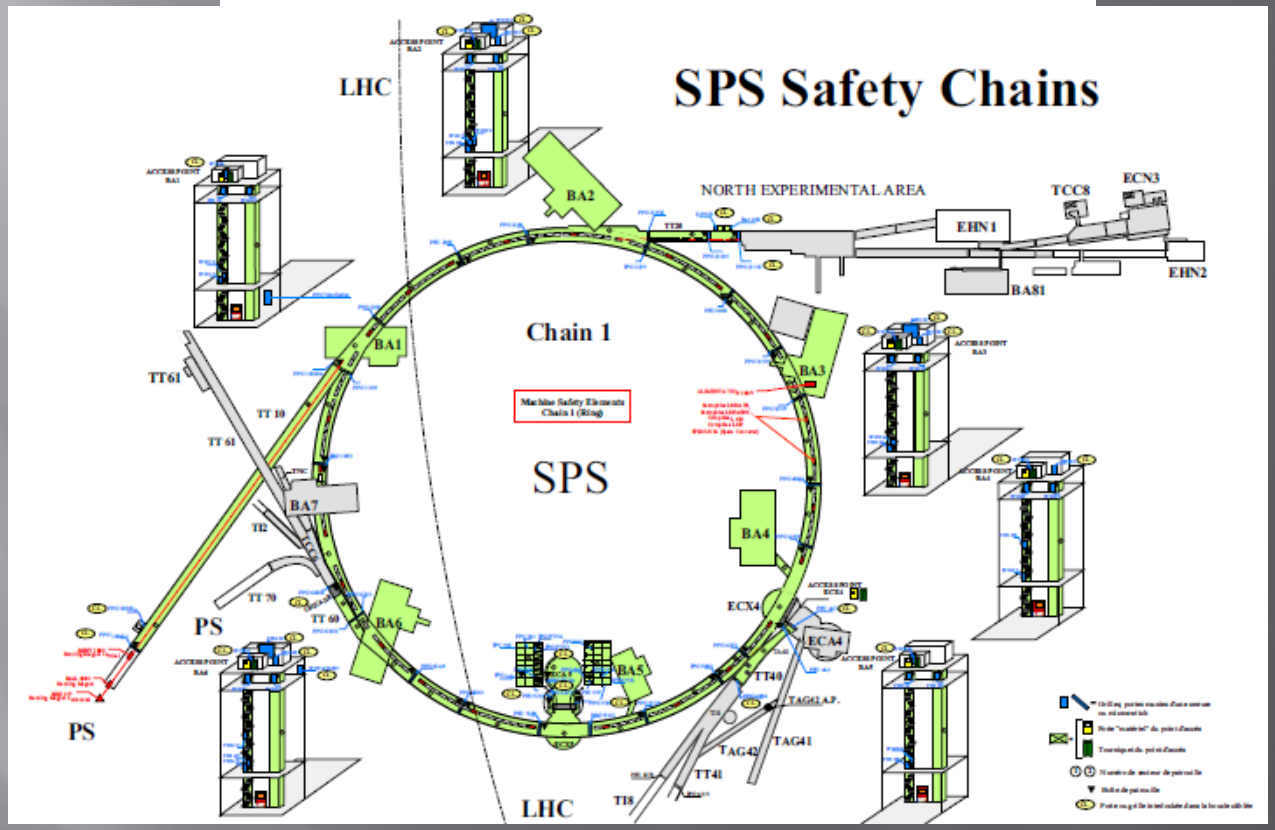
SAFETY MANAGEMENT OF SHUTDOWNS

David Mcfarlane
Superintendent for SPS
EN/MEF/ABA

SPS Statistics



- 6.9km of accelerator tunnel.
- 2.5km of transfer tunnels.
- 7 main access points.
- Over 20 surface buildings.
- 10 pits and 15 lifts.
- Access to the underground areas is only possible for very short periods of time.

2010/11 SPS Shutdown Statistics

- Although the technical stop lasted 11 weeks *(from the 6th December 2010 until 21st February,)* general access for works was only possible for 4 weeks
- 334 separate jobs requested.
  - 17 required *VICs (Visite d'Inspection Commune - Joint Inspection)*
- Works coordinated between multiple groups and departments:
  - EN (EL/CV/HE/STI/MEF)
  - BE (APB/BI/RF/OP)
  - TE (MSC/EPC/VSC)
  - GS (SEM/ASE/SEE)
  - DGS (RP)

Safety related works

- Electrical Safety checks
- Area safety visits
- Lighting inspections and maintenance
- Lift maintenance
- RP surveys
- Visits by the fire brigade to improve familiarisation with areas
- Fire and smoke detection maintenance
- Fire extinguisher maintenance
- Access control tests
- Toilet cleaning and maintenance.

Safety Documents

- PPSPS (Plan Particulier de Sécurité et de Protection de la Santé)
  - (EDMS 801899)
- SPS general coordination plan
  - (EDMS 1099003 - rev. 2010)
- Visitors in the controlled zone of the SPS
  - (EDMS 346813)

Safety Courses

- Biocell training
- Electrical safety awareness
  - *Access into the SPS can only be granted to persons who have followed this web-based course.*
- General CERN safety courses (level 1,2 & 3)
- RP course.
  - *(**NO** dosimeter without this course)*
- EDH access request and authorisation

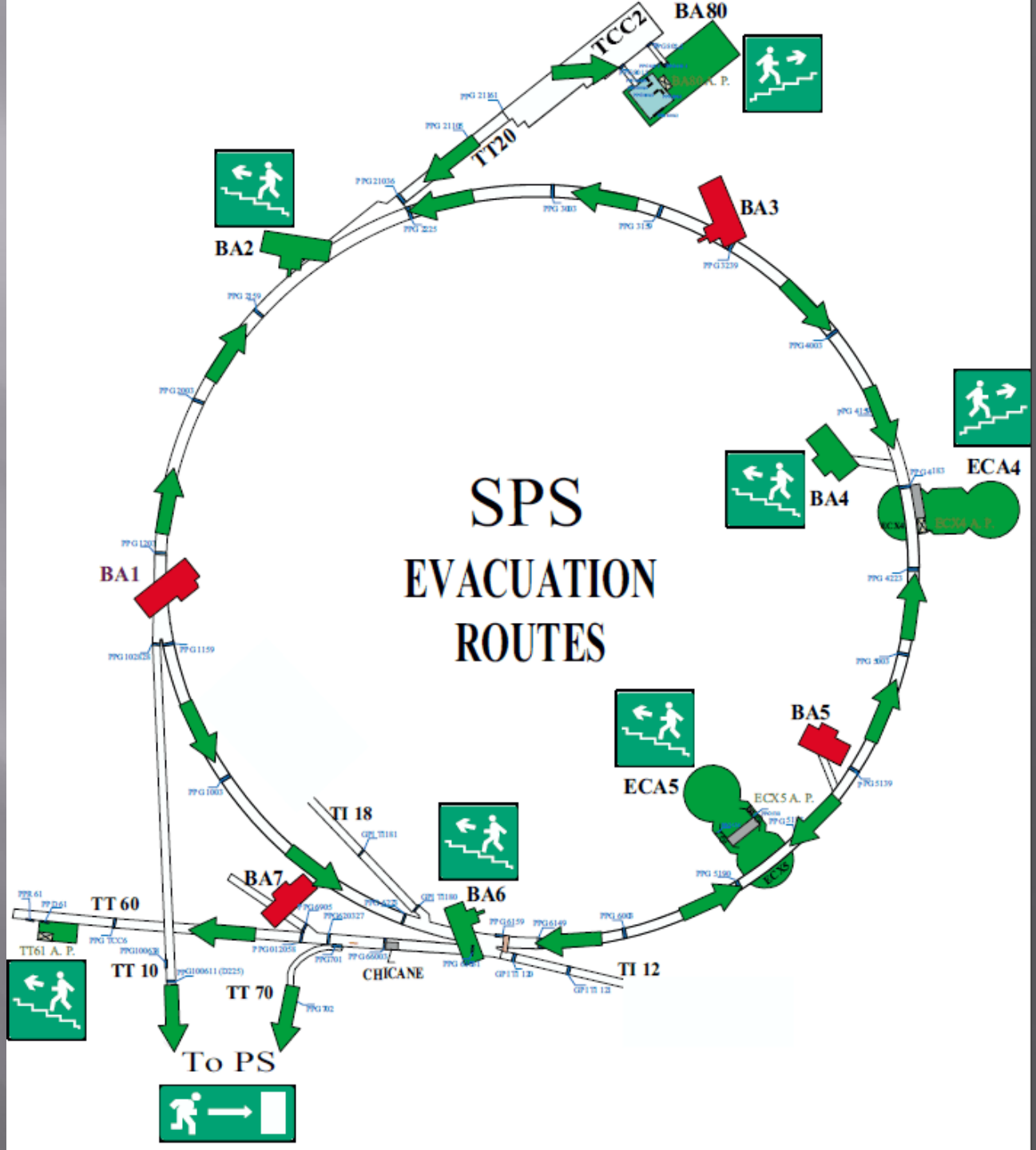
Personal Safety Equipment

- Hard hat
- Lamp/torch
- Passive dosimeter
- Electronic dosimeter
- Biocell
- Safety shoes

And your Buddy. *(Do not work alone !)*

SPS Safety Equipement

- Fire extinguishers
- Smoke detection systems
- Fire detection systems
- Sprinkler systems
- Evacuation alarms
- Emergency **RED** telephones
- Intercom system
- Controlled access systems
- Clearly marked evacuation routes


SPS
EVACUATION
ROUTES
BA80
TCC2
TT20
BA2
BA3
ECA4
BA4
BA1
BA5
ECA5
ECX5 A. P.
TI 18
BA7
BA6
TT 60
TT61 A. P.
TT 10
TT 70
CHICANE
TI 12
To PS


BA 6
RADIATION
ZONE CONTROLEE
CONTROLLED AREA
FILM BADGE
OBLIGATOIRE
REQUIRED
Temps de séjour limité
Limited occupancy time


ACCES COMPLEXE SPS
CASQUE + LAMPE
RECOMMANDEES
CHAUSSURES DE SECURITE
OBLIGATOIRES
HELMET + LIGHT
RECOMMENDED
SAFETY SHOES
MANDATORY
TURN THE KEY
TOURNEZ LA CLE
COME IN
ENTREZ

Safety Help and Tools

- People
  - TSO - *(Territorial Safety Officer)*
  - Safety Coordinator
  - Superintendent / Technical coordinator
  - CCC operators
  - DSO - *(Departmental Safety officer)*
  - GLIMOS *(Group Leader In Matters of Safety)*
- Visits
  - VICs – *(Visite d'Inspection Commune - Joint Inspection)*
  - Regular on site visits
- Permits
  - Authorisation to work
  - Consignation (Isolating of electrical equipment)
  - Fire permit
  - IS37 *(Disabling all or part of the system generating a level 3 alarm.)*
- Weekly planning meetings
  - Vital that key personnel attend
- Website *(up to date planning)*
  - http://sps.web.cern.ch/SPS/

Communication is key!

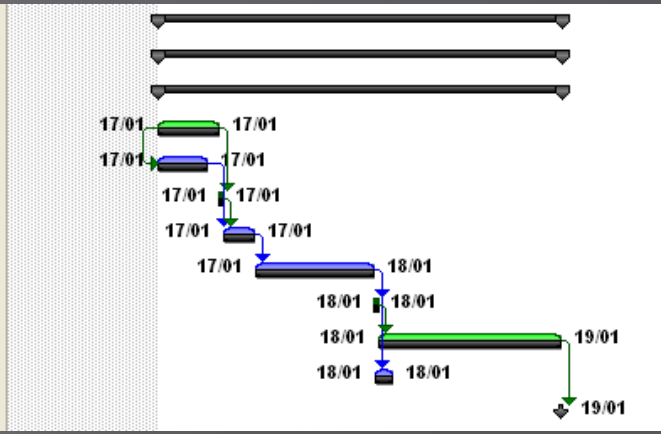
- Notice boards
- E-mails
- Meetings
- Telephone calls
- Face to face conversations
- RP surveys
- SPS coordination website
- De-Briefing meeting
  - Lessons learned and how can we improve for next time

When it comes to safety, you can never have too much information.

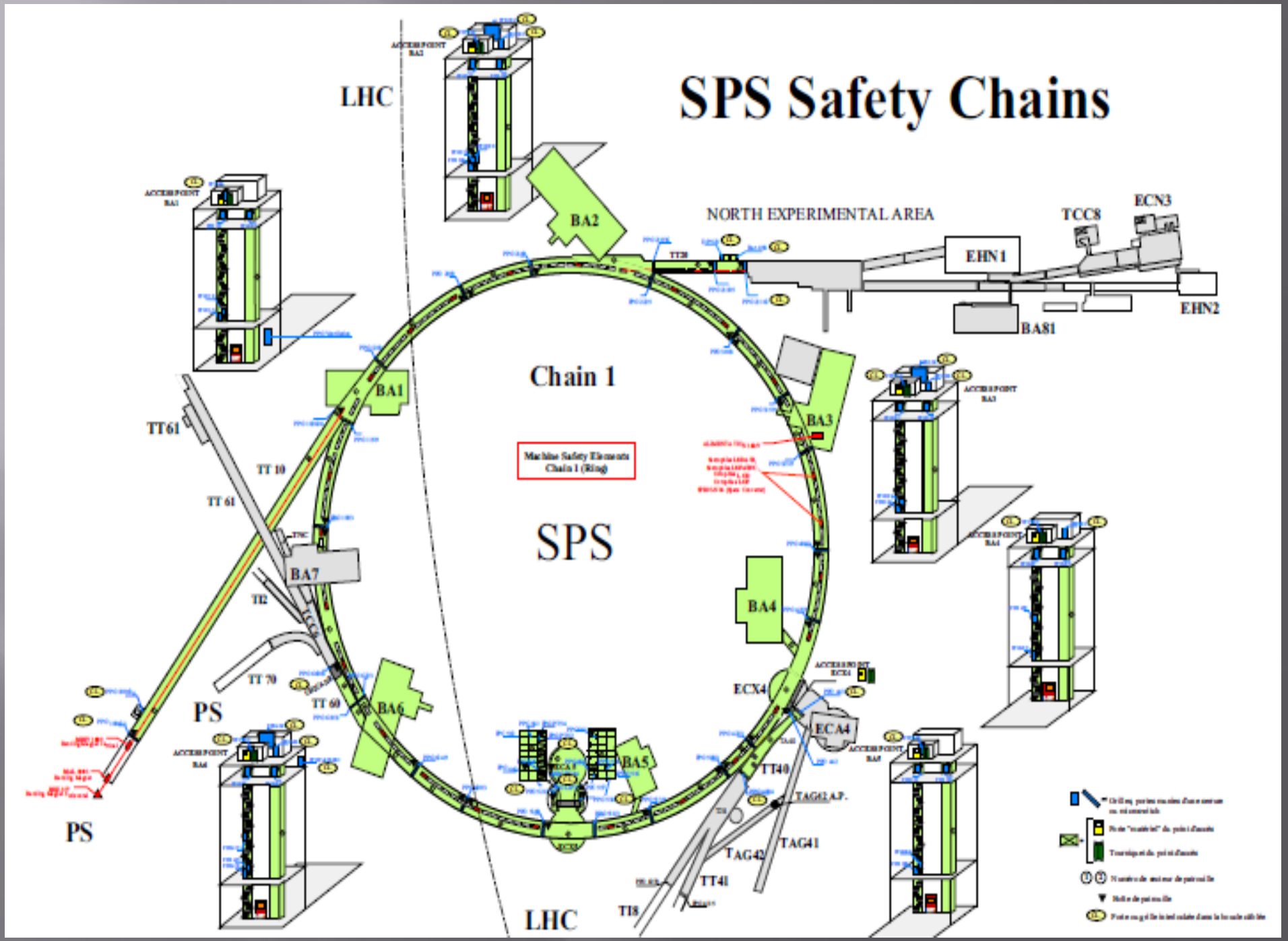
Example of how this works in Practice

Changing of 1 magnet in the SPS

Magnet change campaign (ACCESS VIA BA3)	2.88 days	Jeremie Bauche	TE/MSC
Cooling water circuit 5- & 5+ (main magnet) PURGED	2.88 days	Bill Bannister	EN/CV
Magnet 51510 (QD)	2.88 days	Jeremie Bauche	TE/MSC
Vent vacuum circuit 520	2 hrs	Paolo Chiggiato	TE/VSC
Cut bus bars	10 mins	Jeremie Bauche	TE/MSC
Disconnect magnet from Vacuum system	30 mins	Paolo Chiggiato	TE/VSC
Magnet exchange (Transport)	4 hrs	Caterina Bertone	EN/HE/HH
Magnet alignment (Survey)	0.5 days	Patrick Bestmann	BE/ABP
Reconnect magnet to vacuum system (Vide)	30 mins	Paolo Chiggiato	TE/VSC
Pump vacuum sector 520	12 hrs	Paolo Chiggiato	TE/VSC
Re-braze magnet to bus bars	2 hrs	Jeremie Bauche	TE/MSC
Refill water system	0 days	Bill Bannister	EN/CV



- Coordination of work between 5 separate groups
- Breaking of the vacuum
- Cutting of cooling water systems
- Isolating of main power supplies
- Transportation of a large magnet around the SPS
  - For the main dipoles (MBA's and MBB's): w- 80cm x h- 65cm x l- 6.5m ; weight 18 tons
  - For the main quadrupoles (QD's and QF's): w- 80cm x h- 80cm x l- 3.5m ; weight 8.5 tons


SPS Safety Chains
LHC
NORTH EXPERIMENTAL AREA
TCC8
ECN3
EHN1
EHN2
BA81
BA2
BA1
BA3
BA4
BA5
BA6
BA7
Chain 1
Machine Safety Elements
Chain 1 (Ring)
SPS
TT61
TT 10
TT 61
TI2
TT 70
TT 60
PS
PS
ECX4
ECA4
TT40
TAG42 A.P.
TAG42
TAG41
TT41
TI8
LHC

Changing a magnet in the SPS

- Preliminary meeting
  - Ensure that all groups are aware of what they need to do and when.
  - Coordinate with planning to find the best time in the schedule to do the work.
  - Identify any radiation issues. *(How hot is the area being worked in?)*
  - Identify any safety issues. *(Arrange a VIC if necessary)*
  - Ensure that all equipment to be used has been fully tested and certified. *(lifting equipment etc)*
- Inform all parties working in the affected areas of the planned work
  - E-mail
  - Weekly planning meeting
  - Notice boards in the affected areas
- Ensure that the planning is respected!!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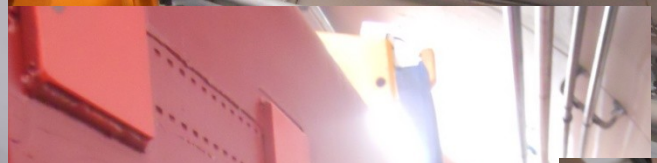


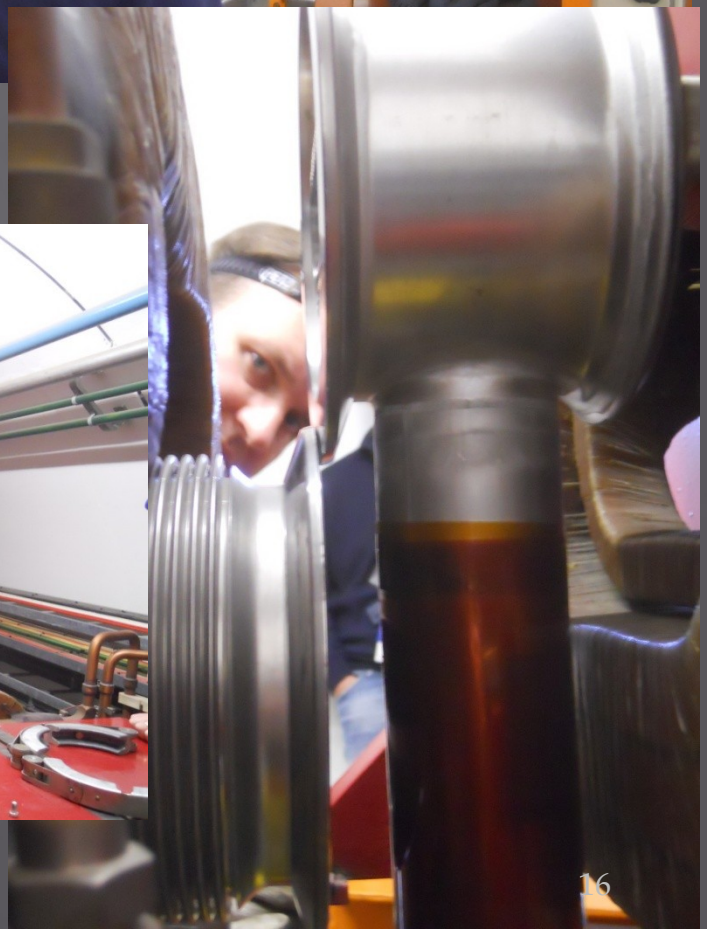

Completion of work

- Once work has been finished, it is imperative:-
  - That the area is clean and has been made safe.
  - That the coordination team and everyone involved is informed.
  - That all permits and consignations are signed off.
  - That the planning is updated.

Handing the SPS back to Operations

EDMS N° : 1052987

BEAM PERMIT SPS / 2011 Beam is permitted once all sections have been completed correctly and signed

ZONE : Main ring and transfer lines TT10, TT20, TT40 and TT60

1 - Shutdown works complete: The EN *Please note any exceptions or additional rema*	Name: Superintendant EN/MEF responsible of the zone or GLIMOS responsible of the experience Signature: Date:
2 - Access system Functionality: The access system for the machine/zone is pu eration. The safety and control functions are operational. Any bypass or strap of EIS must be properly reported. *Please note any exceptions or additional remarks:*	Name: GS-ASE-AC Signature: Date:
3 - Patrol The area is nce of a nne in the zone when key distribution system is put back in place. *Please note*	Name: Patrol leader or Shift Leader on duty in CCC Signature:
4 - BE-DS The purpose unctions ccess s procedures. *Please note*	partment Signature: Date:
5 - Radiation protection The DGS-RP technician checks the absence of unnecessary material in the zone and t diation shielding are in place. Radiation sign posting is in place. Limitations on beam operation can be expressed in accordance with reduced shielding. Radiation mor ystem (measurement, alarm functions and alarm transmission) is operational. *Please note any exceptions or additional remarks :*	Name: DGS-RP-AS or designee Signature: Date:
6 - Final Authorisation At this point the machine is c ve been made in writing. *Please note any exceptions c*	Name: Group Leader BE-OP or deputy Signature: Date:
7 - Beam Permit suspension Date of suspension: Date of re-activation: **7 - Beam Permit cancellation** ☐ Cancellation during the run Date of cancellation: ☐ Cancellation at the end of the run (The beam is stopped and all safety equipment are consigned)	Name: Suspension by any qualified person / Annulation by Group Leader BE-OP or Deputy Group :
Explanation or related documents :	Signature: Date:

Superintendant's signature

SPS Ring Patrol
EPC start up checks
Cold check out tests
DSO Tests

Minimum 2 weeks

Operations Group leader signature

Final remarks

- Safety is not there to make it harder or more difficult for you to do your work.
  It is there to ensure that your work is done without danger to yourself, others or to the equipment or the accelerator itself
- We want you to go home at the end of the day in the same condition you arrived, free from harm, injuries or work-related illness.
- EVERYONE is responsible for safety!