ul style="list-style-type: none"> - Title changed - authorisation criteria completed - "Other Hazards" disclaimer added and role of supervisor reinforced
1.1	2.9.2014	5-8, Annexes	Updated 6.1, 6.6, 6.8 and annexes 1, 6, 8
1.2	12.9.2014	6, 9, Annex 5	Updated 6.5, Table of annexes (7) and annex 5
1.3	29.9.2014	8, 10, Annex 7	Updated 6.7, Table of annexes (7) and annex 7
1.4	22.10.2014	6, 7, 12, Annex 2,4	Updated 6.2, 6.4, 7 and Annexes 2 & 4

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1. Introduction

The LHC Access Matrix restricts access to the LHC tunnel depending on the cryogenic state of the accelerator and the QRL.

Once the temperature of the accelerator is below 80 K or flushing with Helium is in progress, the following work requires specific authorisation:

- Work on the QRL side of the accelerator, requiring crossing a magnet
- Work in areas with sensitive cryogenic instrumentation

This document defines the authorisation chain for work in these areas.

2. Areas with Sensitive Cryogenic Instrumentation

Areas with sensitive cryogenic instrumentation contain particularly fragile cryogenic instruments on either the accelerator or the QRL, which, when damaged, could lead to a spill of liquid helium with a mass flow not exceeding 100 g s^{-1} .

Sensitive areas are located

- On and around DFBs
- On and around standalone superconducting magnets.
- Around Cryogenic Interface Modules ("Jumpers")

A pictorial guide to areas with sensitive cryogenic instrumentation is given in the annexes for each sector.

3. Authorisation for work

An exceptional authorisation for work on the QRL side or in areas with sensitive cryogenic instrumentation is given by the Complex Manager (Director for Accelerators and Technology) via the TE DSO.

The work for which authorisation is sought must be sufficiently justified (e.g. unacceptable risk for safety or environmental protection, unacceptable impact on the function of the accelerator).

The request for authorisation must be accompanied by

- A detailed description of the work to be performed
- The location(s) where the work is performed, with as much detail as possible
- A nominal list of participants in the activity
- The duration of the work to be performed

The request for authorisation is addressed to the Complex Manager via the DSO of the TE department, who will perform a risk assessment with the requestor and an expert of cryogenic instrumentation.

The IMPACT system shall be used for the request for authorisation.



4. Other Hazards

This document gives an exhaustive listing of sensitive cryogenic instrumentation to the best knowledge of the authors. Other instrumentation may be accidentally damaged during interventions and cause significant down-time of the accelerator.

5. Role of the Supervisor

Once authorised, the supervisor for the work executed makes sure that all personnel intervening

- Know the location of sensitive cryogenic instrumentation
- Have been informed of the risks entailed by damaging this instrumentation
- Know how to react in case of an accidental Helium spill (self-rescue mask and evacuation).

In any case where personnel are not certain about the course of action to take during the work, they shall report back to their supervision. LHC Coordination, Safety Officers and experts from instrumentation groups will assist in devising the safest strategy of accomplishing work.

6. Identification of sensitive areas

The following tables list the sensitive areas for He-spill in the LHC with their coordinate (DCUM), starting from sector 1-2.

Drawings of the sensitive areas, indicating precisely the sensitive elements with a red circle, are given in the Annexes 1 to 8 (in eight extra files).



6.1 Sensitive areas in Sector 1-2

DCUM (LHC Coordinate)	Closest magnet Subsector	-	Equipment identification
55	R1		DFBXB
172	D2Q4R1		DS
200	Q5R1		DFBM
231	Q6R1		DFBM
250	R1		DFBAB
250	RR17		DFBLB
340	Q9R8		BA module
541	Q13R1		AA (jumper)
755	Q17R1		AA (jumper)
969	Q21R1		AA (jumper)
1183	Q25R1		AA (jumper)
1397	Q29R1		AA (jumper)
1717	Q33L2		AA (jumper)
1931	Q29L2		AA (jumper)
2145	Q25L2		AA (jumper)
2359	Q21L2		AA (jumper)
2573	Q17L2		AA (jumper)
2786	Q13L2		AA (jumper)
2984	Q9L2		DS
3075	L2		DFBAC
3087	Q6L2		BA module
3167	Q5L2		DFBMC
3189	Q4D2L2		DFBMA
3275	L2		DFBXC



6.2 Sensitive areas in Sector 2-3

DCUM (LHC Coordinate)	Closest magnet Subsector	-	Equipment identification
3388	R2		DFBXD
3476	D2Q4R2		DFBMB
3506	Q5R2		DFBMC
3574	Q6R2		DFBAD-LCM
3582	R2		DFBAD-HCM
3673	Q9R2		DS
3873	Q13R2		AA (jumper)
4087	Q17R2		AA (jumper)
4301	Q21R2		AA (jumper)
4515	Q25R2		AA (jumper)
4729	Q29R2		AA (jumper)
5049	Q33L3		AA (jumper)
5263	Q29L3		AA (jumper)
5477	Q25L3		AA (jumper)
5691	Q21L3		AA (jumper)
5904	Q17L3		AA (jumper)
6118	Q13L3		AA (jumper)
6317	Q9L3		DS
6412	L3		DFBAE
6446	Q6L3		DFBMD & QRLIC



6.3 Sensitive areas in Sector 3-4

(table will be supplied in a future version of the document)

6.4 Sensitive areas in Sector 4-5

(table will be supplied in a future version of the document)

DCUM (LHC Coordinate)	Closest magnet -Subsector	Equipment identification
10014	R4	ACS
10054	D3R4	DFBMK
10132	D4Q5R4	DFBML
10164	Q6R4	DFBMG
10250	R4	DFBAH
10336	Q9R4	DS
10538	Q13R4	AA module (jumper)
10754	Q17R4	AA module (jumper)
10968	Q21R4	AA module (jumper)
11182	Q25R4	AA module (jumper)
11396	Q29R4	AA module (jumper)
11714	Q33L5	AA module (jumper)
11928	Q29L5	AA module (jumper)
12142	Q25L5	AA module (jumper)
12355	Q21L5	AA module (jumper)
12569	Q17L5	AA module (jumper)
12783	Q13L5	AA module (jumper)
12982	Q9L5	DS
13077	L5	DFBAI
13090	L5	DFBLD
13098	Q6L5	Standalone Module
13130	Q5L5	Standalone Module
13158	Q4D2L5	Standalone Module
13272	IT5	DFBXE, QRLID



6.5 Sensitive areas in Sector 5-6

DCUM	Closest magnet -Subsector	Equipment identification
13385	R5	DFBXF, QRLIA
13501	D2Q4R5	Standalone Module
13523	Q5R5	Standalone Module
13555	Q6R5	Standalone Module
13580	RR57	DFBLE
13580		DFBAJ
13669	Q9R5	DS
13871	Q13R5	AA module (jumper)
14085	Q17R5	AA module (jumper)
14298	Q21R5	AA module (jumper)
14512	Q25R5	AA module (jumper)
14726	Q29R5	AA module (jumper)
15047	Q33L6	AA module (jumper)
15261	Q29L6	AA module (jumper)
15474	Q25L6	AA module (jumper)
15688	Q21L6	AA module (jumper)
15902	Q17L6	AA module (jumper)
16116	Q13L6	AA module (jumper)
16274	Q10L6	DS
16412	L6	DFBAK
16451	Q5L6	DFBMM
16488	Q4L6	DFBMM



6.6 Sensitive Areas in Sector 6-7

DCUM (LHC Coordinate)	Closest magnet - Subsector	Equipment identification
16831	Q4R6	DFBMM_4
16868	Q5R6	DFBMM_5
16922	R6	DFBAL
17043	Q10R6	BA module
17203	Q13R6	AA module (jumper)
17416	Q17R6	AA module (jumper)
17630	Q21R6	AA module (jumper)
17844	Q25R6	AA module (jumper)
18058	Q29R6	AA module (jumper)
18379	Q33L7	AA module (jumper)
18592	Q29L7	AA module (jumper)
18806	Q25L7	AA module (jumper)
19020	Q21L7	AA module (jumper)
19234	Q17L7	AA module (jumper)
19448	Q13L7	AA module (jumper)
19646	Q9L7	BA Module
19741	L7	DFBAM
19761	Q6L7	EA- and ID module



6.7 Sensitive Areas in Sector 7-8

DCUM (LHC Coordinate)	Closest magnet	Equipment identification
20218	Q6R7	DFBMH & QRLIA
20245	R7	DFBAN
20334	Q9R7	DS
20536	Q13R7	AA (jumper)
20749	Q17R7	AA (jumper)
20963	Q21R7	AA (jumper)
21177	Q25R7	AA (jumper)
21391	Q29R7	AA (jumper)
21711	Q33L8	AA (jumper)
21925	Q29L8	AA (jumper)
22139	Q25L8	AA (jumper)
22353	Q21L8	AA (jumper)
22567	Q17L8	AA (jumper)
22780	Q13L8	AA (jumper)
22978	Q9L8	DS
23077	L8	DFBAO-HCM
23090	Q6L8	DFBAO-LCM
23150	Q5L8	DFBMC
23172	Q4L8	DFBMA
23258	L8	DFBXG



6.8 Sensitive Areas in Sector 8-1

DCUM (LHC Coordinate)	Closest magnet	Equipment identification
23371	R8	DFBXH
23459	D2Q4R8	DFBMB
23480	Q5R8	DFBMI
23562	Q6R8	DFBMJ
23575	R8	DFBAP
23667	Q9R8	DS
23867	Q13R8	AA module (jumper)
24081	Q17R8	AA module (jumper)
24295	Q21R8	AA module (jumper)
24509	Q25R8	AA module (jumper)
24723	Q29R8	AA module (jumper)
25043	Q33L1	AA module (jumper)
25257	Q29L1	AA module (jumper)
25471	Q25L1	AA module (jumper)
25685	Q21L1	AA module (jumper)
25899	Q17L1	AA module (jumper)
26112	Q13L1	AA module (jumper)
26311	Q9L1	DS
26408	L1	DFBAA
26408	RR13	DFBLA
25434	Q6L1	EC
26465	Q5L1	EC
26487	Q4D2L1	FD
26604	L1	DFBXA



7. Annexes

The following table lists the annexes and gives the most recent valid version number.

Annex Number	Sector	Most recent version
1	1-2	1.1
2	2-3	1.4
3	3-4	
4	4-5	1.4
5	5-6	1.2
6	6-7	1.1
7	7-8	1.3
8	8-1	1.1