



# IRE ongoing effort to develop reliable LEU Mo-99 supply

**Valery Host**

**Mo-99 Topical Meeting 2016, St. Louis**



**Excellence dedicated to nuclear medicine, healthcare and environment**

# Institute for Radioelements

- **175** employees
- Missions
  - **Contribute to public health**
    - ✓ Major producer of I-131
    - ✓ First producer of Mo-99 for Europe
    - ✓ Outstanding performances (QoS, release, dosimetry...)
  - **Environmental protection**
- Continuous investments for **innovation**, modernization and **safety** improvements

institute for  
radioelements **IRE**



# from diagnosis to therapeutics



Galli Eo 

$^{68}\text{Ge}/^{68}\text{Ga}$  generator



Yttri Eo 

$^{90}\text{YCl}_3$  solution

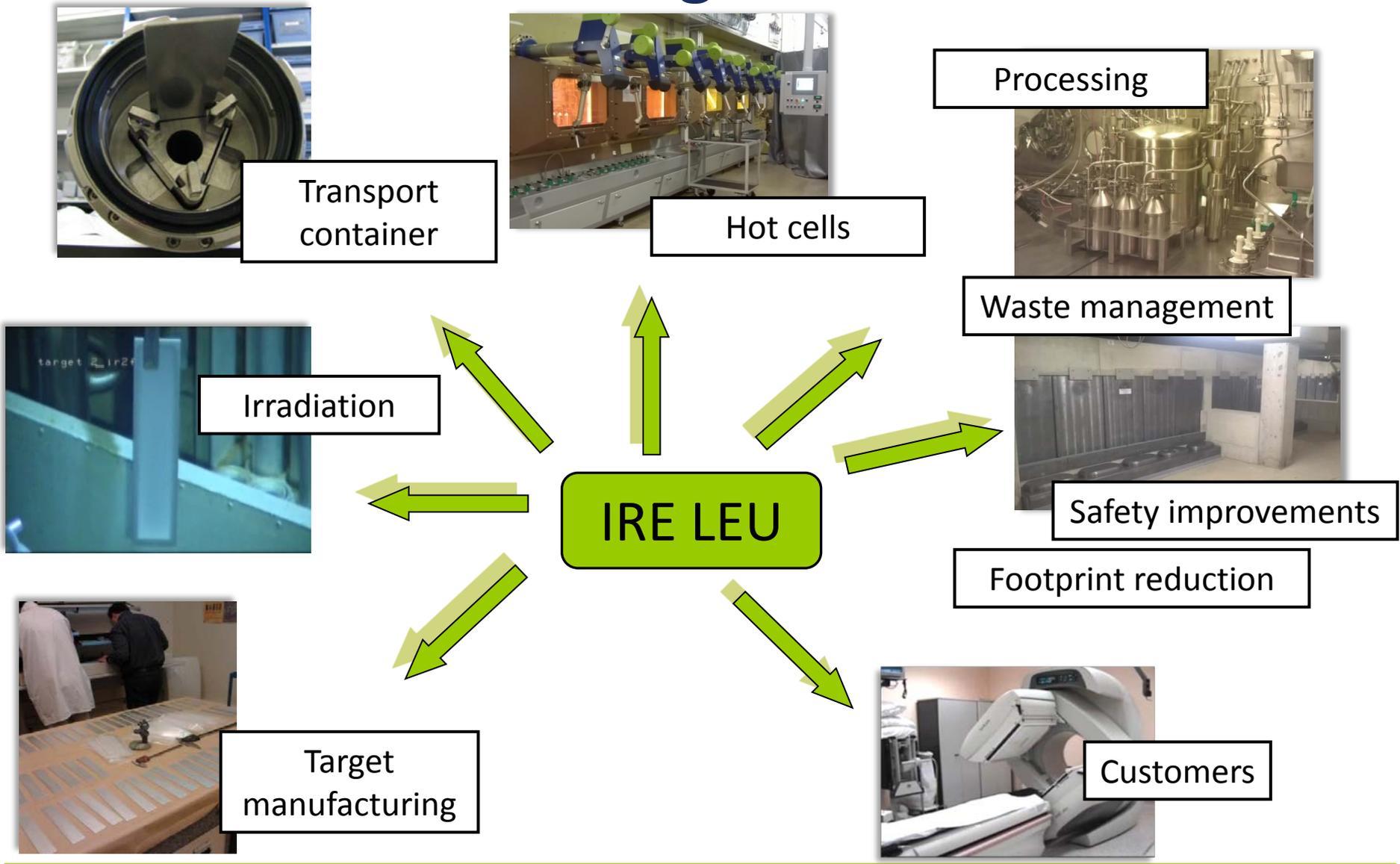


Rheni Eo 

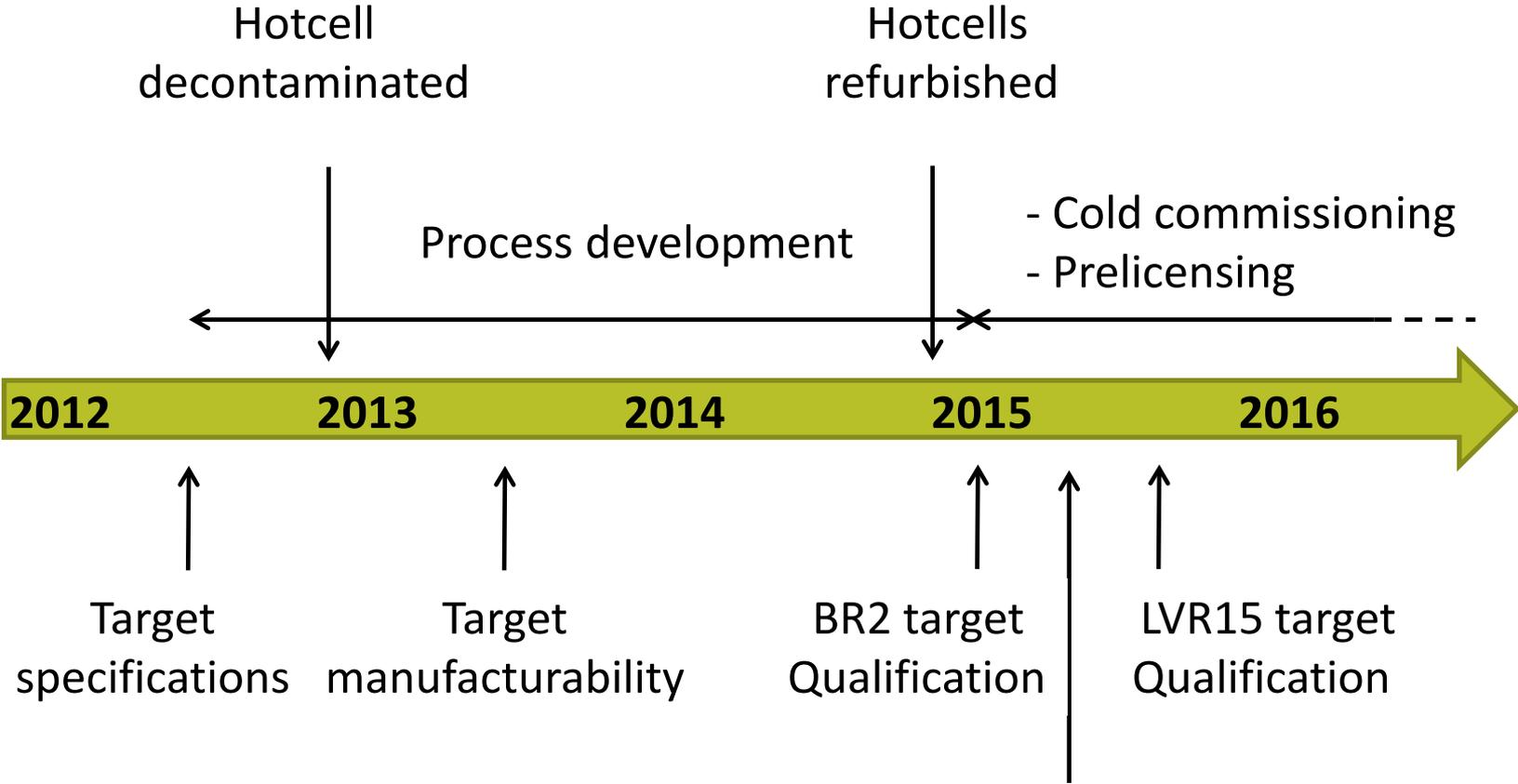
$^{188}\text{W} / ^{188}\text{Re}$  generator



# LEU conversion challenges



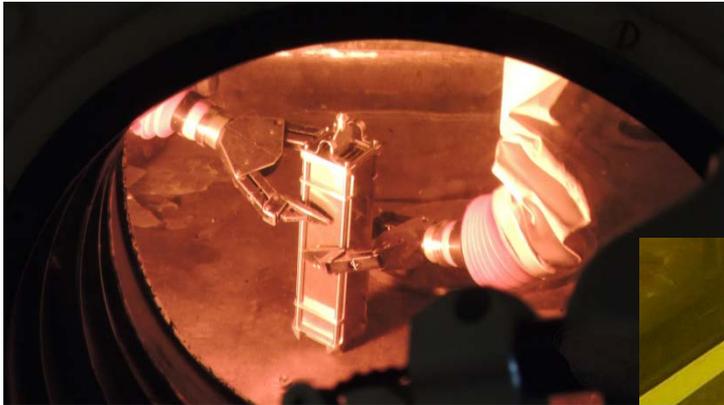
# IRE conversion : achievements



Approval of target transport container...

# LEU target qualification in European reactors

- Innovative target
- Target qualification in BR2 and LVR15 completed
- LEU Target irradiations scheduled in HFR



Courtesy LVR15



Courtesy SCK-CEN

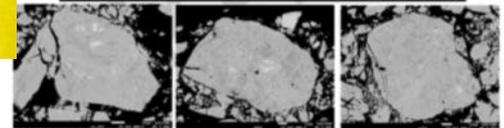
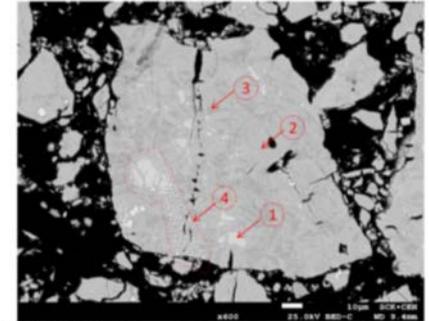
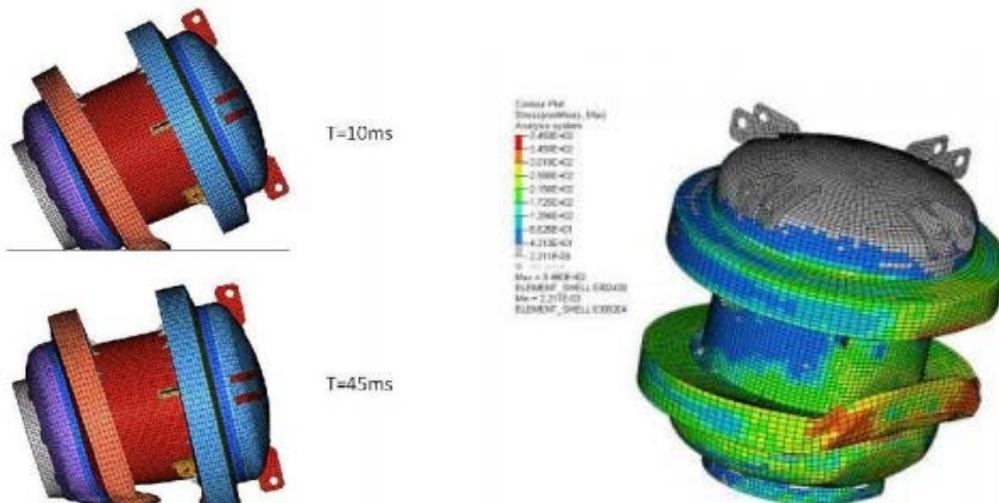


Figure 7 Backscattered electron images of several fuel particles showing a contrast in density.

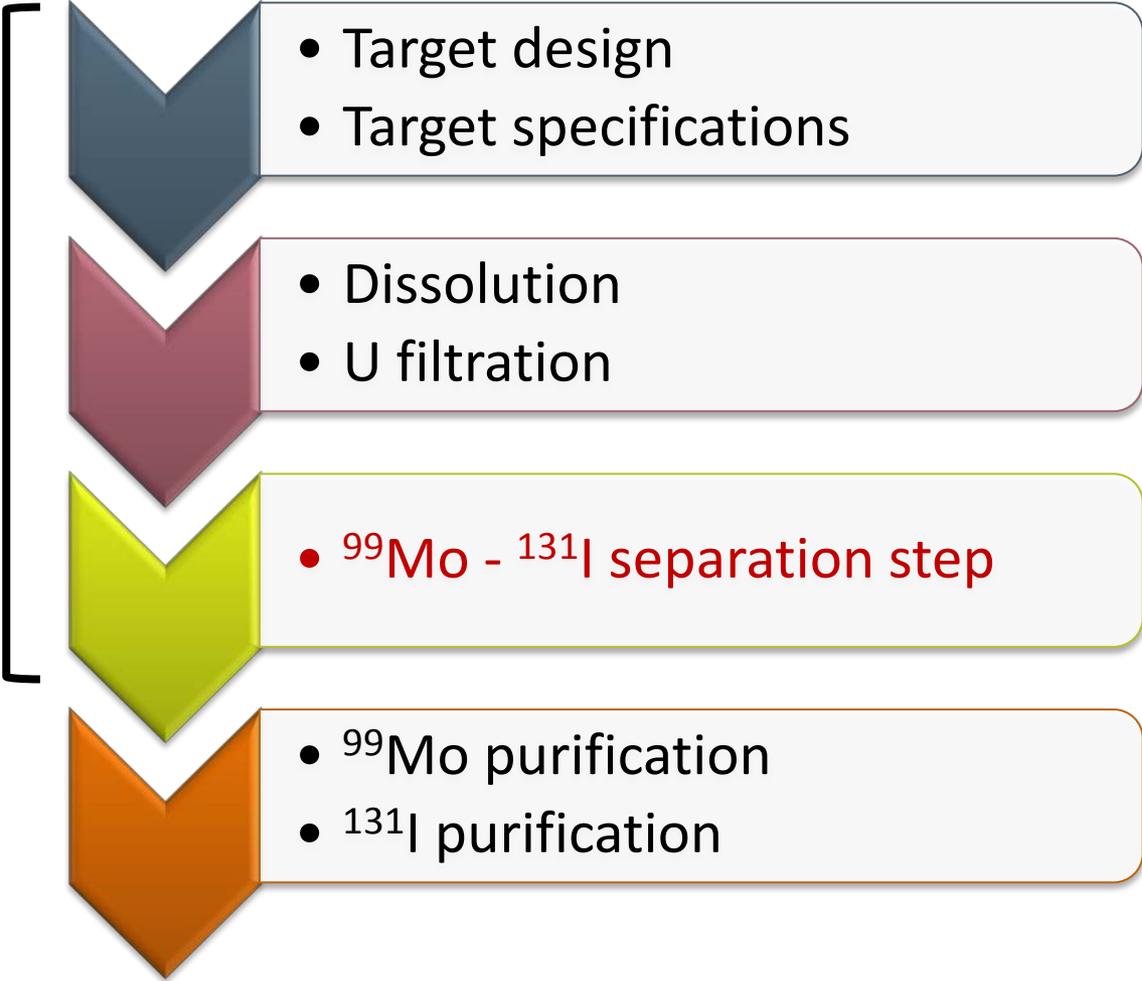
# Transport container

- Modified container and overpack
- New transport license have been obtained !
- BUT license temporarily withdrawn
- Special arrangement for France and Belgium
- On going for NL, D, CZ



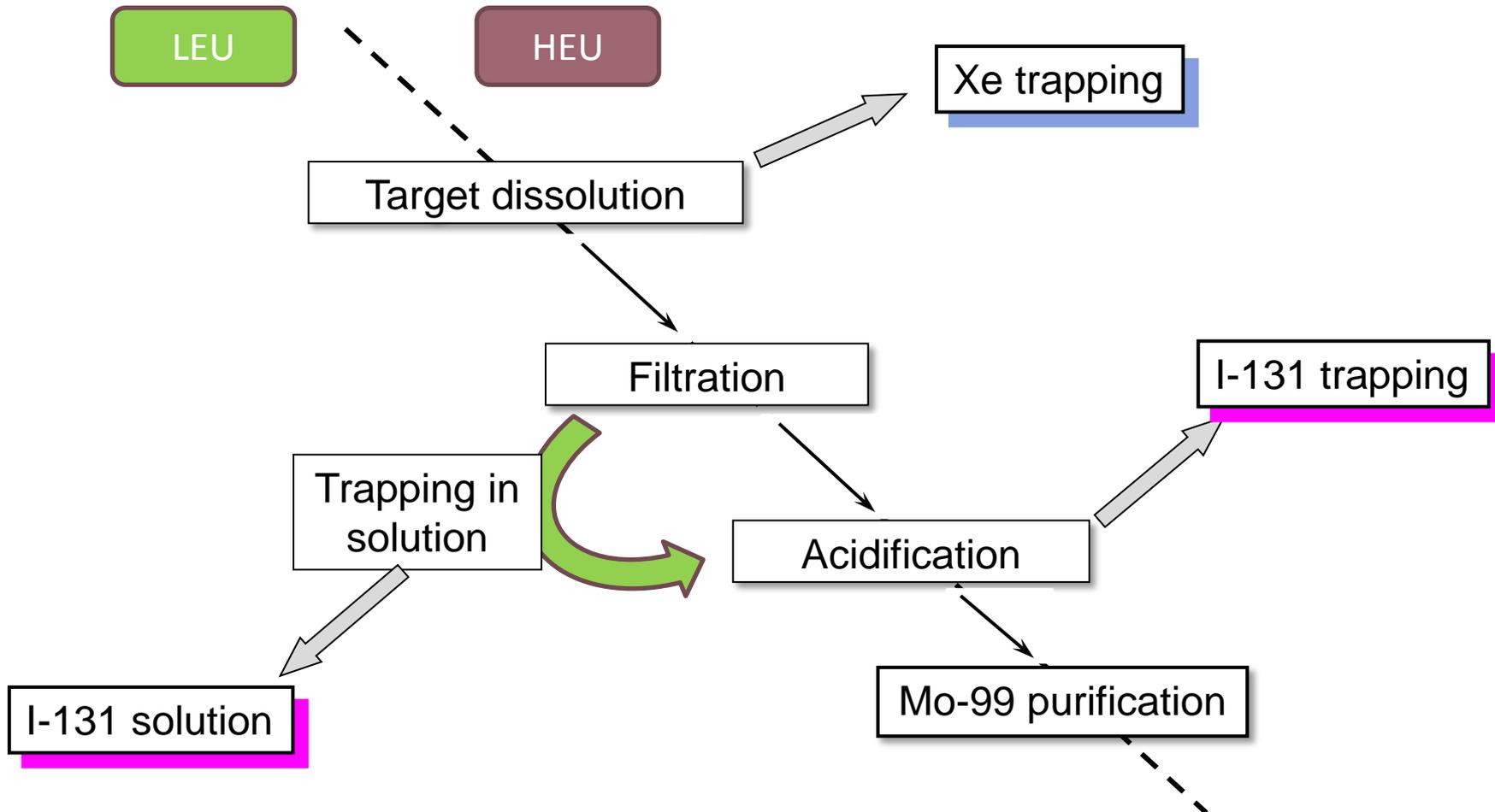
# Process modifications

LEU conversion impacts



→ Improved safety

# 2. IRE LEU process at a glance



# Cold commissioning

- Increase progressively the batch size
- Processing on Al plates and non-irradiated uranium targets
- Spike with limited amount of activity
  
- Develop new Standard Operating Procedures
- Perform operator training
  - New production environment
  - Process
  
- Numerous successful runs have been already performed



# Cold commissioning issues

- Higher impact of target specification on processing
- >100 tests have been performed
- Very high impact on filtration
  - Different filtration procedure
  - Equipment modifications
  - Impact on waste production
- Additional resources have been allocated
  - R&D
  - DU then LEU plates
  - > 200 LEU targets have been processed



# Processing authorization



filiaal van het FANC | filiale de l'AFCN

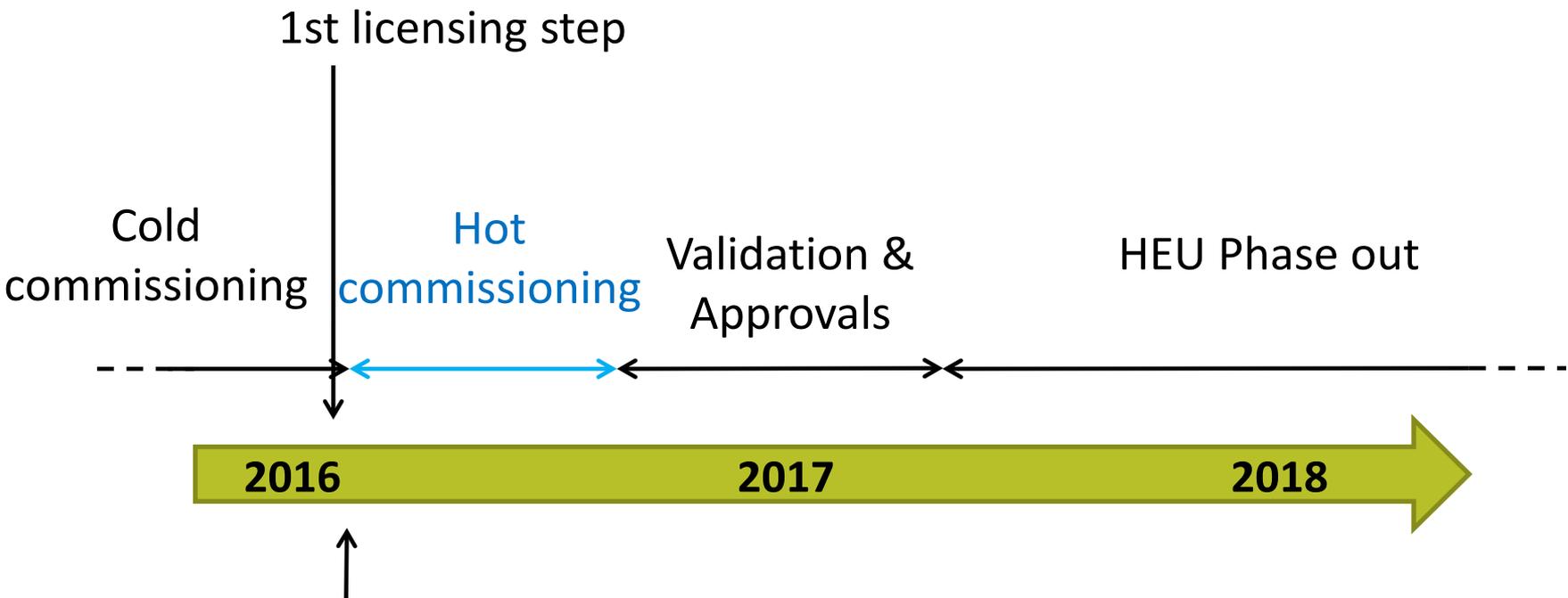
- Pre-licensing achieved
  - Facilitate the licensing
  
- Safety file submitted
  - Technical modifications
    - Process
    - Processing equipment
    - Hot cells
    - Chiller
  - New operating conditions
  - Environmental impact study
  
- First step successful achieved

# Hot commissioning

- Preparing pharmaceutical file modifications with customers
- Ramp-up
  - Increase progressively the batch size
  - Processing of irradiated targets up to full scale
- Validation
  - Full scale runs
  - Regulatory file modifications
- Obtain GMP certificates and validation by customers



# IRE conversion : next milestones

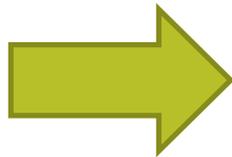


... approval of target transport container

- ✓ Ensuring a reliable, long term <sup>99</sup>Mo supply
- ✓ Progressive transition to full LEU capacity

# Conclusions

- Project running full steam ahead
- Several major milestones have been achieved
- On going cold commissioning with delay due technical issues
- IRE is and remain fully committed to convert its radiosotope production process to the use of LEU
- Shorten phase out if possible



**But no compromise on the  
security of supply**



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