Minutes of LHC-CP Link Meeting 32 held on 28.01.2003

Present:
M.E. Angoletta (scientific secretary), A. Bland, E. Carlier, A. Daneels, B. Frammery, C. Frisk R. Gavaggio, P. Gayet, P. Gomes, E. Hatziangeli, A. Hilaire, R. Hopkins, M. Lamont, R. Lauckner (chair), M. Peryt, G. Riddone, F. Rodriguez Mateos, R. Saban, R. Schmidt, CH Sicard, P. Sollander, M. Tyrrell

Agenda

1. Matters arising from Previous Meetings.
2. LHC-CP News – R. Lauckner
3. QRL review – G. Riddone
4. QRL controls/communication issues, AB-CO responsibilities – C-H Sicard
5. QRL Controls coordination/scheduling and issues – A. Daneels
6. AOB.

Minutes

1. MATTERS ARISING FROM PREVIOUS MEETING

It was asked how a user could request a network service, for instance a network connection. A. Bland answered that a normal network connection form is available for the "old" network, while for "new" networks an email has to be sent to netops.

2. LHC-CP NEWS

Robin announced that probably in June a Controls Workshop would be organised, dealing mainly with technical-type issues.

3. QRL REVIEW (GERMANA RIDDONE)

Germana Riddone gave an overview of QRL system layout, installation/testing schedule and instrumentation, using sector 7-8 of QRL as an example.

Sector 7-8 is decoupled from the cryostat vacuum and it's composed of 9 vacuum spaces, separated by 8 longitudinal vacuum barriers.

The installation phase is divided into 4 major steps:

a) Pre-installation;

b) Installation & pre-commissioning;

c) Pumping + QUI connection, commissioning;

d) Reception.

All activities within the same step can be carried out in parallel. The time allocated is 8 weeks for step a), 19 weeks (21 weeks for sectors 7-8 and 2-3) for step b), 3 weeks for step c) and 8 weeks (12 weeks for sector 7-8) for step d).

Germana mentioned that Air Liquide will carry out the installation phase. Robin Lauckner then asked whether Air Liquide would use their own pumping equipment or not. The answer was that in order to save money, CERN will lend them the mobile pumps needed. However, no control actions will be required at that stage, since it will be Air Liquide's responsibility to implement local controls and databases.

Germana gave then some figures for the cryogenic instrumentation needed for sector 7-8. This includes about 250 thermometers, 42 transducers, 36 pressure switches, 43 quench valves and so on. Similar figures are also true for the other sectors.

Robin asked whether the quench valves are passive. The answer was that in principle they are not, since they can be opened remotely by digital control via individual cable.

Concluding the part regarding cryogenic instrumentation, Germana underlined that WorldFIP-type crates foreseen for LHC will not be available for QRL reception tests. For this reason, specific crates based on Profibus-DP will be used. This means that the instrumentation will have to be re-commissioned, once the LHC-type crates are in place.

Germana added that only one set of QRL reception test electronics is foreseen, therefore it will not be possible to tests sectors in parallel.

A list of sector 7-8 major milestones follows:

- 13.06.03 corresponds to the completion of the external supports positioning phase (item a) above).
- 16.06.03 corresponds to the start of the vacuum spaces mounting (item b) above).
- 11.11.03 corresponds to the start of the phase described in point c) above. This will include pumping & connection to QUI phase, as well as commissioning. This part will be completed by 28.11.03.
- 2.02.04 is the starting date of the reception tests. This phase will be completed by 23.04.04.

Finally, Germana recalled some control functionality that will be required in pre-commissioning, commissioning and reception phases. In particular, access to calibration data, logic simulation of operation phases as well as sensors and actuator manipulation will be needed. In addition, alarms, monitoring and logging capabilities will have to be in place.

Robin asked whether they needed these control functionalities to be accessed from the central control room, or whether the local control room would be enough. The answer was that there is no need to have them available in the central control room.

Robin asked also what whether the instruments will be left under vacuum and require remote monitoring once the tests have been carried out. After discussion it appears that the QRL will be filled with dry air after testing and will not require monitoring, this is not yet confirmed.

4. QRL CONTROLS/COMMUNICATIONS ISSUES (CLAUDE-HENRI SICARD)

Claude-Henri's talk covered the controls needed for cryogenics and vacuum for reception tests to be carried out in sector 7-8. During the talk it is assumed that power, network and control cables are already in place. In addition, it is assumed that the control facilities implemented during the pre-commissioning phase will not involve any logic, such as in regulation loops, but only valve control checking.

Claude-Henri listed the technical requirements for AB/CO. with the corresponding deadline and the name of the section that will implement each requirement. Only PLC and SCADA were included in the requirements list, since only they were deemed necessary for reception tests.

Robin asked whether a time-stamping mechanism was going to be implemented in the PLCs. The answer was that this was not required for the reception tests. Roberto mentioned that previous experience with time stamps in PLCs showed that they could not be transmitted to the SCADA. Claude-Henri said that this limitation does not apply to PVSS. Robin then underlined that the idea is to carry out a time-stamping as near to the source as possible, therefore it would be wise do it also in this case. This will nevertheless have to wait for promised NTP support from the PLC manufacturer.

Claude-Henri went on by listing the requirements for other groups, namely IT/CS, ACR and the LHC Data Interchange Working Group (LDIWG). In particular, Claude-Henri underlined that the pre-commissioning phase, scheduled to start in September 2003, will need the Ethernet network. Unfortunately, the IT/CS group recently stated that the Ethernet network would be installed in September 2003. Clearly, it has to be installed before then, so an agreement will have to be reached.

On a more general view, Claude-Henri underlined that application software specifications should be handed out at least 3 months before the date when the service is needed.

Some issues are still open, such as whether the PVSS server supported will run under Linux or under Windows. This might imply the need for software upgrades.

Concerning the data interchange between cryogenics and vacuum, P. Gayet underlined that they want a loose coupling between vacuum and cryogenic systems. A meeting concerning this will be organised (by Philippe?) very soon.

5. QRL CONTROLS COORDINATION/SCHEDULING AND ISSUES (AXEL DANEELS)

Axel started by saying that his presentation is a mixture of the one-year old scheduling exercise and of new (partial) inputs he got following a recent inquiry. As a consequence, some dates reported in his talk might have to be updated.

Axel underlined also that scheduling – and not planning – is the correct word, since neither a resource levelling nor a cost estimation exercises were carried out.

Axel detailed the Work Packages milestones for several tasks discussed also in Germana's and Claude-Henri's presentations. Several dates were partially controversial, therefore Robin suggested all persons involved to send to Axel their "versions" of the period when a certain activity will be carried out. Axel then stressed that to avoid misunderstandings both start and end date should be specified for each activity, together with dependencies between these activities.

6. OUTSTANDING POINTS

Many of the technical issues raised during the meeting have been scheduled for attention at the AB-CO technical board during February and March.

The controls commissioning is scheduled to start on 20th August. All other dates are to be confirmed by A. Daneels and the groups concerned, who should supply start and end dates for their major activities. Axel will look into interdependencies in these activities together with all those concerned.

Another LHC-CP meeting will be dedicated to this topic before June.

The AB-IN section is coordinating with IT/CS to define the procedures to be followed for connecting equipment to the Technical network.

Long-Term Actions	**People**
Common power circuit database requirements	R. Schmidt
Underground Control Rooms requested	R. Lauckner
Establish Post-mortem sub-project	R. Lauckner
Clarify Middleware Services to be used by LHC-CP	AB-CO TC

Reported by M. E. Angoletta

QRL Review

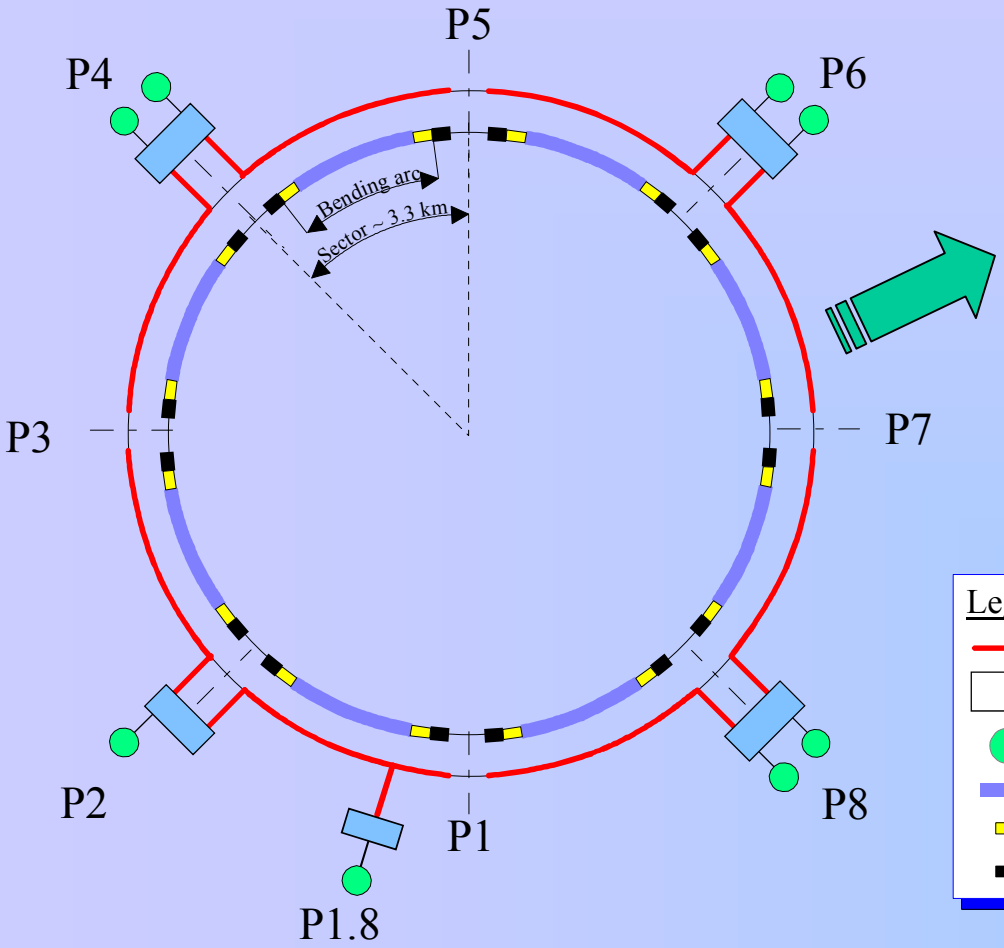
32nd LHC-CP meeting, 28.01.03

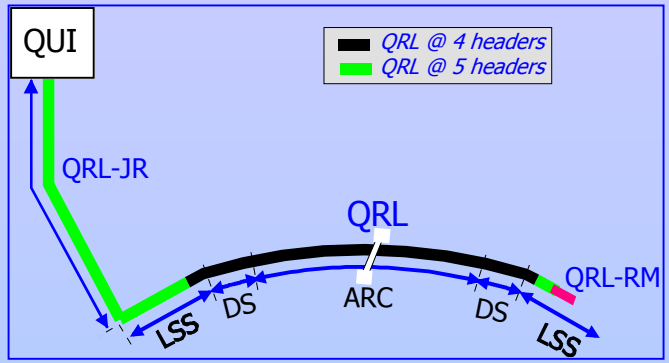
G. Riddone, AT/ACR-cd

Contents

- Architecture of the LHC cryogenic systems
- QRL layout
- Installation sequence
- Summary of instrumentation and vacuum equipment
- Planning for installation and reception tests
- Main requirements

Layout of LHC Cryogenics

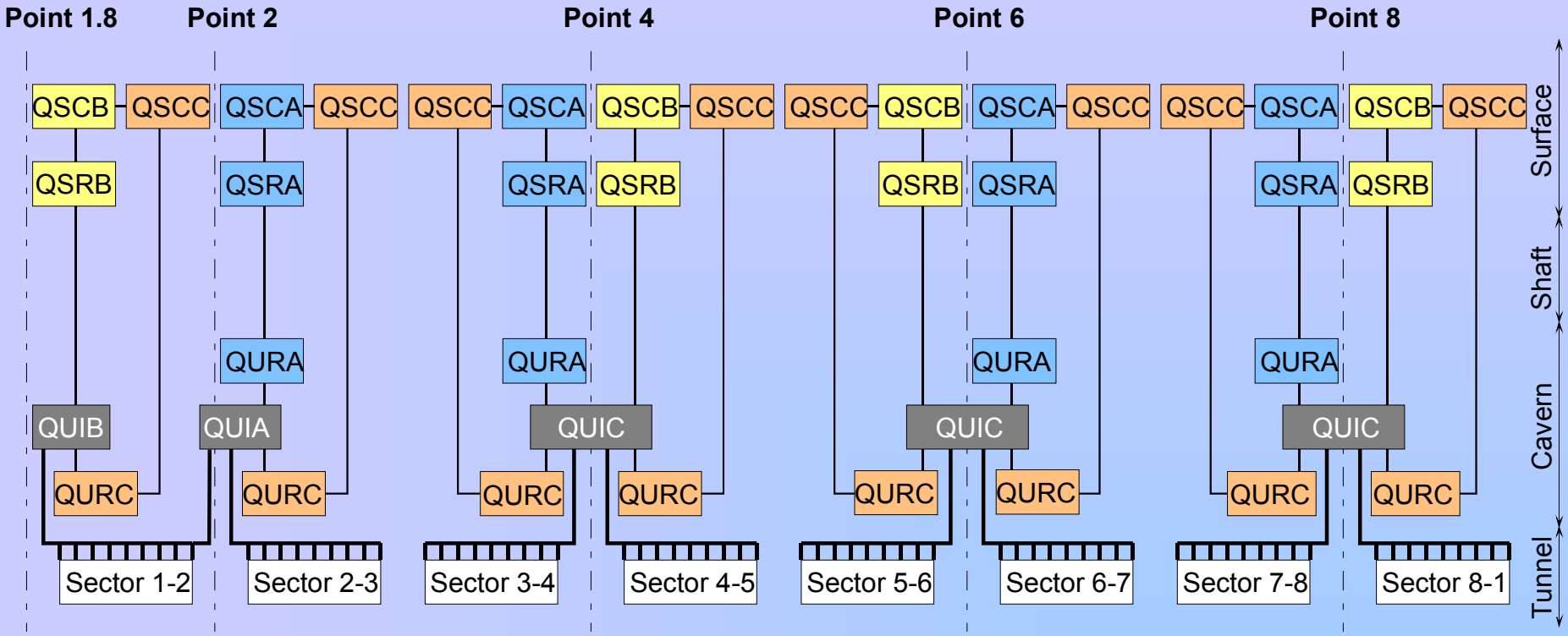




Legend:

- QRL
- QUI
- Refrigerator
- Arc
- Dispersion Suppressors
- Long Staight Section

Architecture of the LHC Cryogenics



Legend

Cryogenic Distribution Line

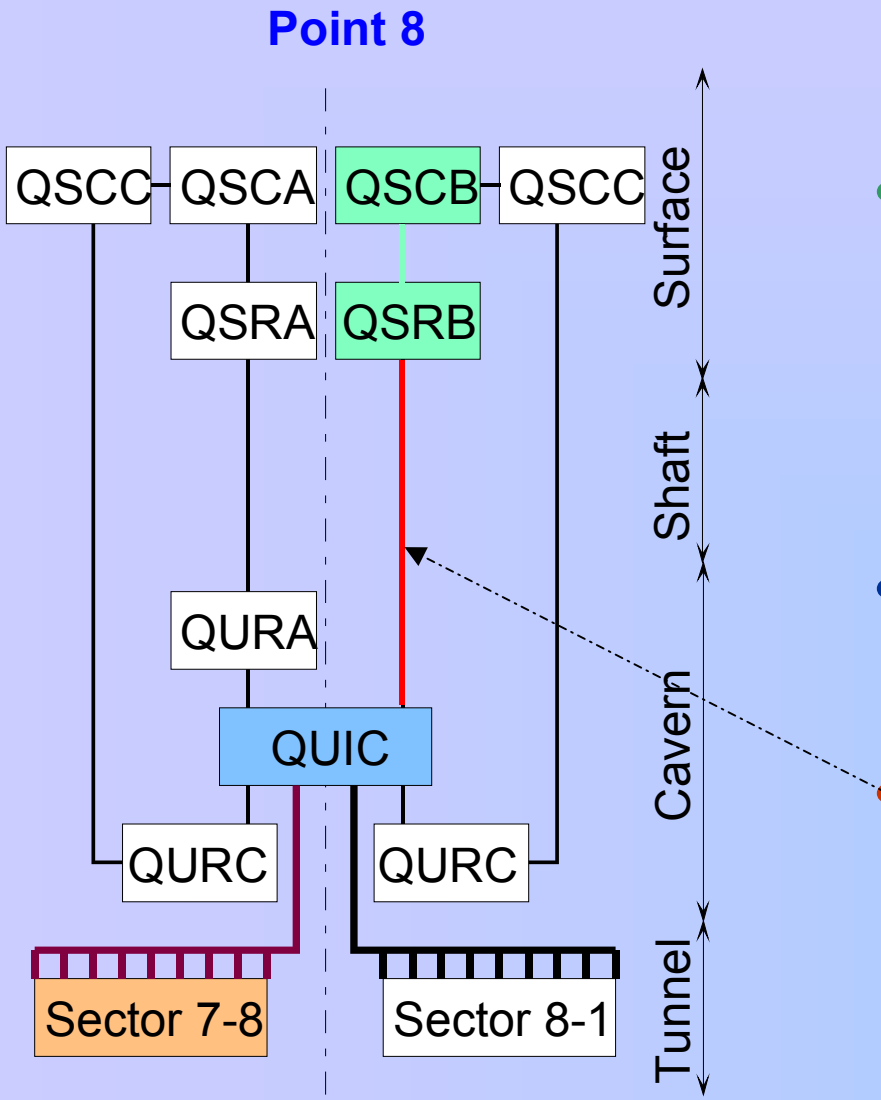
QSC_(A,B,C): Warm Compressor Station
QSR_(A,B): Surface 4.5 K Refrigerator Cold Box
QURA: Underground 4.5 K Refrigerator Cold Box
QURC: 1.8 K Refrigeration Unit Cold Box
QUI_(A,B,C): Cryogenic Interconnection Box

New 4.5 K refrigerator

Ex-LEP 4.5 K refrigerator

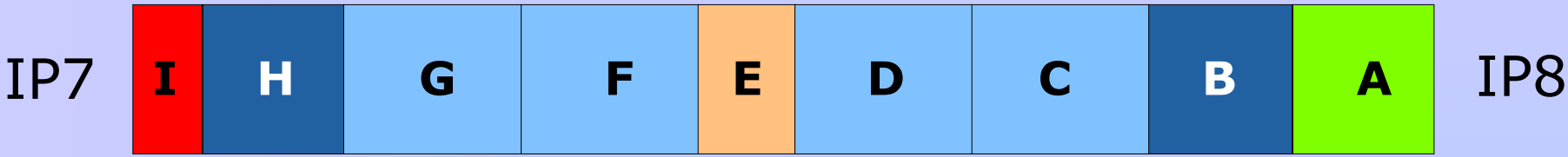
1.8 K Refrigeration unit

Required cryogenic equipment



- ***New 4.5 K refrigerator:*** *QSRB (surface cold box), & QSCA (warm compressor station), incl. nitrogen dewar (QSDN) and helium tanks (QSV)*
- ***Cryogenic interconnection box:*** *QUIC*
- ***Vertical transfer line:*** *QPLB*

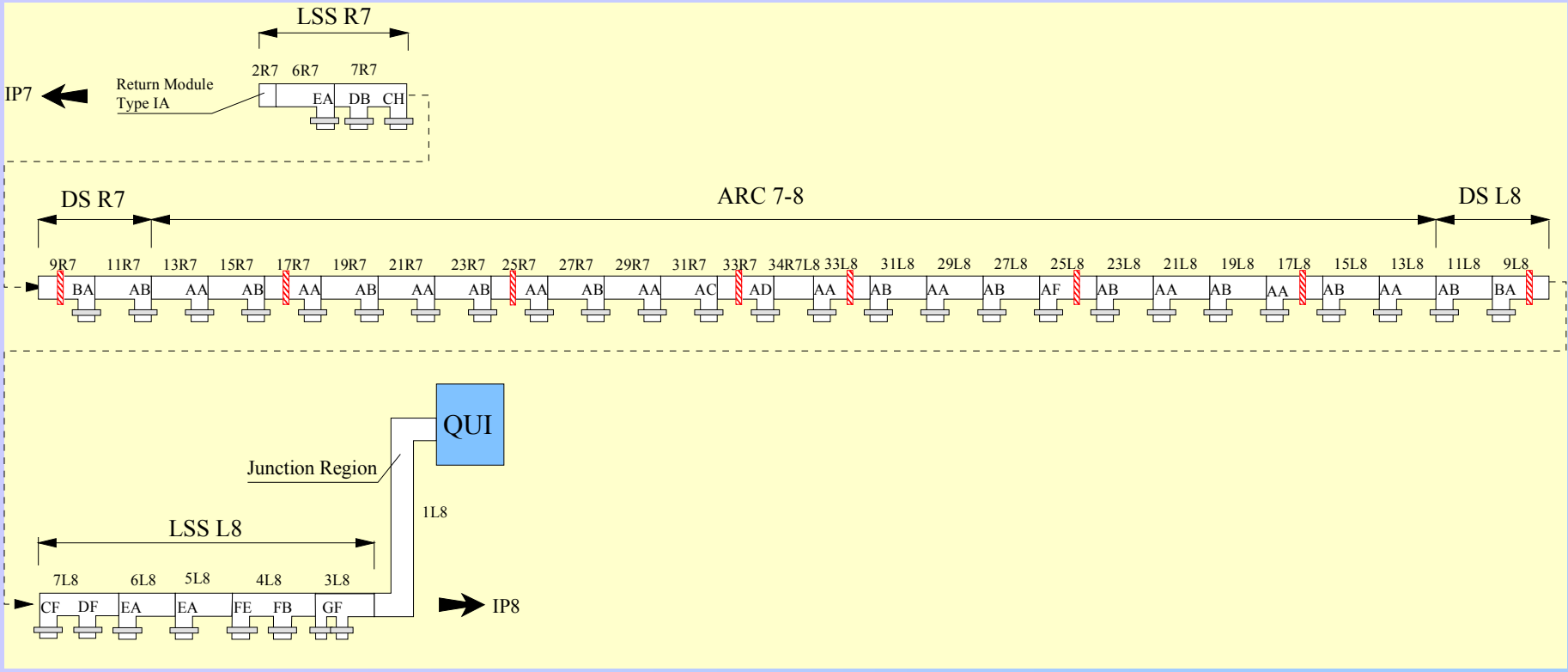
QRL simplified layout



9 vacuum sectors:

- G, F, D, C = about 428 m
- H, B = about 380 m
- E = about 215 m
- A = about 360 m
- I = about 75 m

QRL layout



- 8 longitudinal vacuum barriers
- transverse vacuum barriers at each jumper connections

Main phases

- **Pre-installation → external supports**

- **Installation [I]**
- **Pre-commissioning [PC]**

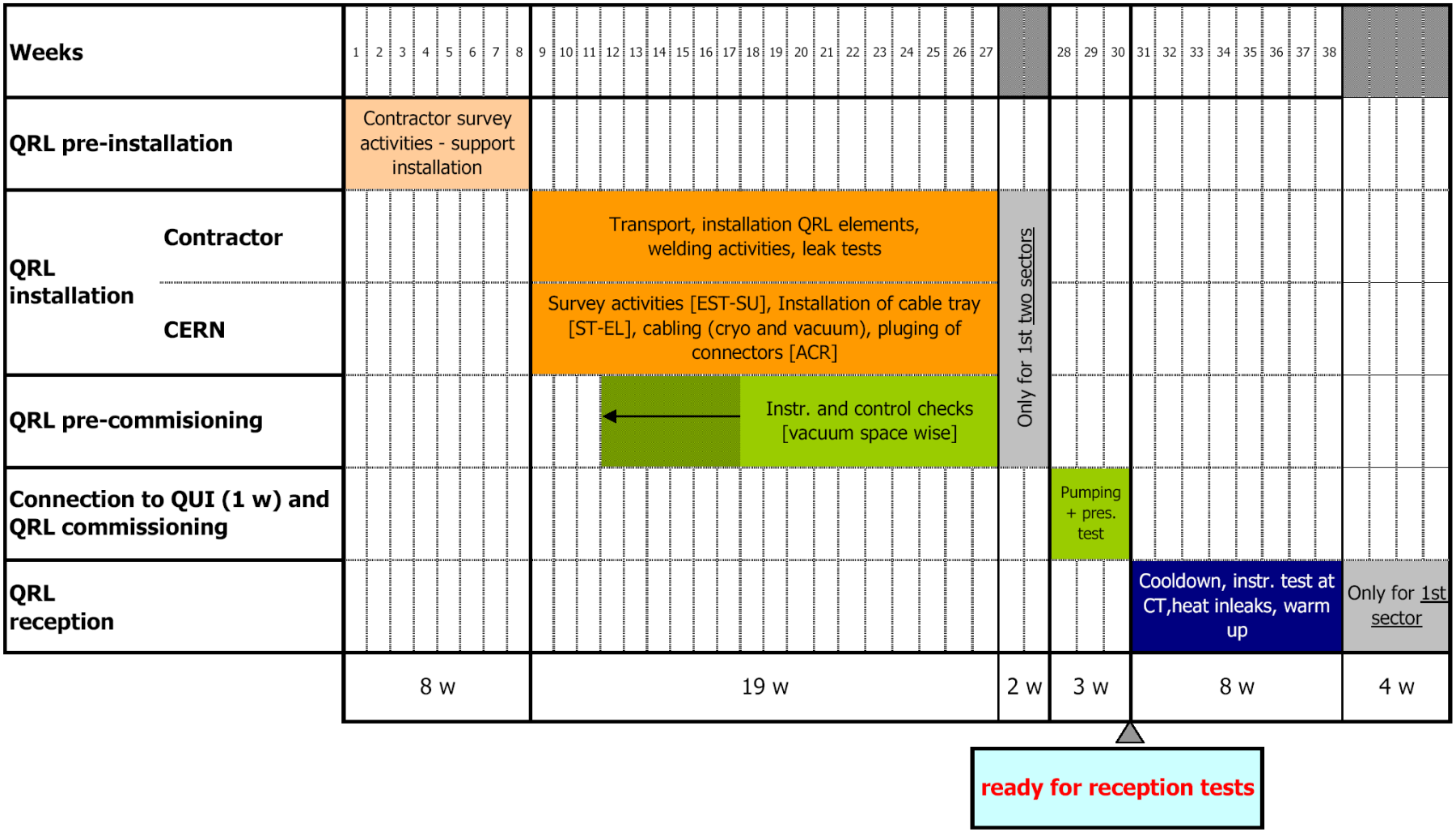
- **Pumping and QUI connection**
- **Commissioning [C]**

- **Reception [R]**

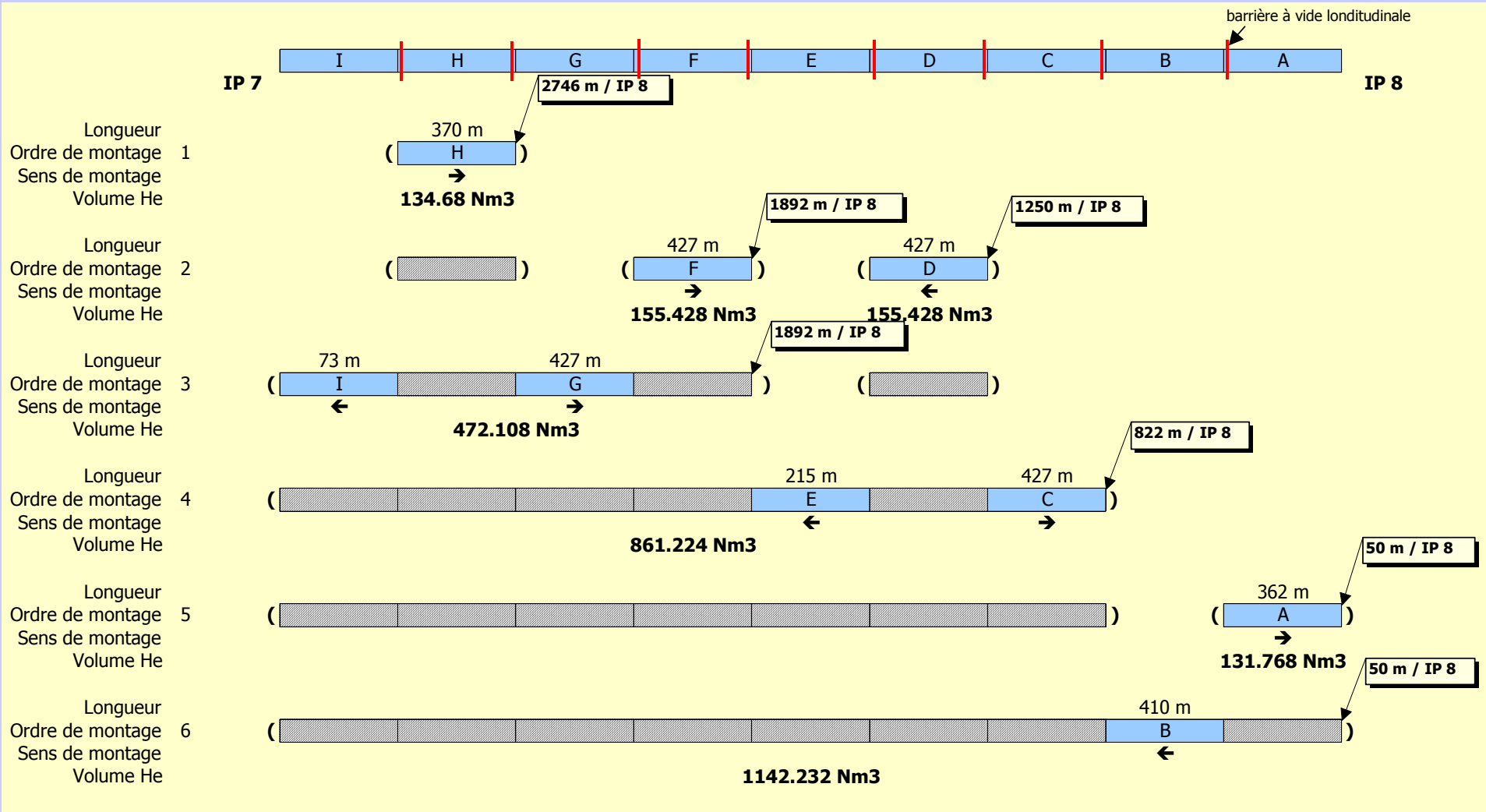
Installation Structure

- **8 weeks before installation tunnel access for suppliers: survey activities and installation of external supports.**
  (at this period general services installation in the tunnel)
- **19 weeks installation**
  (21 weeks for the 1st & 2nd sector)
  - » 2 working fronts & two shifts
  - » automatic orbital welding (~100 %)
  - » CERN services (vacuum, local cabling, instrumentation, ...) according to subsector completion by Air Liquide
- **3 weeks for global pressure & leak testing and others**
- **8 weeks of reception testing (12 weeks for the first sector)**

Sector Schedule



Mounting sequence of the QRL



Cryogenic instrumentation

- Thermometers: ~ 250
- Pressure transducers: ~ 42
- Pressure switches: ~ 36
- Electrical heaters: 5
- Level gauge: 1
- Control valves: 167 [Profibus]
- Quench valves: 43

Cryo instrumentation – sector 7-8 (1)

Instrumentation associated with QRL service modules for sector 7-8

SM Type	Quantity	TT	PT	EH	LT	Cryo Valves			PS	CV guard
						Total	CV profibus	QV		
AA	10	9	2	0	0	6	5	1	1	1
AB	11	5	0	0	0	6	4	2	1	1
AC	1	5	0	0	0	7	5	2	1	1
AD	1	5	0	0	0	6	5	1	1	1
AF	1	12	2	2	0	8	7	1	1	1
BA	2	9	2	0	0	6	5	1	1	1
CF	1	6	0	0	0	4	3	1	1	1
CH	1	4	0	0	0	3	2	1	1	1
DA	1	5	2	0	0	4	4	0	1	1
DB	1	5	2	0	0	3	3	0	1	1
EA	3	6	2	0	0	5	5	0	1	1
FB	1	2	0	0	0	2	2	0	1	1
FE	1	4	2	0	0	3	3	0	1	1
GF	1	10	2	0	0	11	8	3	1	1
IA	1	10	2	3	1	6	6	0	0	0
Total	37	249	42	5	1	210	167	43	36	36

Slide prepared by J. Casas-Cubillos

Cryo instrumentation – sector 7-8 (2)

Instruments associalted to local or remote cabinets for sector 7-8

Local Cabinets (Crates)					
Crate Type	Quantity	Analog IN	Analog OUT	Level Gauge	Digital IN
AA	10	11	0	0	3
AB	11	5	0	0	5
AC	1	5	0	0	5
AD	1	5	0	0	3
AF	1	14	2	0	3
BA	2	11	0	0	3
CF	1	6	0	0	3
CH	1	4	0	0	3
DA	1	7	0	0	1
DB	1	7	0	0	1
EA	3	8	0	0	1
FB	1	2	0	0	1
FE	1	6	0	0	1
GF	1	12	0	0	7
IA	1	12	3	1	0
TOTAL	37	291	5	1	122

Alcove IO (RIO)			
SM	Quantity	% Valves	Digital OUT
AA	10	5	2
AB	11	4	3
AC	1	5	3
AD	1	5	2
AF	1	7	2
BA	2	5	2
CF	1	3	2
CH	1	2	2
DA	1	4	1
DB	1	3	1
EA	3	5	1
FB	1	2	1
FE	1	3	1
GF	1	8	4
IA	1	6	0
TOTAL		167	79

Slide prepared by J. Casas-Cubillos

Cryo instrumentation – conclusion

QRL sector 7-8 I/O type							
Type	Analog IN	Analog OUT	Level Gauge	Digital IN	% Valves	Digital OUT	
Quantity	291	5	1	122	167	79	+ a few interlocks

The LHC-type tunnel crates will not be available for the QRL reception tests

=> QRL reception tests: specific crates will be used, they are based on Profibus-DP (S7-300)

ATTENTION: **Only one set of QRL reception test electronics is foreseen**

All cabling, connector, PCU, network and SCADA infrastructure is as for the LHC

Fieldbus hubs, valve controllers & underground UNICOS equipment are located at **IP7, RE78, RE82 & IP8**

Specs for QRL sector 7-8 reception test control software shall be ready by mid-2003

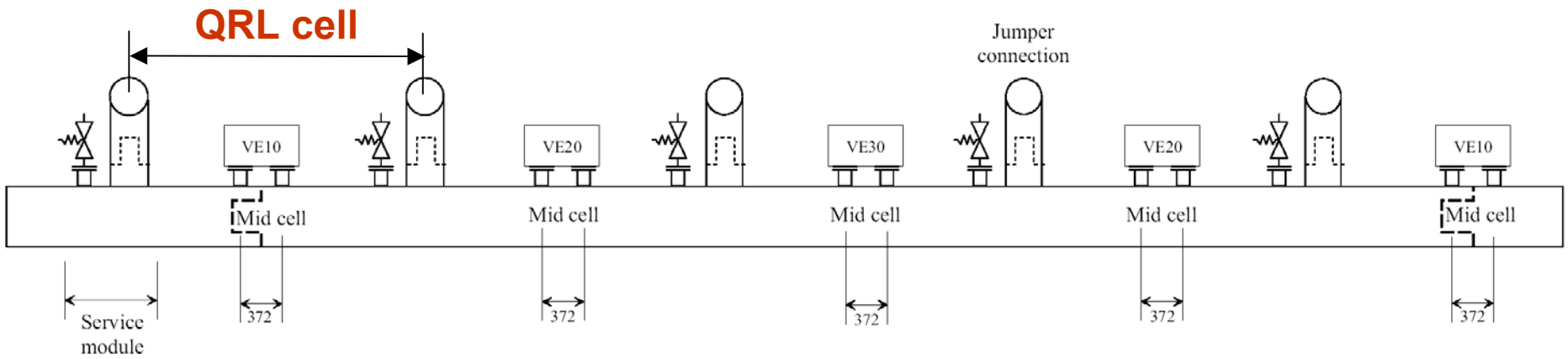
About 250 Cernox will require individual conversion tables stored into an Oracle database

Presently we have problems with DB support - How to implement the link with ORACLE?

Slide prepared by J. Casas-Cubillos

Vacuum equipment

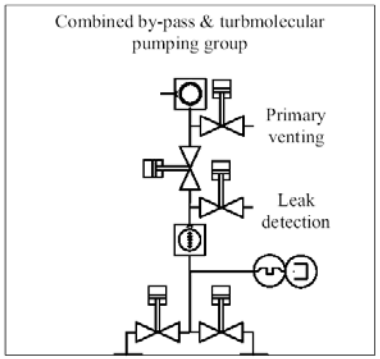
Configuration in the arc region – vacuum sector: 4 cells



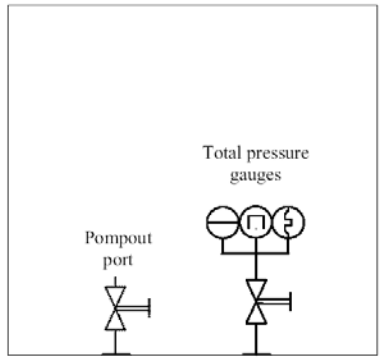
Vacuum equipment:

- 1 flange on each service module
- 2 flanges on each mid cell pipe element
- 2 flanges on each return module
- 2 flanges on each junction region

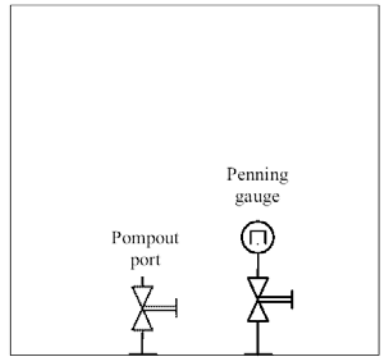
Vacuum equipment type



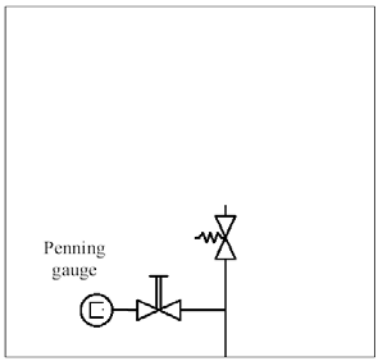
Type VE10



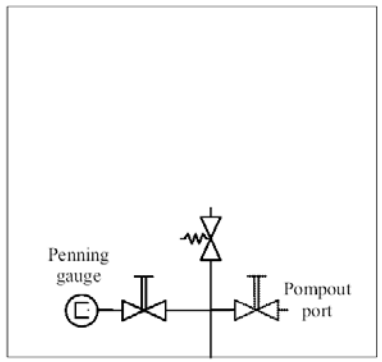
Type VE30



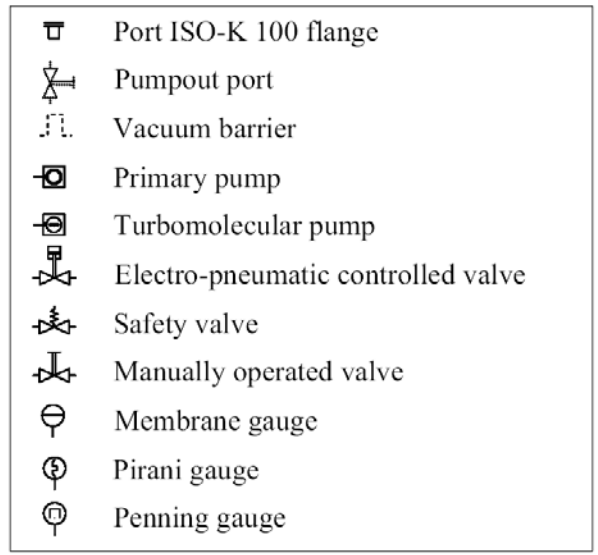
Type VE20



Type VE21



Type VE22



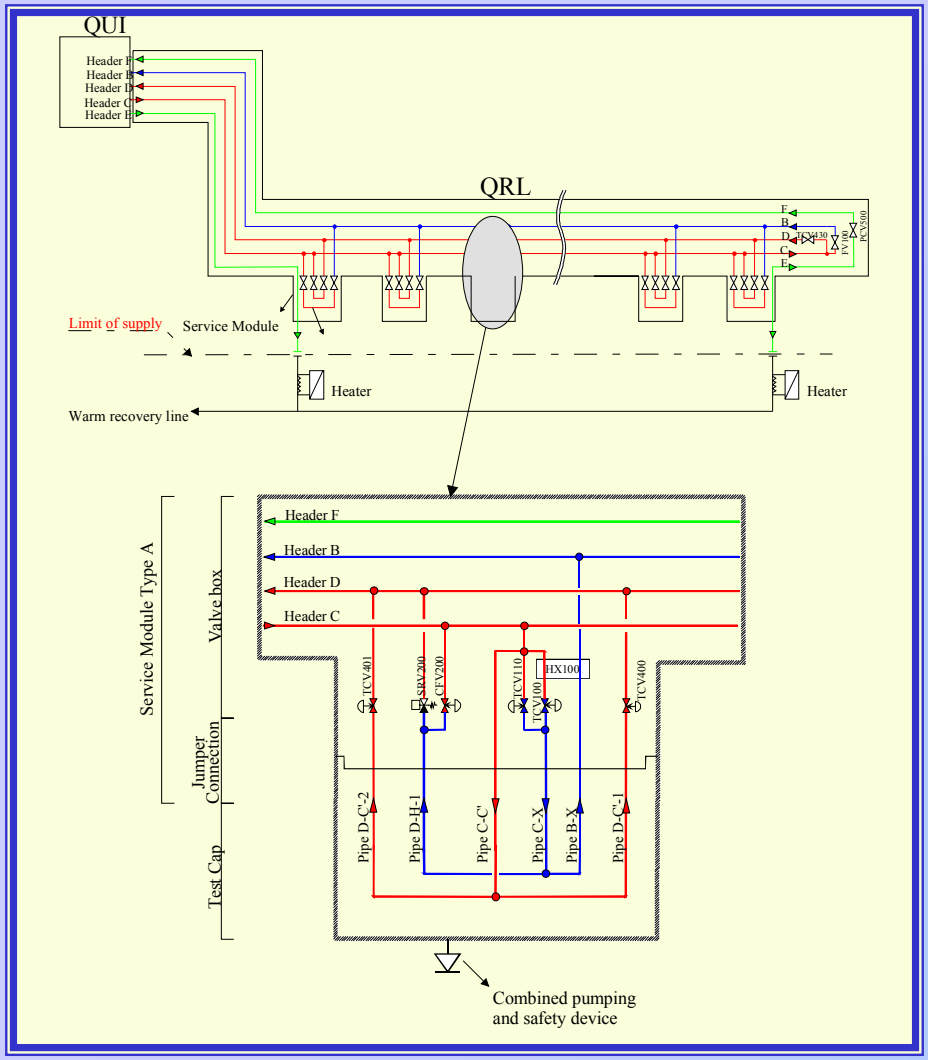
Vacuum equipment list

Equipment	UJ76	RE78	RE82	UA83
Master PLC S7/400	1	1	1	1
Slave PLC S7/300	1	3	3	1
RS485 Repeater	0	1	1	0
Pumping Group	1	3	3	1
Pirani (TPG)	4	0	0	4
Penning (TPG)	4	0	0	4
Boitiers TPG300	[2 .. 4]	0	0	[2 .. 4]
Pirani (Compact)	0	3	2	0
Penning (Compact)	0	9	8	0
Piezo (Compact)	1	3	4	1
VPG gauge(s) [1]	0	3	3	0

[1] : Gauge type not yet defined

Slide prepared by R. Gavaggio

Reception Tests



- **QRL installed with**
  - » test caps
  - » shield and short-cuts for pipes
- **QRL commissioning has pilot function:**
  - » tunnel cryogenics
  - » tunnel control issues

Schedule for Sector Reception Tests

Weeks	1	2	3	4	5	6	7	8
Cool down	**300-4 K with parallel leak detection**							
Functional tests of control and monitoring equipment		**about 250 TT, 200 cryogenics valves, 100 control loops**						
Temperature stabilization and heat inleak measurement #1				**Headers only**				
Temperature stabilization and heat inleak measurement #2						**Headers + pipes in the service modules (jumper)**		
Warm up								**4-300 K**

Important dates

	From	To
Positioning of ext. supports	**21.04.03**	**13.06.03**
Mounting vacuum space H	**16.06.03**	07.07.03
Mounting vacuum space F	08.07.03	29.07.03
Mounting vacuum space D	08.07.03	29.07.03
Mounting vacuum space I	30.07.03	07.08.03
Mounting vacuum space G	30.07.03	20.08.03
Mounting vacuum space C	08.08.03	29.08.03
Mounting vacuum space E	21.08.03	29.08.03
Mounting vacuum space A	01.09.03	11.09.03
Mounting vacuum space B	12.09.03	03.10.03
Pumping + connection to QUI	**11.11.03**	**28.11.03**
Commissioning	**11.11.03**	**28.11.03**
Reception	**02.02.04**	**23.04.04**

Summary of main requirements

- **Before installation**
  - » Warm piping
  - » General systems
  - » Cables foreseen inside teh tunnel already installed in the cable tray
- **Control functionality**
  - » Calibration data [P-C]
  - » Manipulation of sensors/actuators and simulation of operation phases [P-C, C, R]
  - » Monitoring [P-C, C, R]
  - » Logging [C, R]
  - » Alarms [C, R]
  - » TRC and stand-by persons on call [C, R]
- **Required infrastructure**
  - » Vacuum operational [P-C=interlocks only , C and R = fully]
  - » Cryo control (4.5 K refrigerator and QUI fully operational) Instrumentation [C, R]
  - » Local control room [C, R]

QRL Tests Review

Controls Requirements

C.H.Sicard AB/CO

LHC-CP meeting 28.01.03

Plan

1. Scope
2. Technical requirements
   - For AB/CO
   - For other groups (if it affects AB/CO work)
3. Open issues

Scope of presentation

- Covers control needs for Cryo, Vacuum, in the context of the QRL reception tests of sector 7-8
- Architecture proposed to facilitate further QRL reception tests (other sectors)
- Assumes infrastructure (power, network) and control cables are present when needed
- Assumes control facilities in 'pre-commissioning' phase (starting 20.08.03) are limited to instrumentation or valve control checking.

Technical Requirements for AB/CO (1)

PVSS Data servers for Cryo, VAC, with synchronised clock, central surveillance	IN,IS	20/08/03
Operator Stations for Cryo installed & connected in local control room	IN	20/08/03
UNICOS framework (v1) ported to PVSS	IS	15/03/03
Client interface to Central Logging (and Alarms?) defined	DM,AP	01/03/03
PLC architecture for Cryo finalized f(Schneider planning for new PLC range)	IS	01/03/03

Technical Requirements for AB/CO (2)

Procurement of UNICOS PLC HW & SW for Cryo	IS	20/08/03
Automatic extraction of thermometric calibration from Oracle DB for Cryo PLCs	DM,IS	20/08/03
Data Interchange mechanism implemented for PVSS/UNICOS	IS	01/10/03
UNICOS PVSS connection to Central Logging (incl. Data retrieval)	DM	01/11/03
UNICOS connection to Central Alarm, for TCR (name mapping required)	IN	10/11/03

Requirements for Other groups (1)

Ethernet network in surface buildings & alcoves	IT/CS	20/08/03
Check feasibility of GPRS for SCADA usage in tunnel	IT/CS	01/04/03
Definition of Data Interchange protocol	LDIWG	01/04/03
Cryo Process specs available	ACR	01/07/03
Profibus-DP remote-I/O installed	ACR	20/08/03

Requirements for Other groups (2)

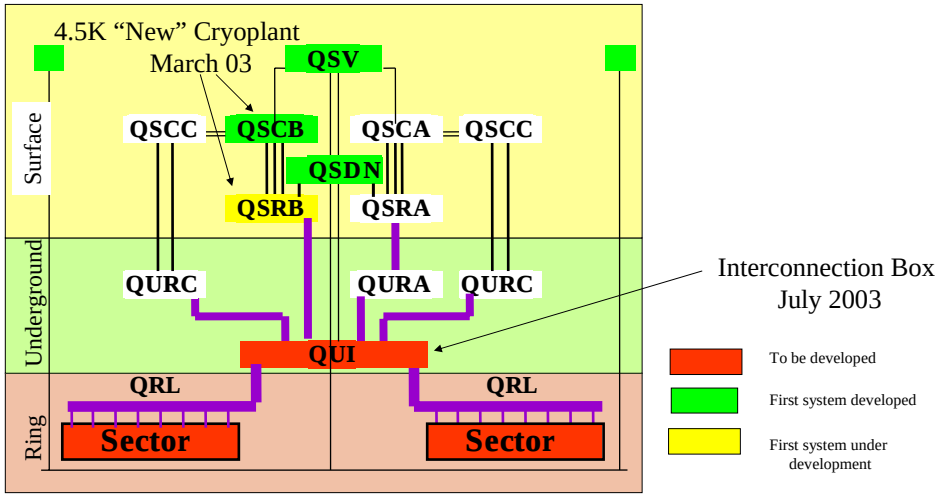
Provide PVSS server on Linux, with Siemens PLC connectivity (Applicom)*	IT/CO, AB/CO	01/07/03
Adapt Communication configuration (OPC->Applicom)*	VAC	01/08/03
Data interchange with Cryo at supervision level	VAC	01/10/03

* If AB/CO policy not to support Windows servers

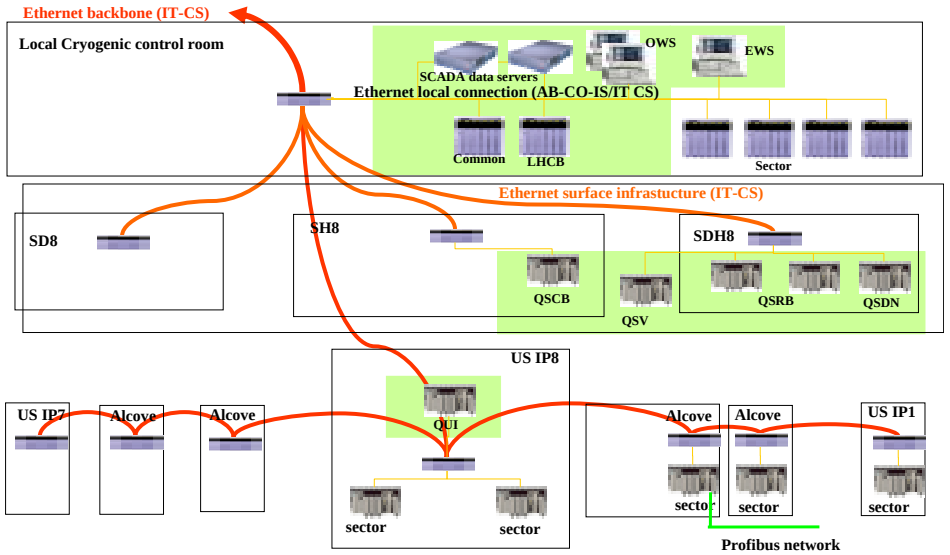
Open Issues

- Clarify controls required during:
  - pre-commissioning,
  - commissioning,
  - reception phases
- Cryo Test Application development mode
  - Via external programming (=>Specs ready 3 months before)
  - Under CERN responsibility
- Cryo Controls generation tool adapted to new Schneider devt SW?
- Manpower for Thermometer DB extraction, connection to Logging & Alarms?
- TCR needs for vacuum and cryo?
- PVSS Server on Linux f(AB/CO policy on servers)

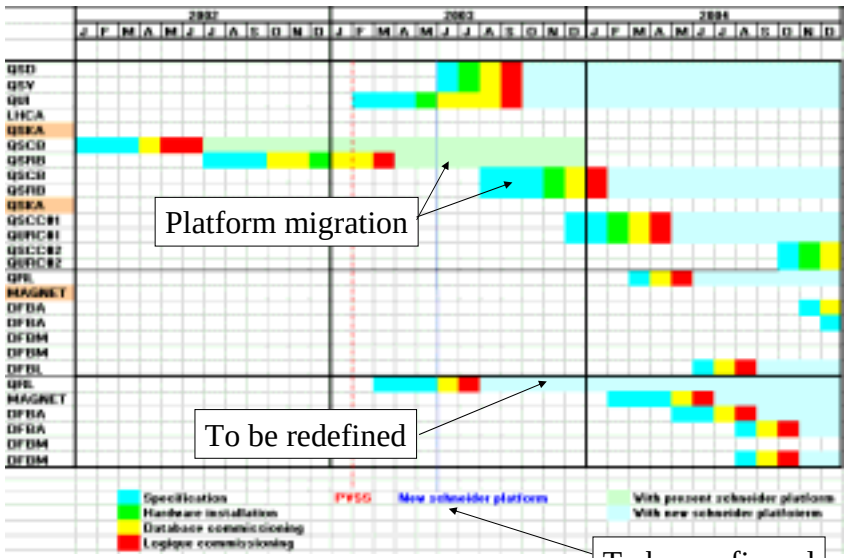
Cryo Applications Development Status



QRL TEST Cryo HW Implementation



Cryo Applic. Production planning



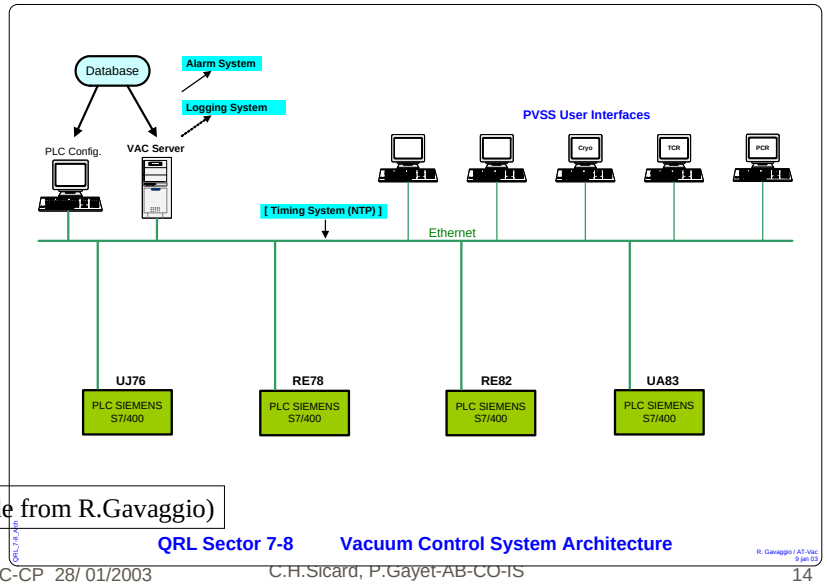
Cryo Software Issues

- PVSS framework (03-03)
- UNICOS Code generation tool
  - Ready for present hardware
  - 04-03 for PVSS
  - 08-03 ?? For new Schneider development platform
- New development platform preferred but solution available on present ones
- QRL solution in a dedicated Data Server
- Interface to logging system for data analysis

Cryo Controls Hardware Issues

- Local Control room available
- Ethernet network
  - (planning transmitted to IT-CS)
- Availability of New Schneider PLC ???
- Validation on the temporary Profibus solution

VAC Control Architecture



(slide from R.Gavaggio)

VAC controls External Needs

- Server Machine
- Ethernet in UJ76, Alcoves & UA83
- Alarms & Logging Systems (+ Interfaces)

(slide from R.Gavaggio)

VAC Controls Equipment List

Equipment	UJ76	RE78	RE82	UA83
Master PLC S7/400	1	1	1	1
Slave PLC S7/300	1	3	3	1
RS485 Repeater	0	1	1	0
Pumping Group	1	3	3	1
Pirani (TPG)	4	0	0	4
Penning (TPG)	4	0	0	4
Boitiers TPG300	[2 .. 4]	0	0	[2 .. 4]
Pirani (Compact)	0	3	2	0
Penning (Compact)	0	9	8	0
Piezo (Compact)	1	3	4	1
VPG gauge(s) [1]	0	3	3	0
[1] : Gauge type not yet defined				

(slide from R.Gavaggio)

Scheduling & Coordination of Controls for QRL Tests

Current State and Schedule (1)

Ax elDaneels

(1) Some updates based on discussions at the meeting

Scop eof Scheduling (1)

Ref. meeting 28 Ma. 01 [Agreed "Planning Activity for LHC Control System" (10 Apr. 01)]

(a reminder)

- **Planning / scheduling limited to:**
  - **Tasks:**
    - that fall strictly within the scope of the L HC- CPproj ecte.g. Alarms, L ogging, etc
    - that req uirecontrols facilities: e.g. CRYO, VAC req uireL ogging, Alarms
    - on which controls heavily depend: e.g. field bus, communications infrastructure
    - for which "help" was req uested:e.g. VAC
  - **Time frames (… i. e."p lagesd'activités") in which tasks are p erformed**
  - **No resources**
- **What does this imp ly?**
  - **"Scheduling"rather than real "Planning"**
    - Scheduling only verified for Time consistency (critical path)
    - No resource levelling
    - No cost estimation

Scop eof Scheduling (2)

(a reminder)

- **Work p ackages/ tasks considered in current schedule**
  1. CRYODevices for QRL
  2. Field bus (change since L HC- CPmeeting of 1 4/ 01 / 03)
  3. Timing
  4. Communications Infrastructure
  5. Control Rooms
  6. CRYOControls
  7. VACControls
  8. DIP(L DIWG)
  9. Alarms
  10. L ogging

Overall "ex ternal"Time F ramesfor QRL

✓ **QRL Activities** ***(G.Riddone)*** *(1)*

	Duration	Start	F inish
QRL(7-8) Installation *(2)* *(3)*	21 w	1 6 - Jun- 03	03- Oct- 03 or 07 - Nov- 03
QRL(7-8) Pre-Commissioning *(4)*	06 w	20- Aug- 03	29 - Aug- 03
QRL(7-8) Pre-Commissioning	1 0w	01 - Sep- 03	07 - Nov- 03
LSS4 ,TT4 0Beam Test !	3 d	08 - Sep- 03	0227 - Oct- 03
QRL(2 -3)nstallation !	21 w	1 0- Nov- 03	1 6 - Apr- 04
QRL(7-8) Commissioning	3 w	1 1 - Nov- 03	28 - Nov- 03
QRL(7-8) Recep tion(cool down etc)	1 2w	02- Feb- 04	23- Apr- 04

(1) New dates: cf. G.Riddone's 14 Jan. 03
(2) According to G.Riddone's slide 12 & 15 (14 Jan. 03), QRL Mounting finishes 3-Oct-03
(3) According to General Planning (LHC-PM-MS-0005, rev 1.4) QRL Installation finishes 7-Nov-03
(4) 6 weeks are foreseen for test of CRYO devices (valves,…) ;

Work Packages Milestones (1)

Note: for consistency, all Milestones correspond to completion dates

✓ **CRYO Devices for QRL** *(J.Casas-Cubillos)*

- PVSS Communication & Access to NICE tested (VAC): 28 - Feb- 03
- CRYO <- -> VAC Communication specified: 28 - Feb- 03
- S/ W Specs ready: 27 - Jun- 03
- PLC installed in Alcoves: 01 - Aug- 03
- Thermo Configuration Data Base available: 15- Aug- 03
- Valve Control commissioning start: 20- Aug- 03
- Test Crates installed: 01 - Oct- 03
- Instrumentation commissioned: 15- Oct- 03

Work Packages Milestones (2)

- **Fieldbus** *(Cl.-H. Sicard??)*
  - "Passerelle" ETHERNET & MICROFIP module: N/ A for QRL Commissioning
  - WorldFIP Network cables + connectors installed for QRL: 14- Jan- 03
  - temporary solution based on Profibus & Siemens EP200 I/ O: 25- Apr- 03
- **Timing** *(P.Anderssen)*
  - Time stamping (1 - 2 msec resolution; NTP only): 14- Jul- 03
- ✓ **Communications_Infra** *(P.Anderssen)*
  - Voice Communication (900MHz leaky Feeder) installed: 28 - Feb- 03
  - Technical network on the LHC surface sites installed: 28 - Feb- 03
  - Additional Optical Fibres in underground areas (7 - 8) installed: 27 - Sept- 03
  - Wireless Communication (GPRS): 11 - Nov- 03 (1) (2)
- **Control Rooms**
  - Local CRYO *(Ph.Gayet)* : O.K.
  - VAC & CRYO Alarms & Logging from PCR *(P.Charrue)* : 31 - Oct- 03
  - VAC & CRYO monitoring from TCR *(P.Ninin)* : 11 - Nov- 03

Work Packages Milestones (3)

✓ **CRYO Controls** *(Ph.Gayet)*

- GPRS Performance Tests in Lab: 15- Feb- 03
- PVSS Framework available: 28 - Mar- 03
- UNICOS Library Delivered (1) : 28 - Mar- 03
- QSRB S/ W commissioning with PCVUE starts: 28 - Mar- 03
- UNICOS Code Generation Tool (1) :
  - For PVSS: 25- Apr- 03
  - For new Schneider Development Platform 29 - Aug- 03
- PVSS Development Kit available (critical for QUI): 27 - Jun- 03
- Refrigerator Controls ready: 05- Jul- 03
- UNICOS Network for QRL _ 7 - 8 installed: 14- Jul- 03
- QRL CRYO Controls ready for Pre- Commissioning: 14- Jul- 03
- QUI Commissioned with PVSS: 26 - Sep- 03
- QRL CRYO Controls ready for QRL Commissioning: 11 - Nov- 03
- QRL CRYO Test with Alarm & Logging systems completed: 01 - Dec- 03
- QRL operational for Reception Tests: 02- Feb- 04

(1) *UNICOS Library + Code Generation Tool to produce Applications*

Work Packages Milestones (4)

✓ **VAC Controls** *(R.Gavaggio)*

- QRL VAC Equipment Test (local) (1) : 20- Aug- 03
- QRL VAC Monitoring from Office (2) : 20- Aug- 03
- QRL VAC tested with interlocks & data exchange with CRYO: 11 - Nov- 03
- QRL VAC Control ready for QRL Commissioning: 11 - Nov- 03
- QRL VAC Test with Alarm & Logging system completed: 28 - Nov- 03

✓ **DIP (Data Interchange Protocol)** *(W.Salter)*

- Definition: 28 - Mar- 03
- Prototype suitable for QRL test implemented : 27 - Jun- 03

(1) VAC Tests as soon as VAC sectors I, F, G, H installed

(2) Needs Optical Fibres in underground areas (cf. Communications' Infrastructure)

Work Packages Milestones (5)

✓ **Logging** ***(R.Billen)***

- UR published: 20-Dec-01
- Functional Specs. available: 30-Nov-02
- Architectural Design Doc: 31-Jan-03
- Interfaces for data providers Published: 28-Feb-03
- Logging available for QRL (browser based GUI): 27-Jun-03
- Logging accepted by QRL clients: 28-Nov-03

- **Alarms** ***(M.Tyrrell)*** [1]
  - UR Doc. Available: 28-Feb-02
  - Functional Specs available : 28-Feb-02
  - Control Interfaces ('Public API' get, set) defined: 28-Feb-02
  - Server available: 28-Feb-02
  - Operational Prototype available [2] : 20-Dec-02
  - Alarm System available for QRL Commissioning: 11-Nov-03

[1] Based on 2001 planning; More detailed mile stone planning will be produced shortly by M.Tyrrell (e-mail 27/01/03)

[2] Prototype consists of: source API, Business layer, "Client"API, Alarm Console, communication between "current"and "new"system

Issues of Concern & Next Steps

- **Issues of Concern**
  - Commissioning starts: 20-Aug-03 or 3-Oct-03 or 11-Nov-03
  - Communication in Tunnel: will GPRS be sufficiently performing?
    - If not: … What?
  - No application software considered
    - AB/CO SW: N/A
    - "reception test control software" *(J.Casas-Cubilos)*
  - Some tasks have completion milestones only: no intermediate ones, e.g.
    - CRYO
    - VAC
- **Next Steps**
  - Check consistency of dates through MS-Project etc., to do so we need:
    - Starting dates / duration
    - Links between tasks
  - QRL (2-3) activities: When?