ISOLDE Technical Report for the ISCC meeting 12th November 2007

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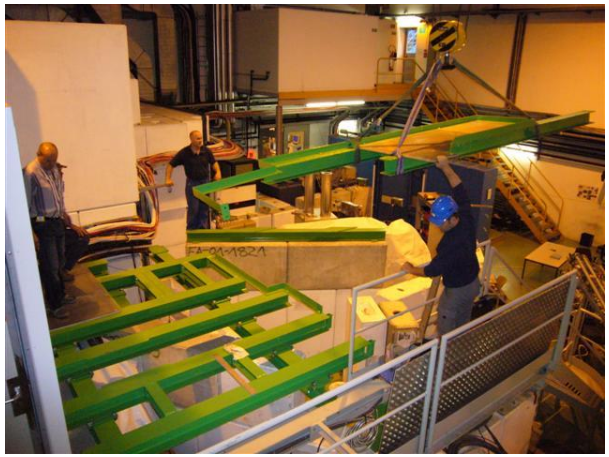
Main Topics

- Installation of RFQ into HRS beam line
  - Preliminary tests
- HRS slits
- Ventilation
- REX
- Target and ion source development
- Shutdown Planning
- Staff and support

RFQ Installation



http://ab-div-op-iso-rfqcb.web.cern.ch/ab-div-op-iso-rfqcb/Installation.htm

RFQ Technical Difficulties

- Platform
  - Ordered in January, delivered in August!!
- HT transport
  - Home made “Boris tube” design by AB-PO
- Vacuum installation
  - Reduction in manpower of AT-VAC
  - Access to HRS separator area
  - Creation of a new vacuum sector
- Alignment
  - Access and observation
- Connector feedthroughs
  - No longer in stock
- Electrical power
  - Currently on temporary network
- “Unforseen” technicalities
  - Cabling, mechanical, interlocks, dismounting and re-assembly

An enormous effort by:

- Erwin Siesling (AB-OP)
- Pascal Fernier (AB-OP)
- Jerome Helen Sarret (AB-ATB-IF)
- Ermanno Barbero (AB-ATB-IF)
- Hannah Franberg (AB-OP)
- Pierre Delahaye (PH-IS)
- Julien Parra-Lopez (AB-PO)
- AB-OP, AT-VAC, AB-PO, TS-CV, TS-EL, SC-RP, AB-ATB, PH-IS

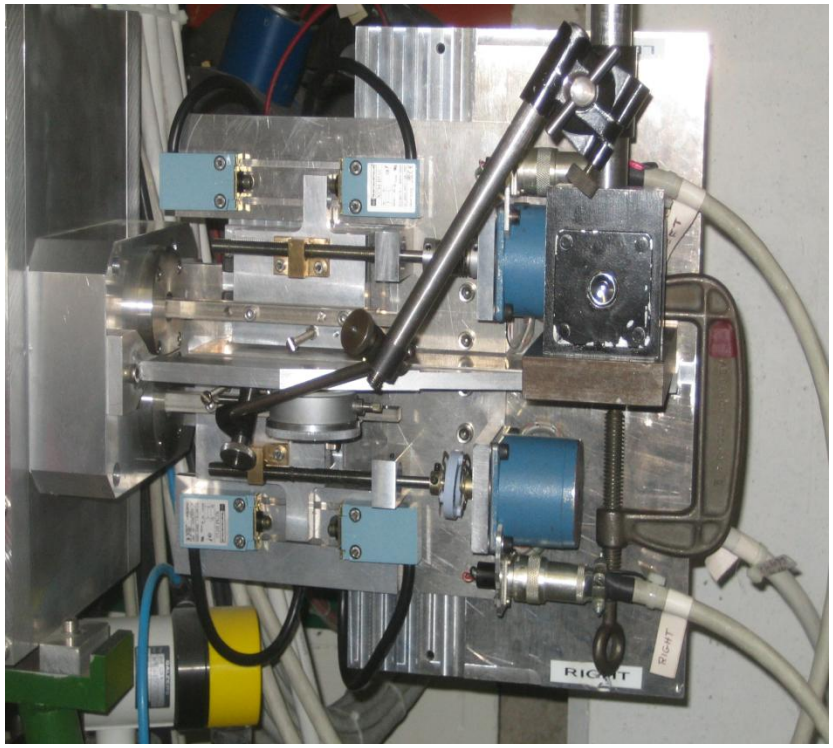
Preliminary Results

- Transmission

Ions	On-line	Off-line (275)
23Na	50%	27%
39K	>75%	60%
85Rb	~80%	n/a

- Space charge limitations seen at (measured with 39K) 2e7 ions/bunch (~ 2 orders of magnitude higher than ordinary RFQC).
- The tuning of the beam after the switchyard is much easier than before, COLLAPS measured a very nice low emittance parallel beam coming to their set-up in the end of the CA0.LA3 beam line.
- On-line work done by:
  - Pierre Delahaye, Hanna Franberg, Magnus Eriksson, Pascal Fernier, Erwin Siesling and Ivan Podadera,

Slit System

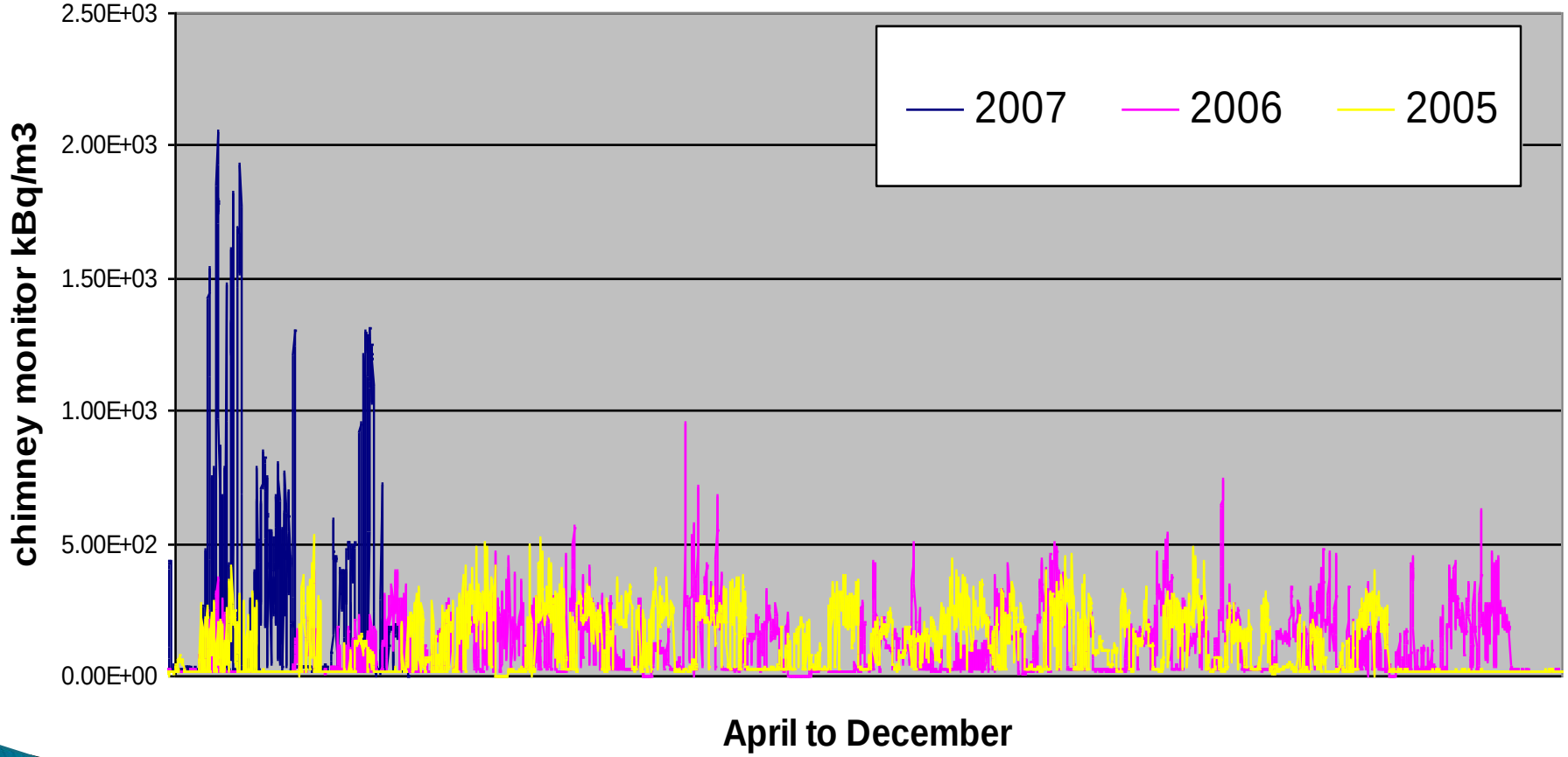


- Reminder:
  - Orphan equipment
  - Had to be used manually
  - No reference position
- Refurbished:
  - Revised conception and mechanical parts
  - Plc driven via touch screen in control room
  - Configuration calibration and set up calibration
  - Fast in/out, gap width adjustment, offset
  - User friendly visual display interface
  - Accurate to 5µm, hysteresis of 50µm.
  - Full documentation

Thanks to Pekka Suominen and Erik Asen

Ventilation

Air activation levels over 3 years as measured in chimney

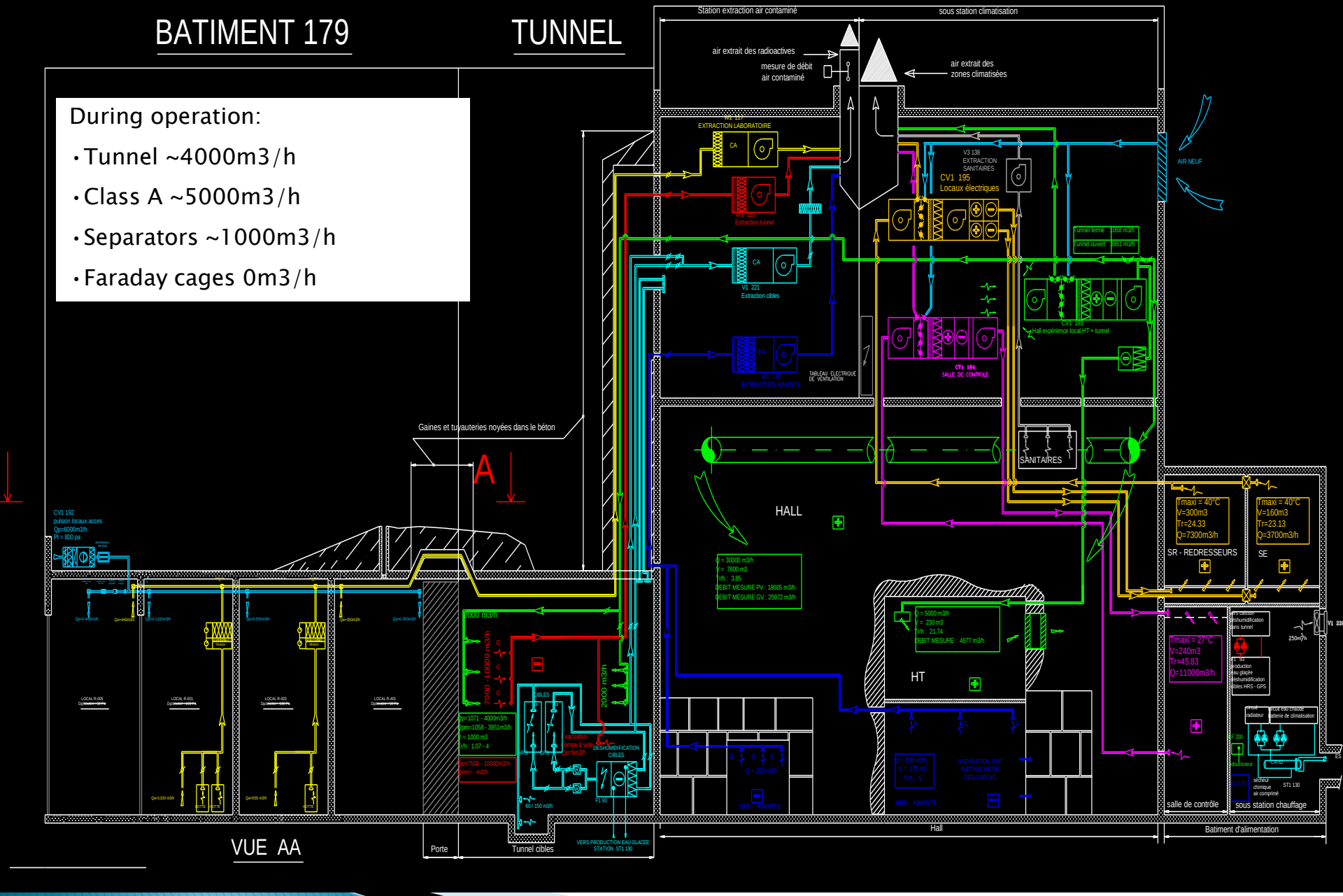


BATIMENT 179

TUNNEL

During operation:

- Tunnel ~4000m3/h
- Class A ~5000m3/h
- Separators ~1000m3/h
- Faraday cages 0m3/h



Ventilation

- List of actions undertaken at the ISOLDE facility during weeks 21 & 22:

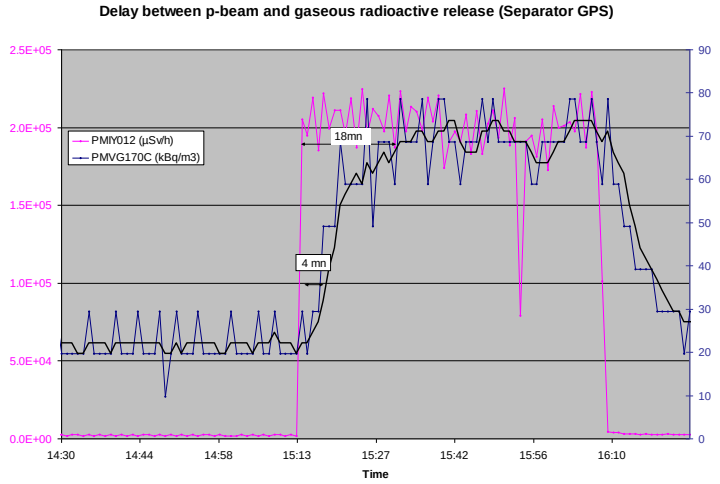
- **Overall verification of ventilation at ISOLDE > ST-CV**
  - **Verification of debit at extraction.**
  - 10000m3/h in operation mode measured by both SC and ST-CV. This compares to 14000m3/h measured in 2006 and 2005 (but measured with a different anemometer).
  - **Verification of pulsed air.**
    - OK, compares to last year
  - **Verification of closed circuit operation (from outside).**
  - All hard wired signals found to be OK

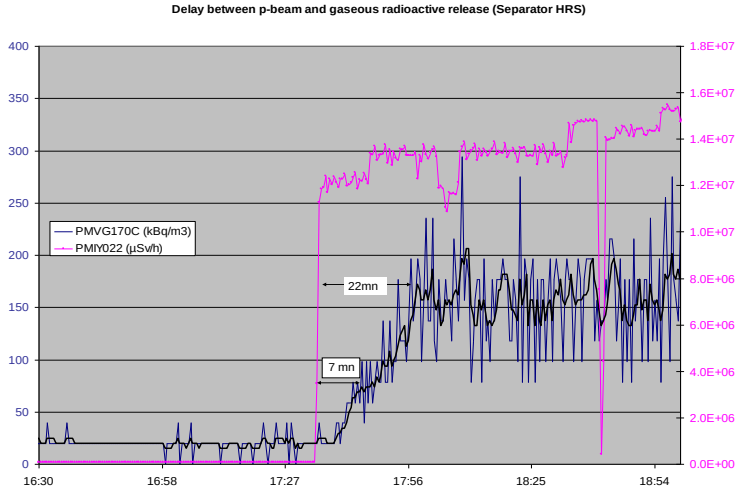
- **Intervention in tunnel**:
  - Observation of dehumidification equipment (part of closed circuit).
    - Seems correct, no panels removed, no new openings
  - Air tightness of faraday cages
  - OK, no compressed air leak
  - Measuring of potential beam loss “hot spots” along BTY beam line.
    - Nothing greater than 7uS/h background measured
  - Verification of valves and motors of closed circuit
    OK
  - Verification of pulsing and extraction in tunnel
    OK

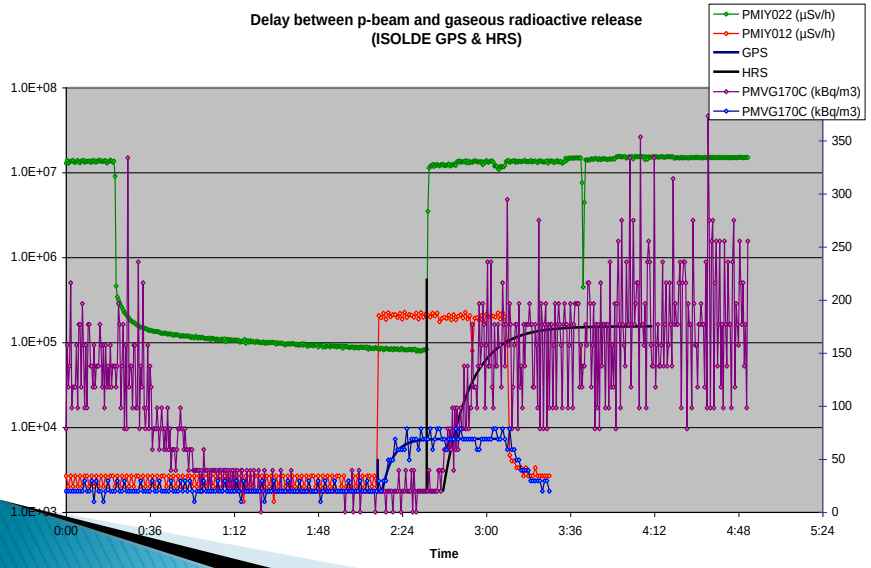
Ventilation

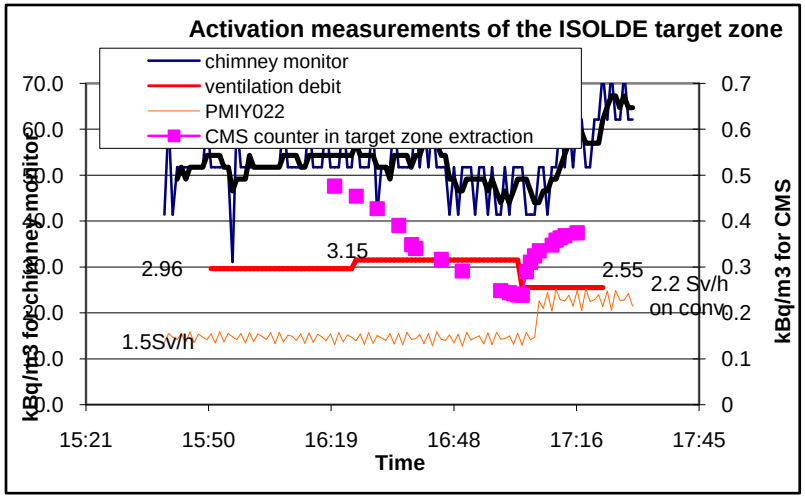
- **Fine tuning of p-beam, monitoring of BLM's, improvement of irregularities in ring 4.**
  - No improvement of situation
- **Clarification of activity measurements**
  - P. Vojtyla (SC-RP) confirms calibration of measuring device using a fixed source. Calculations account for reduction in extraction debit.
- **Verification of exhaust gas collection system.**
  - OK
- **Graphs of air activation**
  - Air activation monitored as a function of p-beam intensity.
  - Measurements compared to those of 2006 and 2005.
- Measurements as a function of ventilation debit

Ventilation

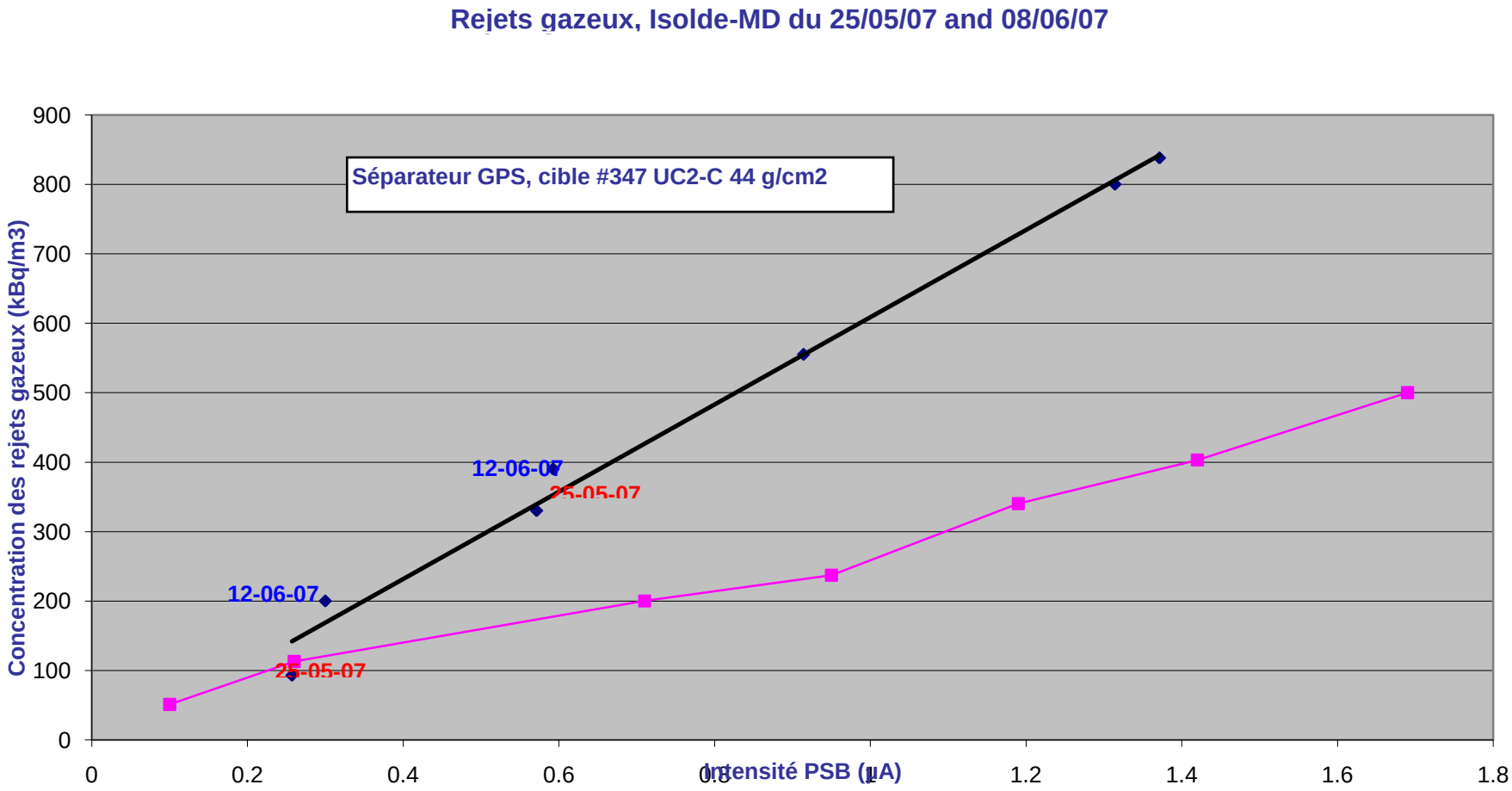








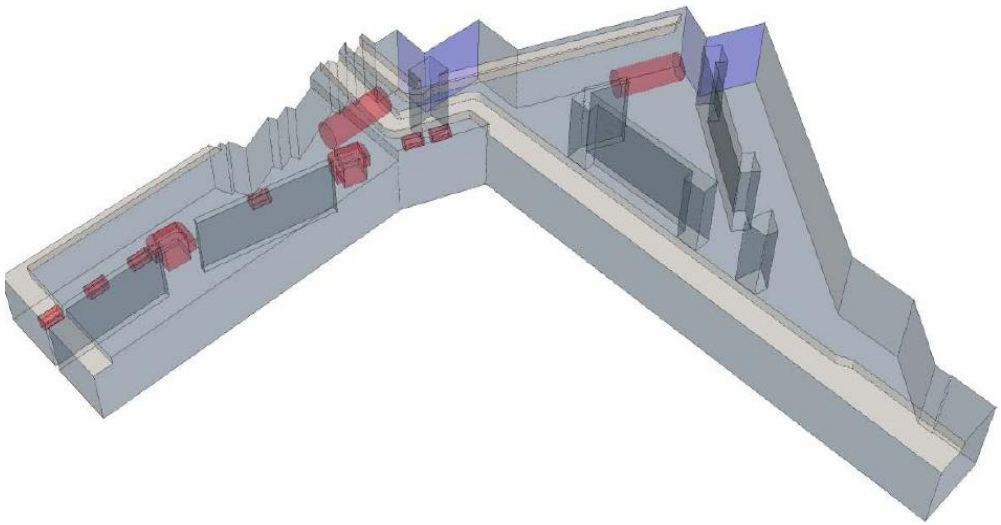
Ventilation



Installation of alarm at CCC

Activated at 500kBq/m3 at extraction chimney (corresponds to ~0.7uA)

Ventilation: Outlook



- ST-CV currently working on air flow simulations
- Modification of extraction and pulsing of air flow in the tunnel during the shutdown
- Replacement of ventilator motor in hall

REX Operation

Highlights and beam statistics

- In total 3 new elements (Sr, Ba, Hg) and new 8 isotopes were delivered for physics, coming either as single ions or molecular ions from ISOLDE.
- One of the experimental runs could be carried out in spite of a malfunctioning trap by operating the EBIS in continuous injection mode. This opens up future possibilities with the RFQ cooler now installed and operational.
- The REX-ISOLDE post accelerator has this year also seriously entered the arena of heavy beams by accelerating light Hg isotopes to full linac energy.
- Molecular sidebands from ISOLDE are not always the solution, e.g. 148BaF contaminated with 148NdF.

Technical problems

- Sparking inside the REXTRAP due to deposits on insulators. Has been repaired.
- Trap CS stopped working after a patch update of the general Windows environment at CERN. Has been corrected.
- Sparking occurs inside the IHS cavity for power levels higher than 60 kW. To be investigated this shutdown.
- The beam tuning of the Linac has not been reproducible since the Minimove, causing occasional poor transmission. Still under investigation.

REX: Technical developments achieved

- Minimove completed (background level in Ge detectors really changed?)
- New control system for the REXEBIS (almost finished) and for the beam diagnostics
- Closed circuit ventilation in RF room installed
- 9-gap amplifier now able to operate at full power

- Future ideas and development
  - Verify mass selective cooling inside REXTRAP under realistic circumstances -> ask for a test run
  - Investigate polarised beams
  - Emittance measurements after the linac
  - Hope to test O,C and N (as single ion or molecues) if Minimono gets operational
  - Test pulsed and continuous beams from the RFQ cooler
- Operation
  - Transfer daily operation to the ISOLDE IEC team
  - Different (longer) setup procedure foreseen next year

Target and Ion Source Production

- Developments:
  - Bi-valve target
    - Successfully tested
  - Minimono target
    - Failed at beginning of run after initial testing
    - 2008: address design, construct 2 magnetron control interfaces for off-line and on-line use.
  - SiC
    - Tested successfully for F production
  - Temperature controlled quartz line
    - Temperature controlled line tested for alkalis but no Cd seen. Reason due to polluted window in HRS magnet preventing laser ionization

Shutdown

- Consolidation of RFQ installation
  - Vacuum, controls, power supplies
  - Removal and replacement??
- Water distribution panel (orphan)
  - Separate target cooling from vacuum sequence
  - Support from ST-CV
- Tape station
  - Revived project with Strasbourg collaboration
  - Delivery promised for April 2008, end of beamline installation in May 2008
- Robot cameras
  - Improve current camera situation
- Ventilation
  - Modification of ventilation system in tunnel
- Vacuum consolidation
  - REX, overall vacuum controls
- Front end #6
  - Prepare installation of FE6 at HRS

Staff and Support

- AB-ATB-IF expects to lose 7 persons over the next 12 months. Consequences: target testing program and technical support for projects. 2009 > target production
- Most grateful for support from collaboration and PH for UPAS
- Concerned about external support from other CERN groups…i.e. vacuum, RP, ST-CV