

# Preliminary Analysis on A Maintainable Test Cell Concept for IFMIF-DONES

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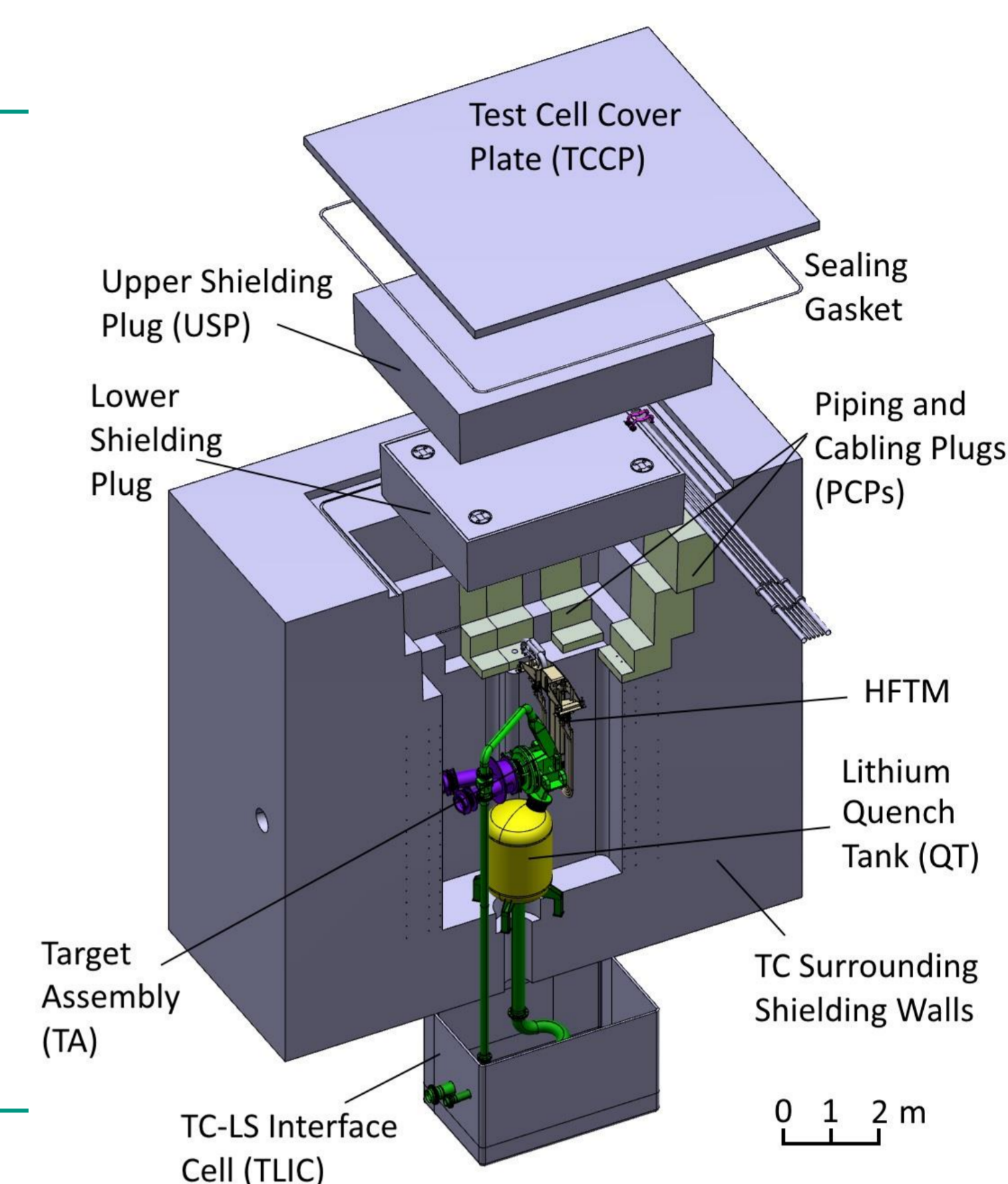
## IFMIF-DONES Reference Test Cell Design

### Major Features

- Monolithic concrete biological shielding walls
- Closed Liner covering internal TC surfaces attached to concrete
- Active cooling pipes embedded in concrete / attached to liner

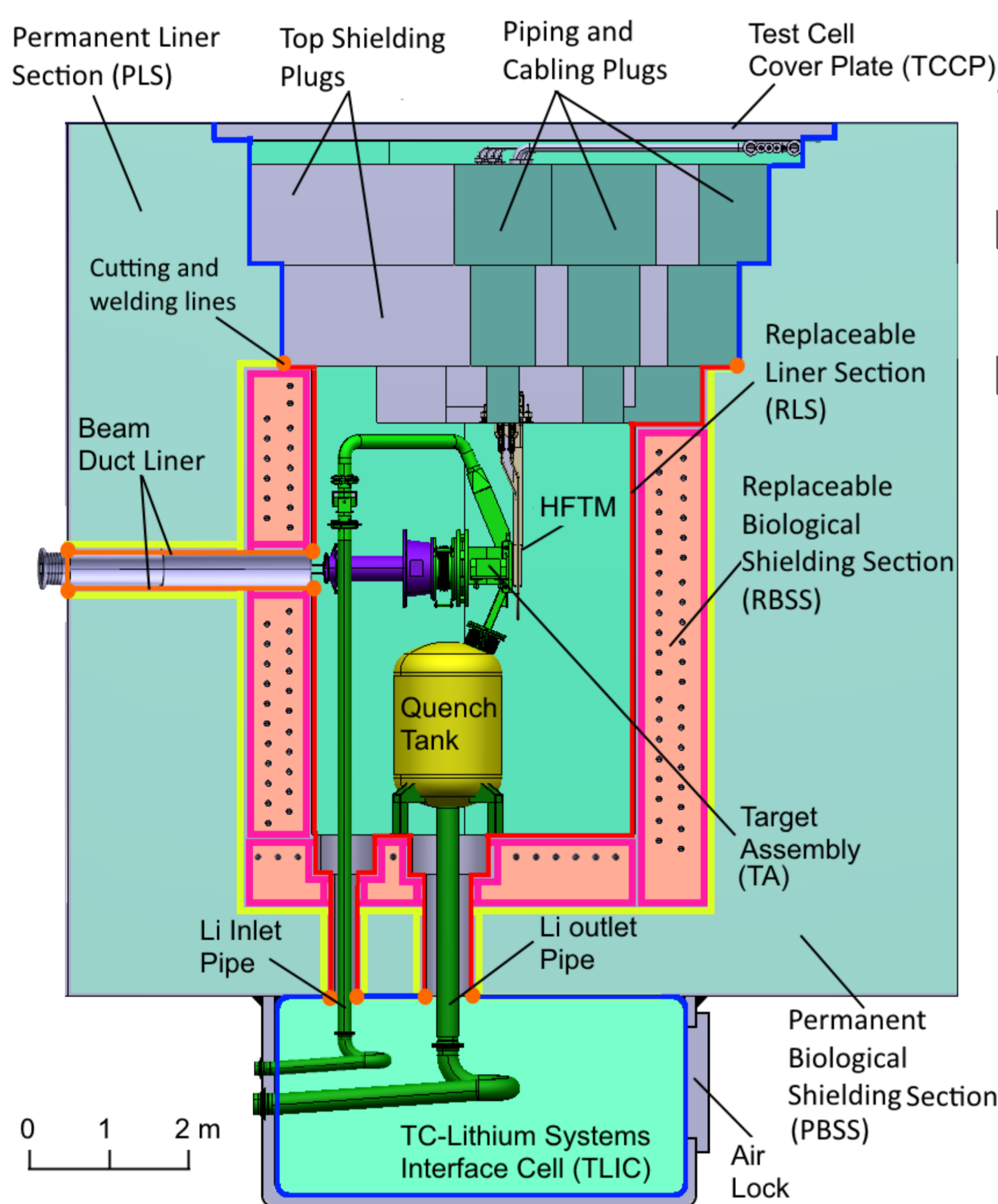
### Potential Issues

- Risks in TC leakage, loss of cooling, components degradation, etc. unavoidable
- Difficulties/infeasibility in maintenance of biological shielding, liner, cooling pipes

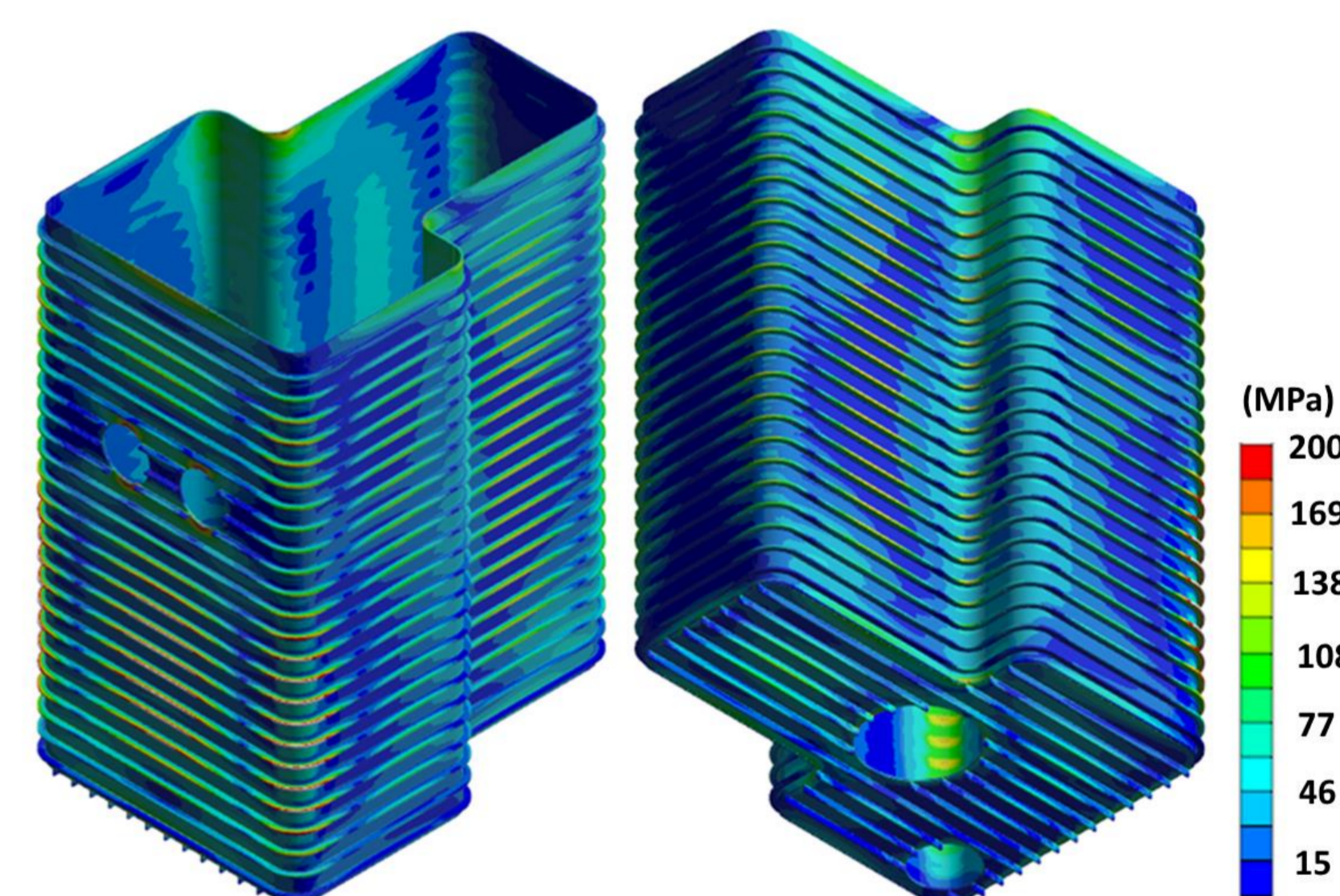
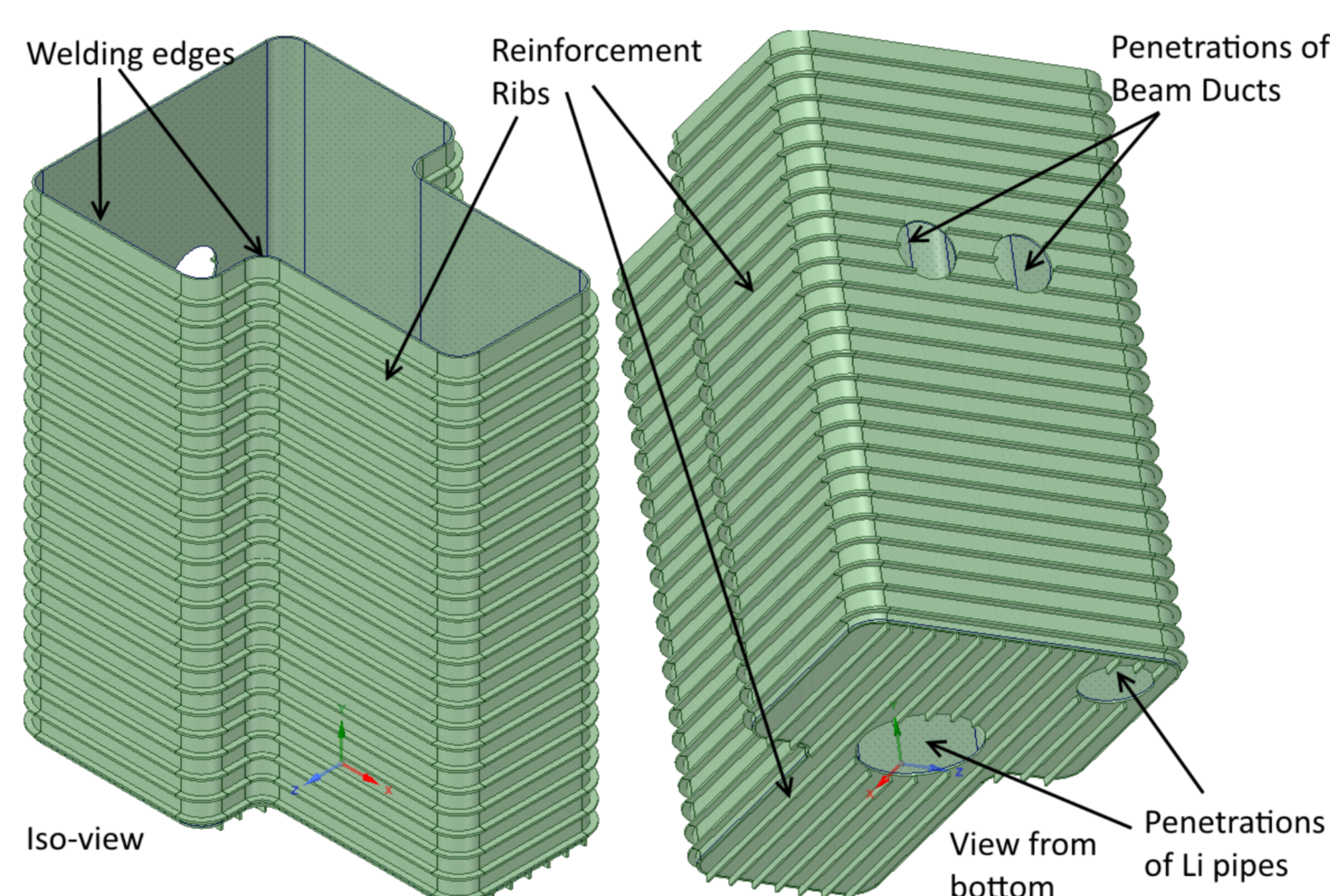


## Proposal of Maintainable TC Concept

- Liner includes: **Removable Liner Section (RLS)**  
**Permanent Liner Section (PLS)**
- Shielding walls includes **Removable Biological Shielding Section (RBSS)**  
**Permanent Biological Shielding Section (PBSS)**



## Preliminary FEM Analysis of RLS

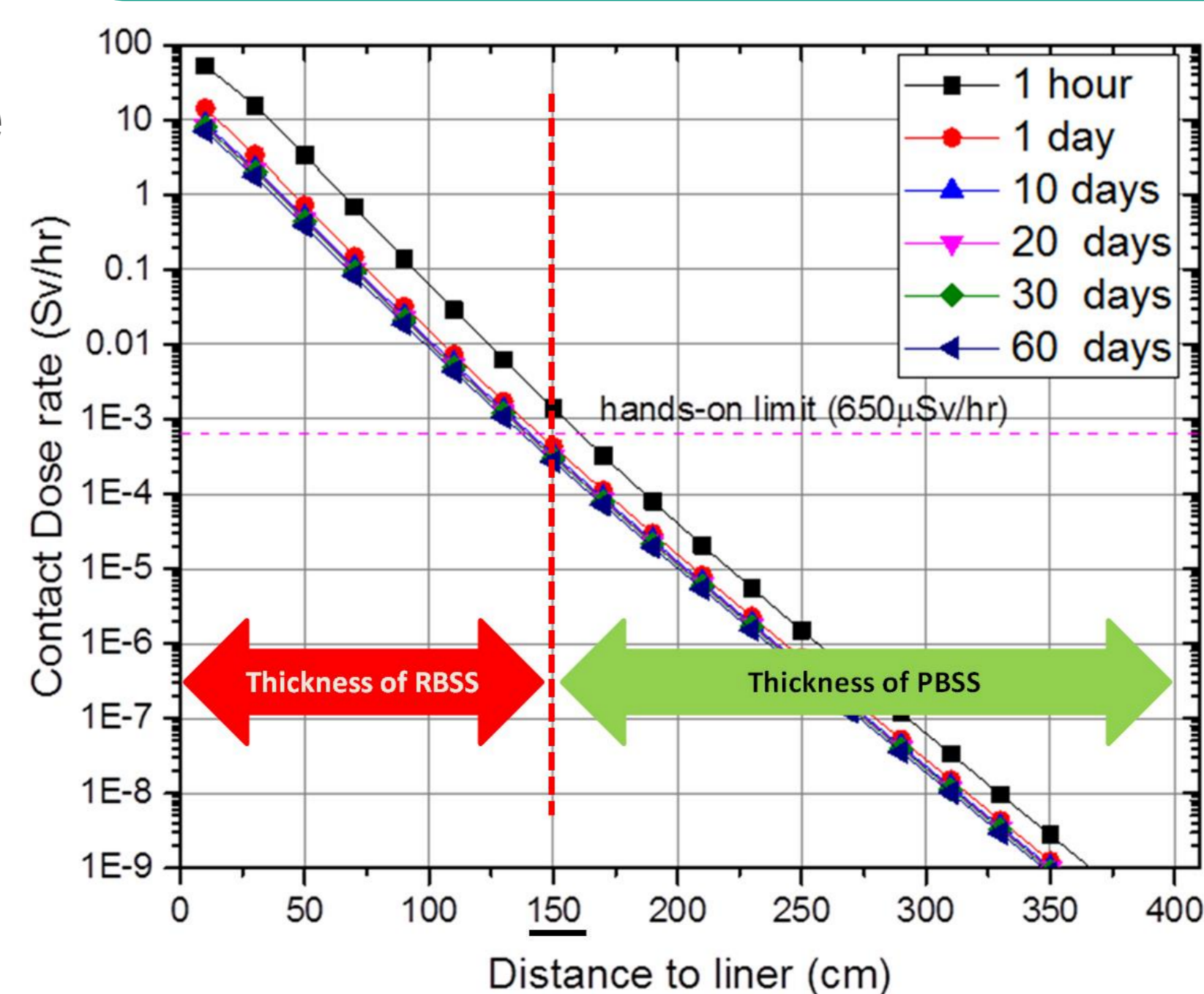


FEM Results of RLS under 1 bar pressure difference

- RLS and RBSS
  - o Receive intense neutron irradiation
  - o High active level (hands-on impossible)
  - o Active cooling required
  - o Removable for emergency maintenance
  - o Re-welding between RLS and PLS required during maintenance

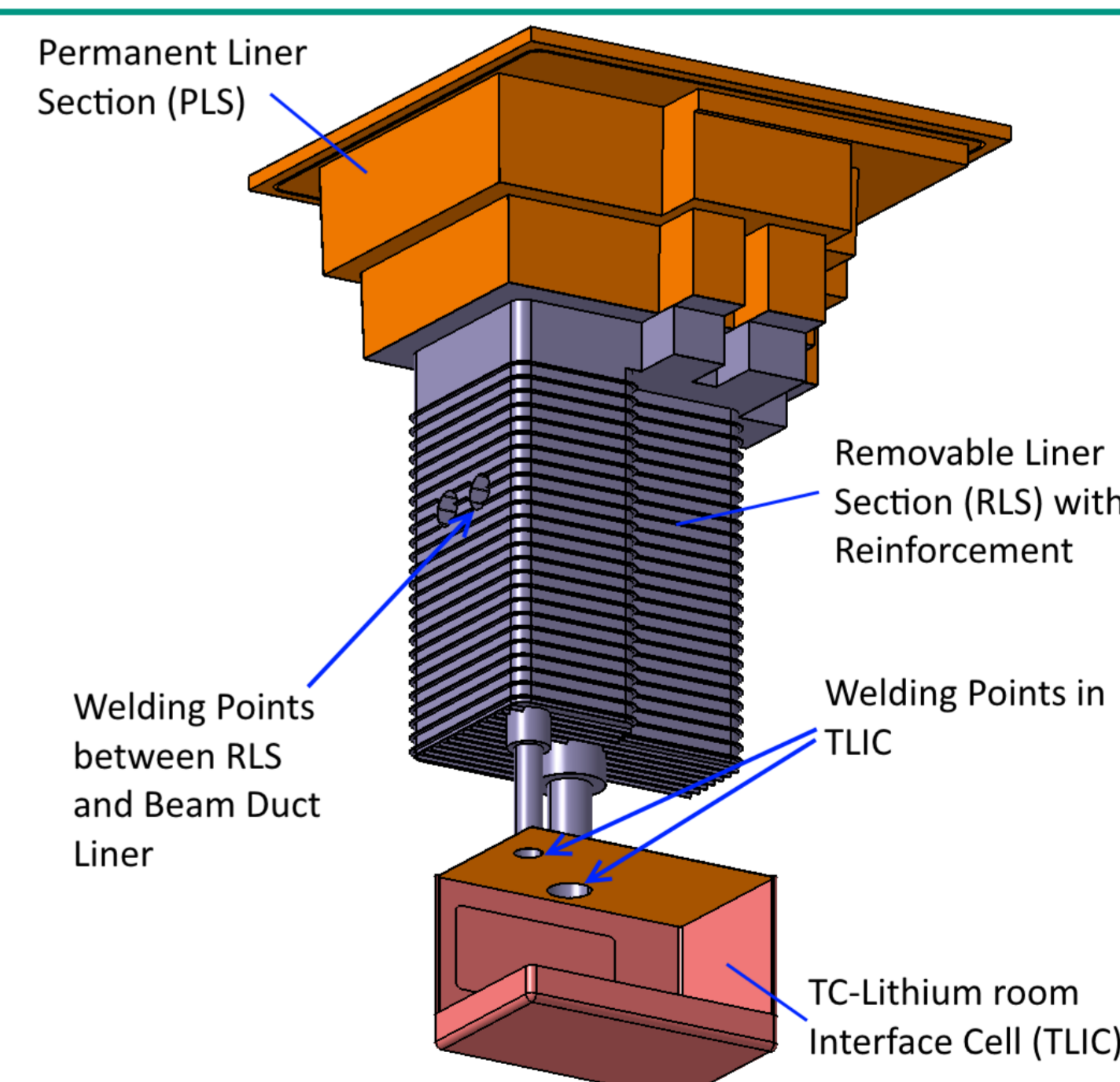
- PLS and PBSS
  - o Receive less neutron irradiation
  - o Low level activity
  - o No active cooling required
  - o Permanent, integrated with facility civil structures

## Separation of RBSS and PBSS



Activation of Biological Shielding after 30 Years Operation

## Maintenance of RLS



RLS detachment from TLIC and Beam Duct Liner (before RLS being removed)

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