Licensing Procedure

Safety approach

Safety, Radiation protection and Environment (SRE) Team

Licensing Procedure

- Technical Proposal for the SPIRAL 2 instrumentation December 2008 (part 4)

- Main steps phase 2 of SPIRAL2 project):
  - DAM report : Included a short preliminary safety report
  - SPIRAL2 project has to send a preliminary safety report at least one year before starting the buildings construction

⇨ SRE team needs to work with DESIR section, for …

DESIR Safety (1/2)

- Three main points :
  - Dose rate : < 25 µSv/h
  - Contamination : < 0,4 Bq/cm²
  - Radiological impact :
    - Below 1 µSv/year in normal conditions
    - Below 50 µSv in case of accident

  …and respect the limit of 80 µSv per month around the building (< 0,5 µSv/h)

- Radioactive Ion Beams from :
  - S3 : short lived neutron-deficient ions, with intensities about 10^6 pps
  - SPIRAL1 : light and short lived ions, with intensities up to 10^9 pps
  - SPIRAL2 : intensities as high as 10^{12} pps are expected in the production building

DESIR Safety (2/2)

- We need to check beam intensity, and if necessary, composition, before it is sent to DESIR :
  - IBE, …
  - Transmission of experimental setup (HRS for example)

- Safety approach (dose rate and contamination) is done with one beam in normal running conditions:

  <u>132</u> : Sn (40 s)-> Sb (2,8 m)-> Te (3 days)-> I (2 hours)

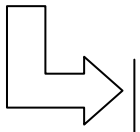
- We consider other beams to check :
  - Radiological impact on worker and public in accidental scenario
  - Shielding, inside and outside the building (< 25 µSv/h and 80 µSv per month) in the case of energetic γ-rays

Dose rate

- Radiation detection systems located close to the beam path will allow stopping the beam delivery to the DESIR building if dose rate thresholds are reached (≈ 10^7 pps for ^{132}Sn)
- OGS : Annual dose < 2 mSv/year per worker :
  - In Green Zone, maximum of 80 hours
  - we need to estimate time of intervention (**ALARA** approach) for :
    - GANIL physicians (per year)
    - DESIR physicians (per experience)
- We need to work for :
  - Advanced design of experimental setups, included shielded and forbidden area
  - Optimization of radiation detection systems (≈ 5 k€ / detection point)

Contamination

- The RIB induced activity must be confined at any time in the beam lines or in the experimental setups, even at the end of an experience (≈ 10^6 pps for ^{132}Sn)
- SPR needs to check contamination before any opening operations (like today in GANIL)
- We have to work on technical approach, especially in the case of contaminated equipments (vacuum pump for example)



How does it works in other place all around the world ?

See solutions under study for the production building (transport zone) ?

Radiological Impact

- All gases extracted from the beam lines and the experimental equipment (in operation as well as during aeration sequences) will be temporarily stored in dedicated storage devices (balloons, bottles,…) located inside the DESIR building.

- The worst accidental scenario is the direct release of the gases :
  - Check of the vacuum pumps before starting an experience,
  - Measurement of atmospheric contamination

- Other “classical” accidental scenario :
  - fire (≈ 10^{11} pps for ^{132}Sn)
  - …

Conclusion

- We need to :
  - Find the best way to control beam intensity and composition (level of safety of these equipments),
  - Organization of the experimental room to check OGS (2 mSv/year)
  - Check risks of contamination in normal conditions

⇨ write the preliminary safety report

Thank you for your attention