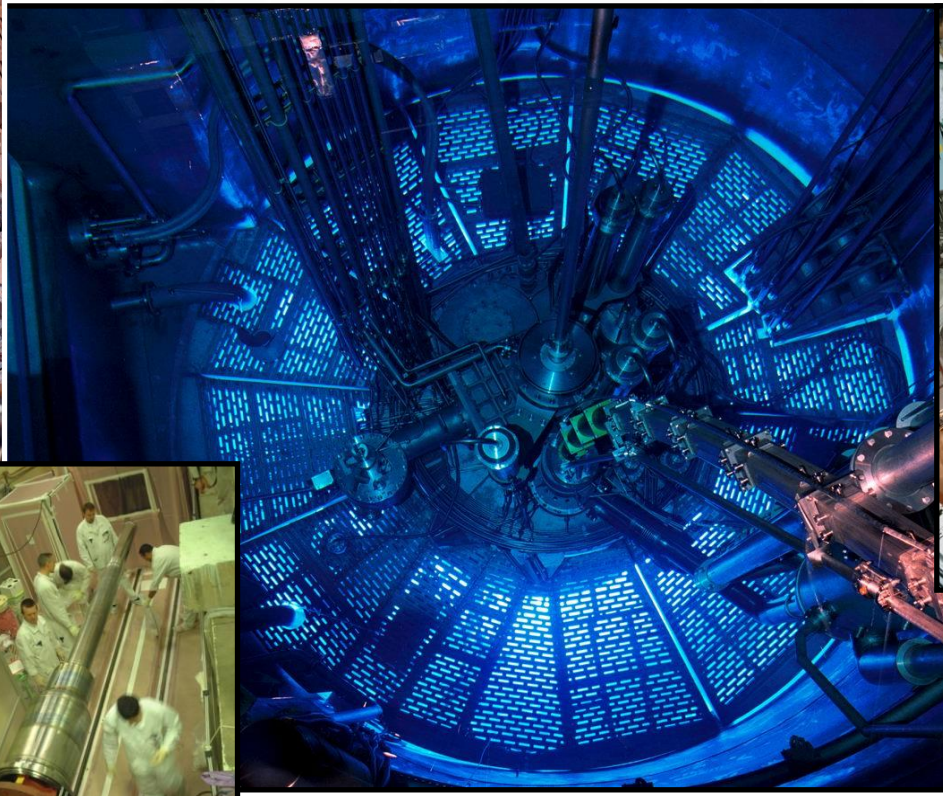
PRESENTATION OF THE NEEDS OF THE ILL



SUMMARY

PRESENTATION OF THE ILL

RESEARCH INTITUTE SPECIALIZED IN USED OF NEUTRONS

- MAIN FUNCTIONS

→ Use a nuclear reactor (50 MW of power) to produce neutrons

→ Transport the neutrons to the physical instruments using:

- At the beginning : Aluminium or Zircaloy Beam tubes
- For further instruments : neutron guides in glass with super mirror coating

→ Use the neutrons to study material or to do fundamental physics

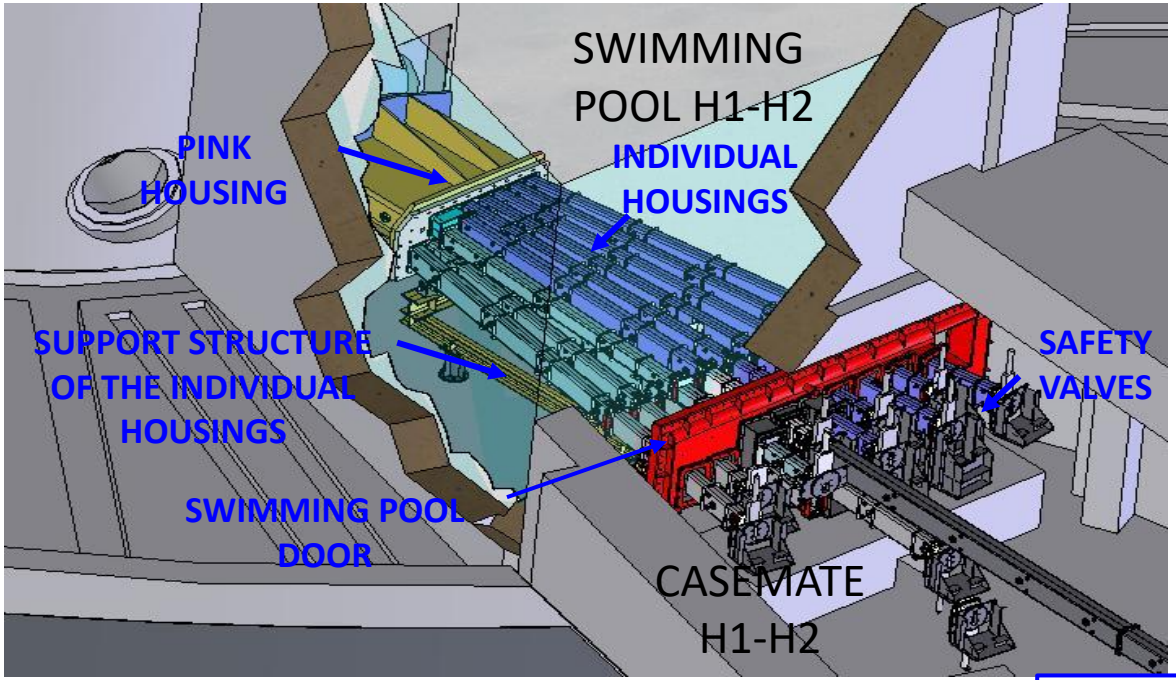
- Needs of optical devices (monochromators, choppers, Analysers, Detectors)
- Needs to reduce the background noise (vacuum vessels, HDPE protection…)
- Needs radiological protections (Steel, Lead, Heavy concrete…)

PRESENTATION OF THE ILL

PRESENTATION OF THE NUCLEAR REACTOR

PRESENTATION OF THE ILL

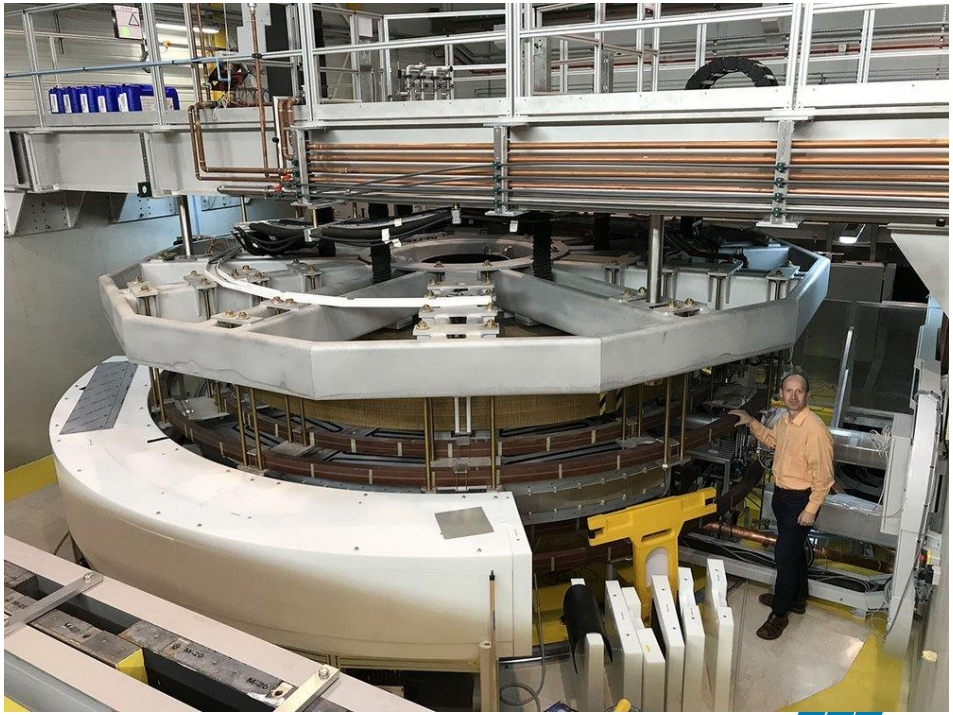
PRESENTATION OF NEUTRON BEAM LINES



Neutron guide

PRESENTATION OF THE ILL

PRESENTATION OF SOME INSTRUMENTS (IN16B and WASP)



PRESENTATION OF THE ILL

- TECHNICAL AREAS OF MANUFACTURING FOR THE REACTOR DIVISION

- NUCLEAR REACTOR = SAFETY AND QUALIFIED PROCUREMENTS

→ General procurement technical rules for reactor parts manufacture

- Protection of the interests must be taken precedence over economic and industrial benefits
- Definition of EIP "Equipment important for the protection of the interests" and and AIP "Activity important for the protection of the interests"
- All designs and manufacturing must follow the INB decrees taking into account the protected interests.

PRESENTATION OF THE ILL

TECHNICAL AREAS OF MANUFACTURING FOR THE REACTOR DIVISION

- NUCLEAR REACTOR = SAFETY AND QUALIFIED PROCUREMENTS

→ General procurement technical rules for reactor parts manufacture

→ What does imply to the supplier ?

- To prove that his workers (and subcontractors) are qualified for the job they have to do (specific quality assurance plan)
- To ensure a perfect tractability of the furniture
- To provide all the required quality documents (Quality plan, welding book, WPS, PQR…)
- To provide all the control documents
- To engage himself to notify the ILL any anomalies noted

PRESENTATION OF THE ILL

TECHNICAL AREAS OF MANUFACTURING FOR THE REACTOR DIVISION

- NUCLEAR REACTOR = SAFETY AND QUALIFIED PROCUREMENTS

→ Addition rules for nuclear pressure vessels (like beam tubes, reactor vessel…)

- Must follow the European directive 2014/68/UE on the pressure equipment
- Must follow the ESPN ASN (French Safety Nuclear Authority) decree of the 30 December 2015,

→ What does imply to the supplier and the ILL?

- A notified "body" (organism) is approved by the ASN to follow the manufacture of the parts
- **The manufacture is under the direction of the approved notified organism**
- All the qualification welders (WPS, PQR), the certifications of the controllers must be approved by the notified body

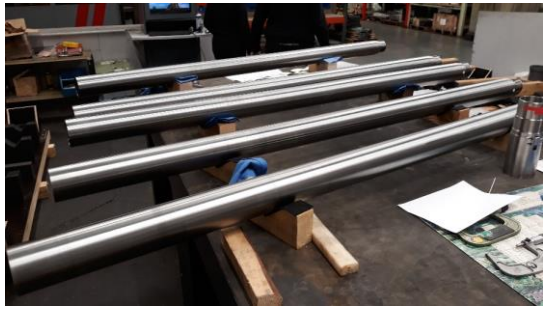
TECHNICAL AREAS OF MANUFACTURING FOR THE REACTOR DIVISION

- Some examples of nuclear reactor manufactures (NO ESPN) - Fukushima project

PRESENTATION OF THE ILL

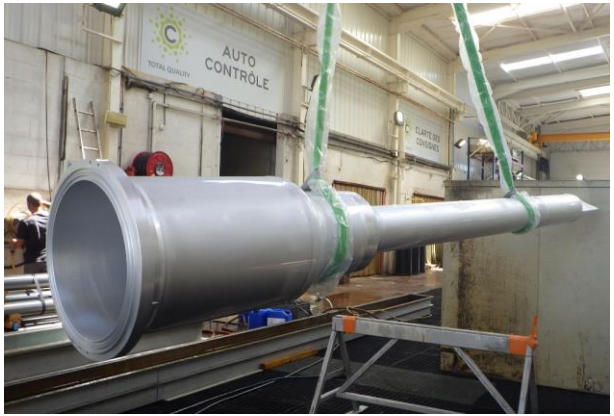
TECHNICAL AREAS FOR MANUFACTURES OF THE REACTOR DIVISION

- Some examples of nuclear reactor manufactures



TECHNICAL AREAS FOR MANUFACTURES OF THE REACTOR DIVISION

- Some examples of nuclear reactor ESPN manufactures



PRESENTATION OF THE ILL

TECHNICAL AREAS OF MANUFACTURING FOR THE REACTOR DIVISION

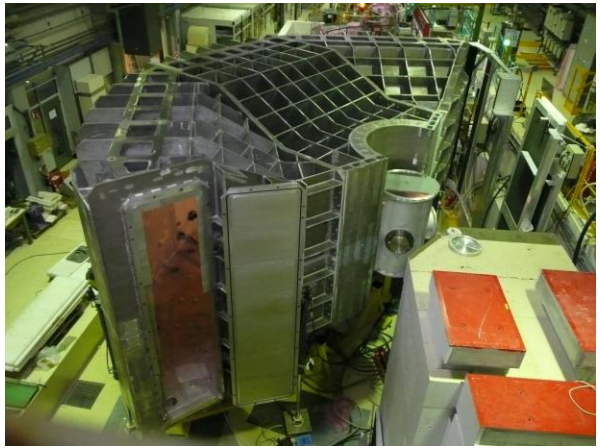
- LIGHTER MANUFACTURING RULES (except for the EIP equipment)

→ What does imply to the supplier ?

- To ensure a good tractability of the furniture
- To provide all the required quality documents for manufacturing (at least : welding book, WPS, PQR…)
- To provide all the control documents

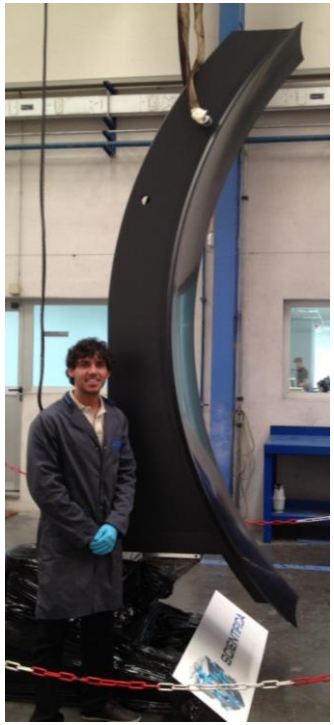
TECHNICAL AREAS OF MANUFACTURING FOR THE REACTOR DIVISION

- Some examples of DPT manufacturing (vacuum vessel)



TECHNICAL AREAS FOR MANUFACTURES OF THE DPT DIVISION

- Some examples of DPT manufacturing (other devices)



FUTURE NEEDS OF THE ILL AND TYPES OF REQUIREMENTS

- FUNCTIONNEMENT OF THE REACTOR DIVISION FOR THE PROJETCS

  → Reactor makes itself the preliminary studies

  → Reactor subcontracts calculations to specific "qualified" companies

  → Reactor subcontracts the manufacture or the installation of equipment to companies with a reliable knowledge (quality)

  → For most of project : French language documentation is preferably required

  → ESPN rules increase really the complexity of the subcontract

  → For the works : companies must have nuclear empowerment (CEFRI, QUALIANOR)

FUTURE NEEDS OF THE ILL AND TYPES OF REQUIREMENTS

- FUTURE NEEDS OF THE REACTOR DIVISION

  → Installation of sprinkler circuit inside the reactor building (2023)

  → Seismic reinforcement of the crane of the level C inside the reactor building (2025)

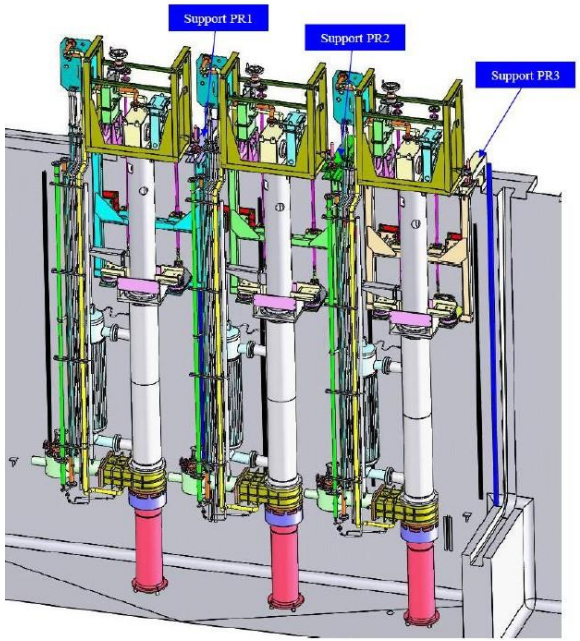
  → Renewal of the horizontal cold source installation (ESPN SKID, ESPN Vessel) (2025)

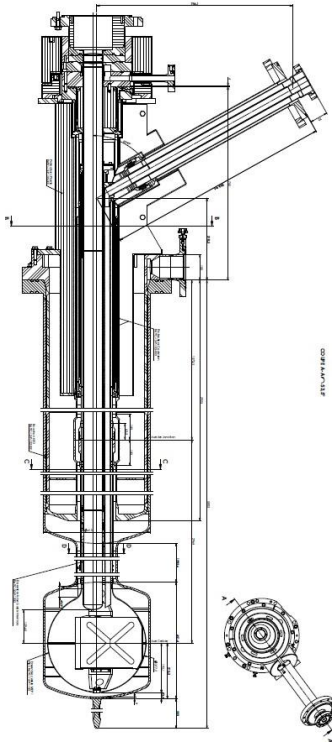
  → Seismic reinforcement of the handling devices of the fuel elements (2025)

  → Manufacture of reactor parts (ESPN) (2028) : vertical cold source, fuel element support…,

FUTURE NEEDS OF THE ILL AND TYPES OF REQUIREMENTS

- FUTURE NEEDS OF THE REACTOR DIVISION





PRESENTATION OF THE ILL

FUTURE NEEDS OF THE ILL AND TYPES OF REQUIREMENTS

- FUNCTIONNEMENT OF THE DPT DIVISION FOR THE PROJECTS

  → DPT makes itself the studies and calculations and mounting

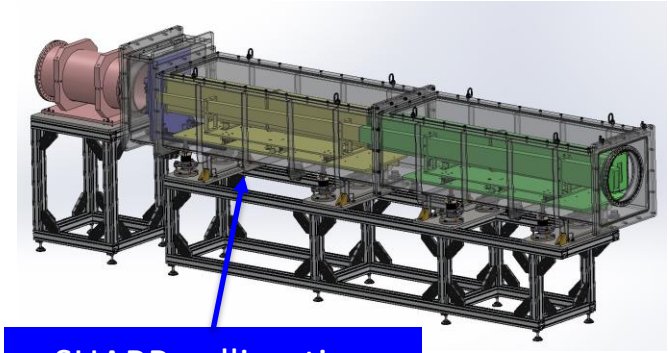
  → DPT subcontracts only the manufacture of parts or assemblies

- END OF THE REFIRBISHEMENT "ENDURANCE" PROGRAM OF THE ILL INSTRUMENTS

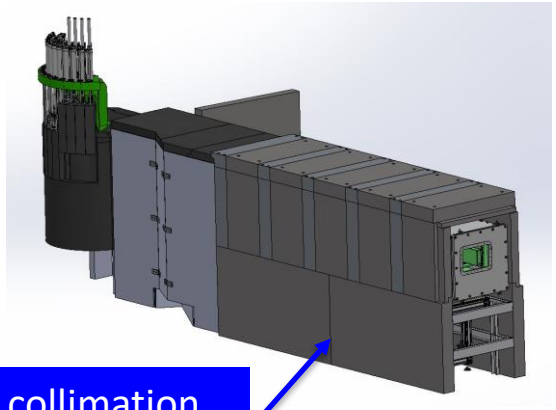
  → The big instruments are nearly finalized. Only the instrument SHARP is in progress

FUTURE NEEDS OF THE ILL AND TYPES OF REQUIREMENTS

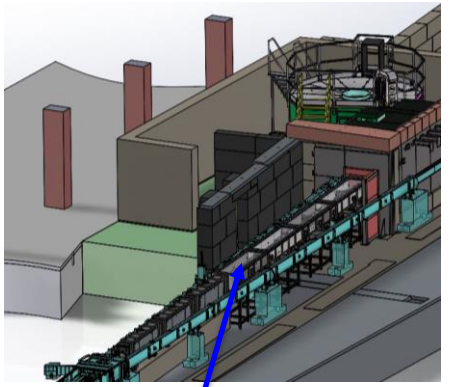
- FUTURE NEEDS OF THE DPT DIVISION
  - → Seismic reinforcement of concrete casemate
  - → Instrument Projects



SHARP collimation (2023)



SHARP collimation shielding (2023)



D11 collimation (2023)