



INTRODUCTION TO THE ITER HOT CELL COMPLEX

Spencer Pitcher

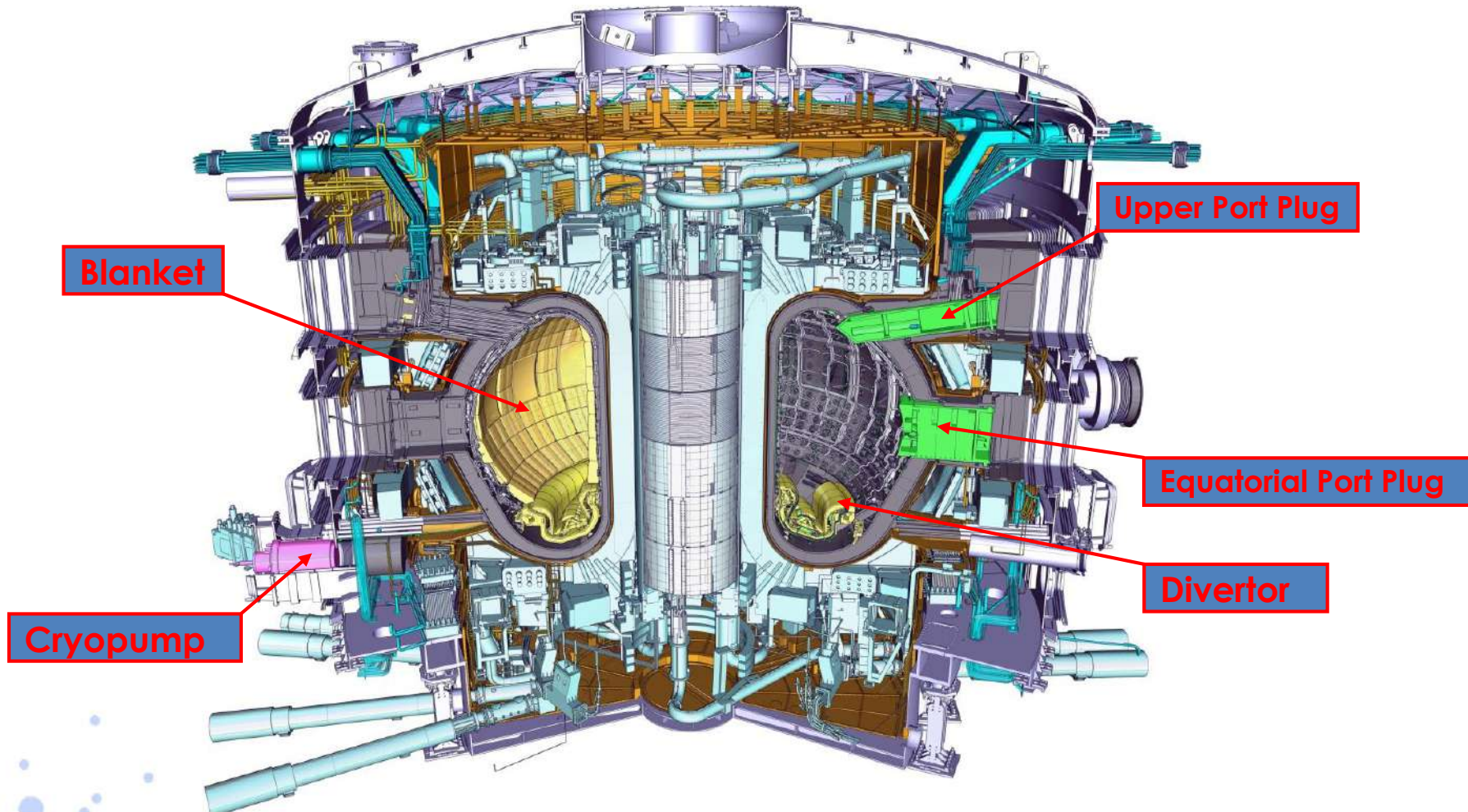
Hot Cell Complex & Remote
Maintenance

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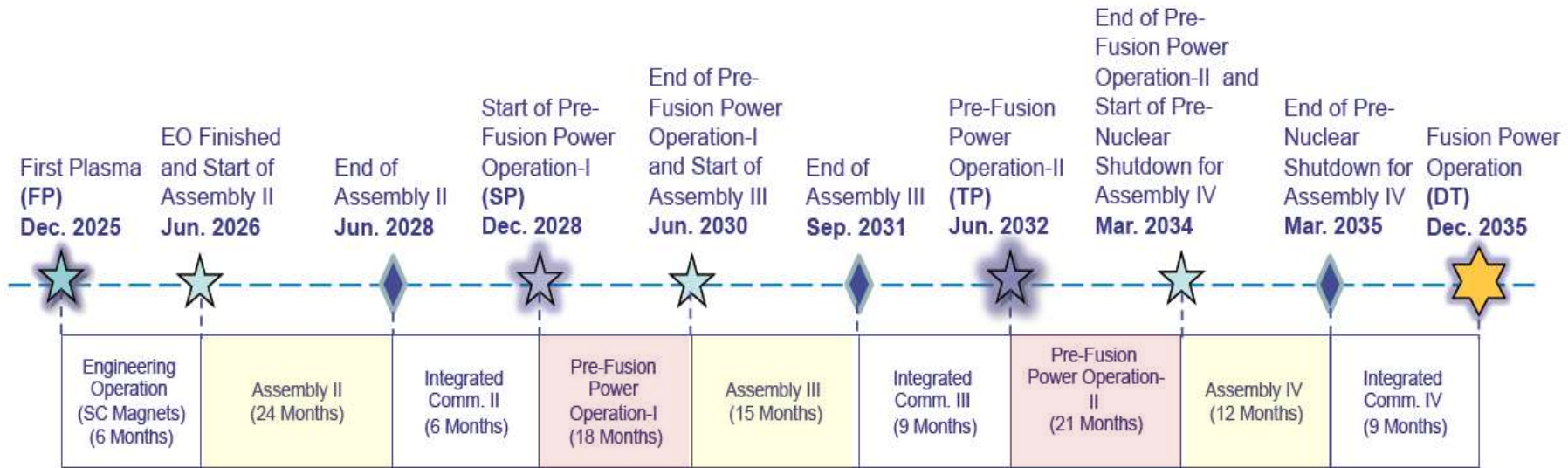
7 & 8 April 2021

Remote ITER Business Meeting

ITER Tokamak – maintainable elements and future radwaste



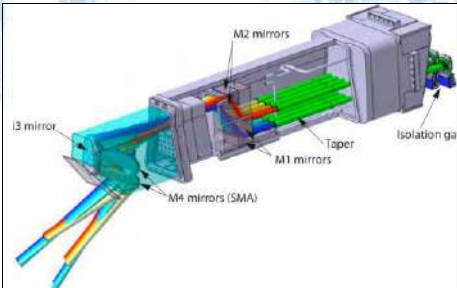
Maintenance Periods during PFPO and FPO



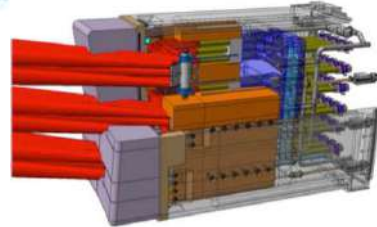
HCC ready for beryllium risk

HCC ready for nuclear risk

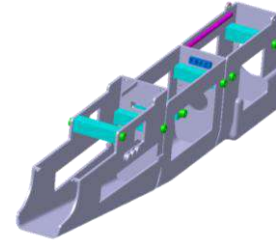
In-Vessel Components to Process



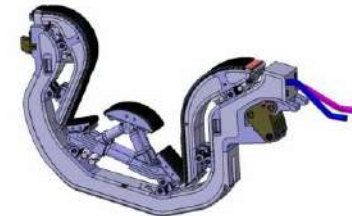
ECH Upper Port Plug



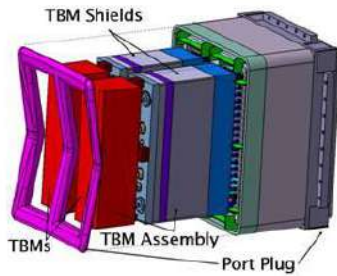
ECH Equatorial Port Plug



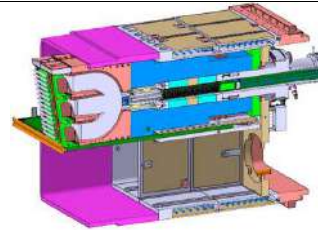
Diagnostic Racks for Divertor cassettes



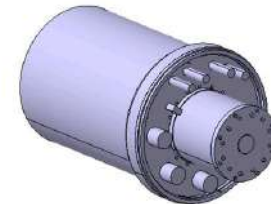
DIVERTOR Cassette



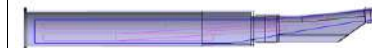
TBM Port Plug



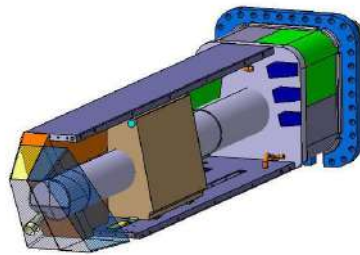
ICH Equatorial Port Plug



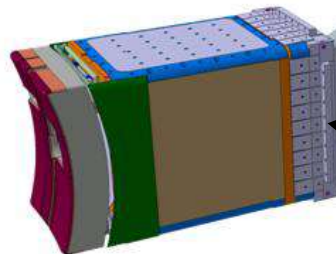
CRYOPUMP Plug



IVVS & GDC Plug.



Diagnostic upper port plug and central tube

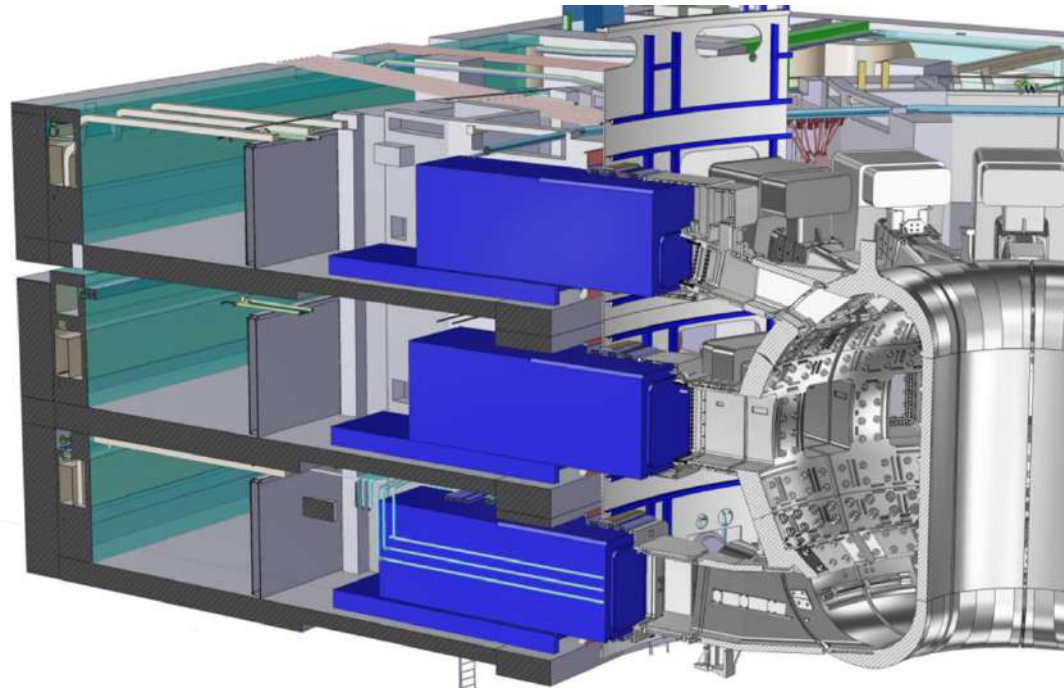


Diagnostic equatorial port plug

Approx 50 tons

← 2 m →

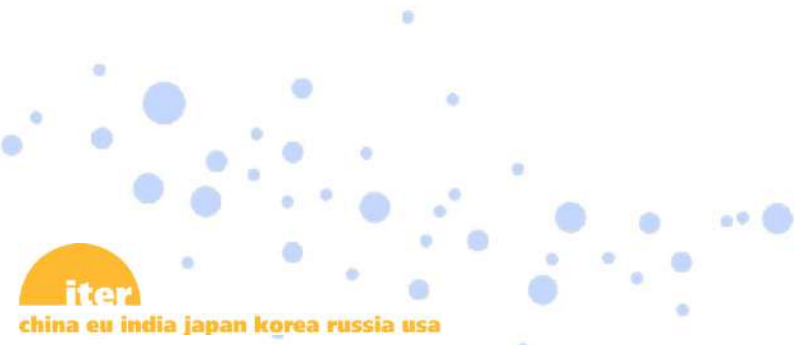
Cask Transport from the Tokamak to the Hot Cell Complex



Because of the Activation and Contamination – In-Vessel Equipment is transported to the HCB in automated Casks. These provide confinement but no shielding.

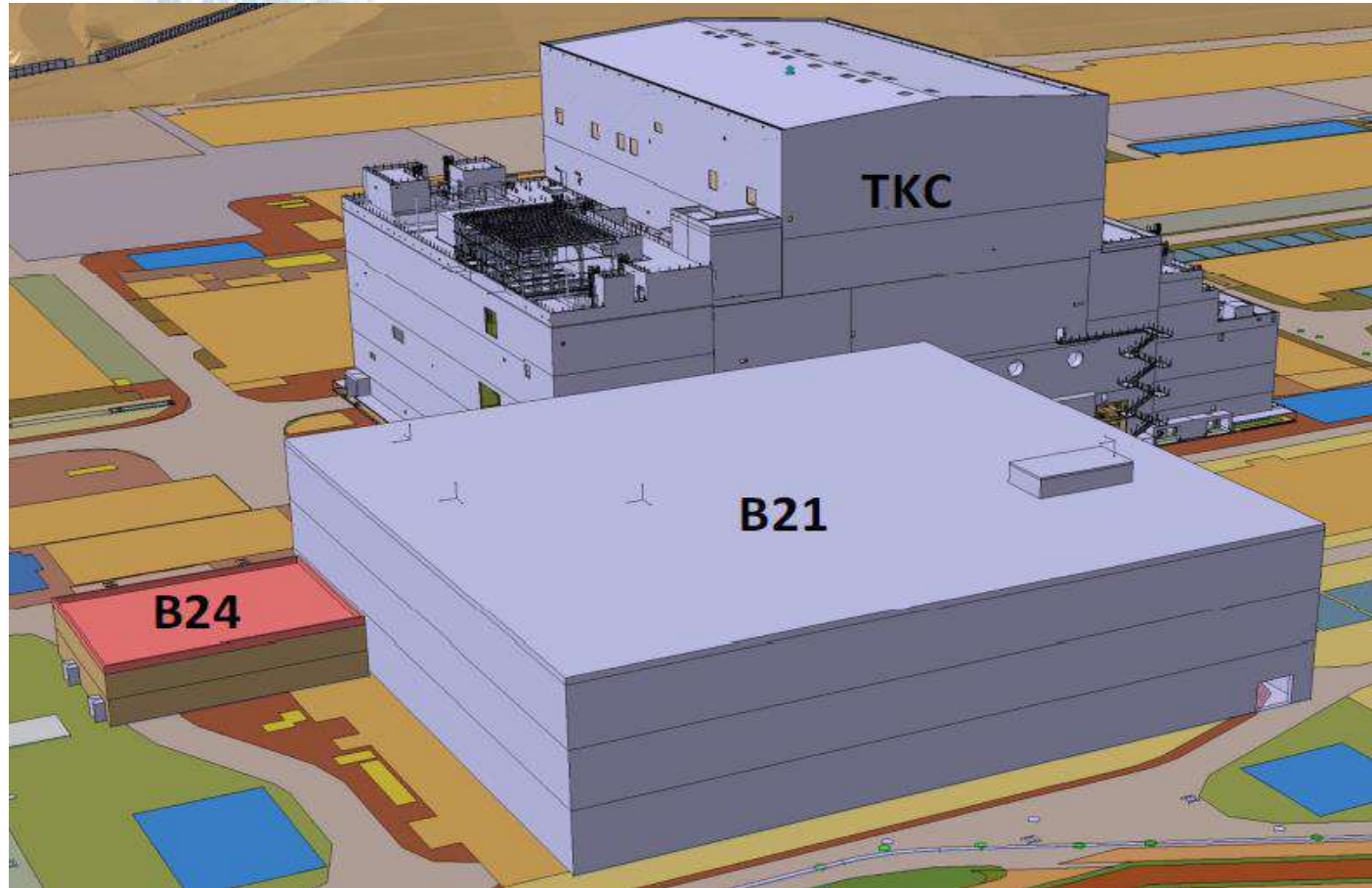


Hot Cell Complex Current Design

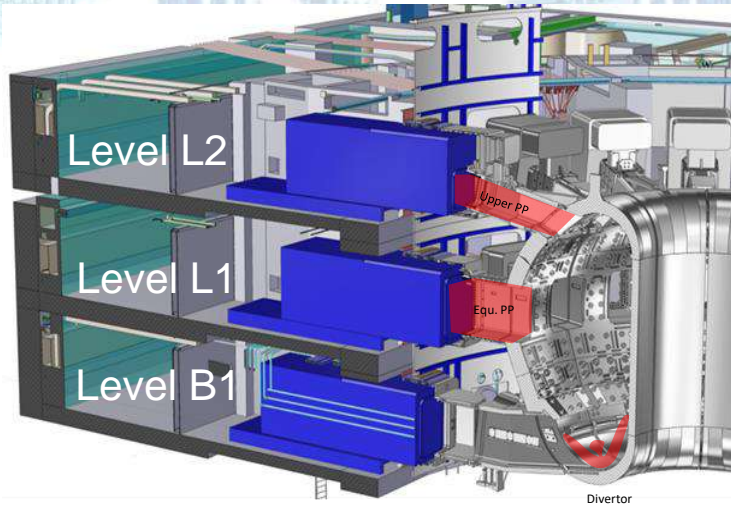


TKM Cargo Lift – Working site



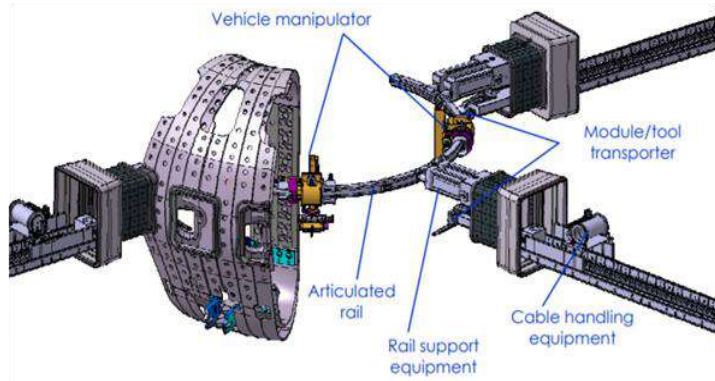
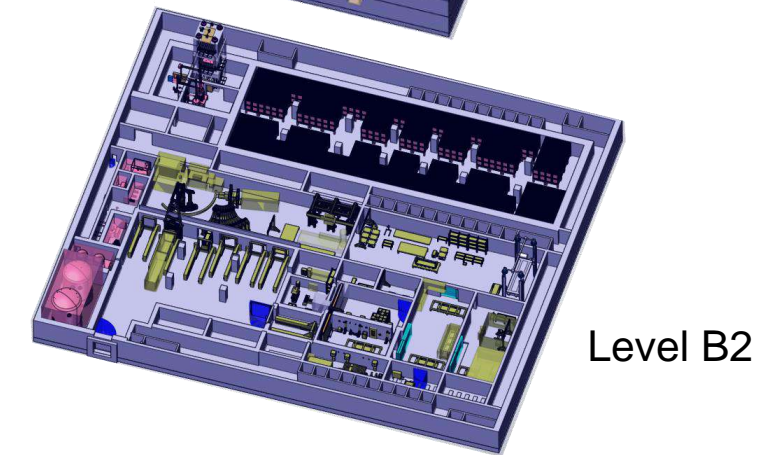
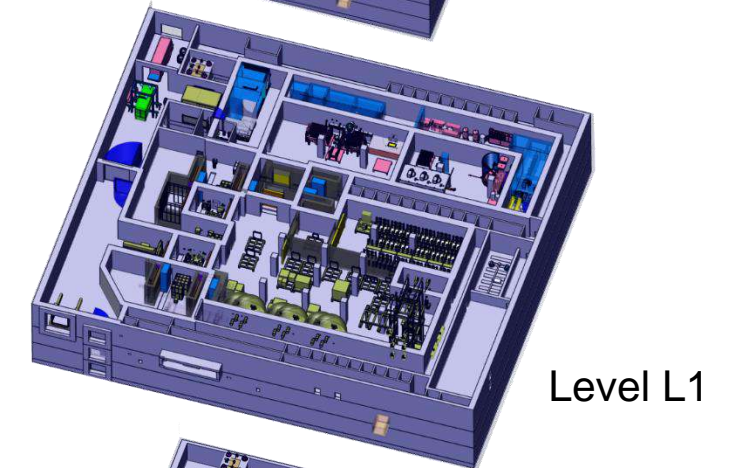
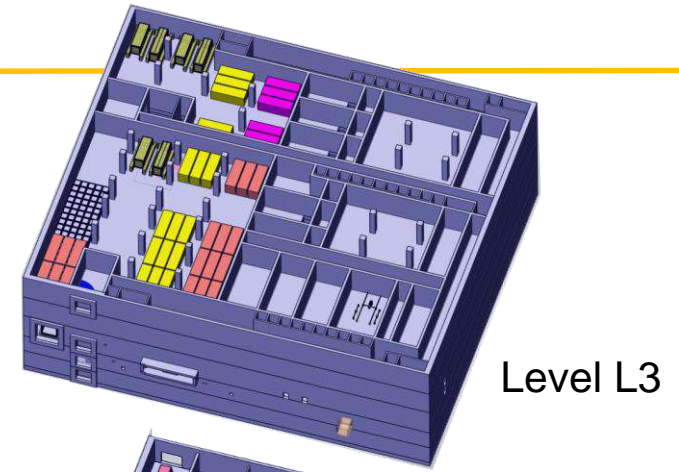
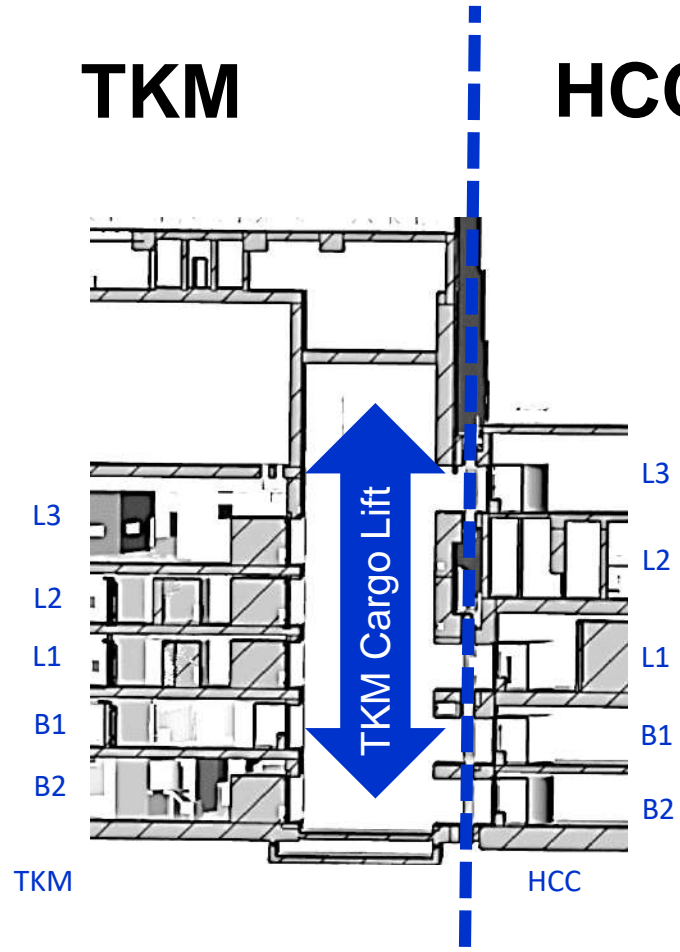


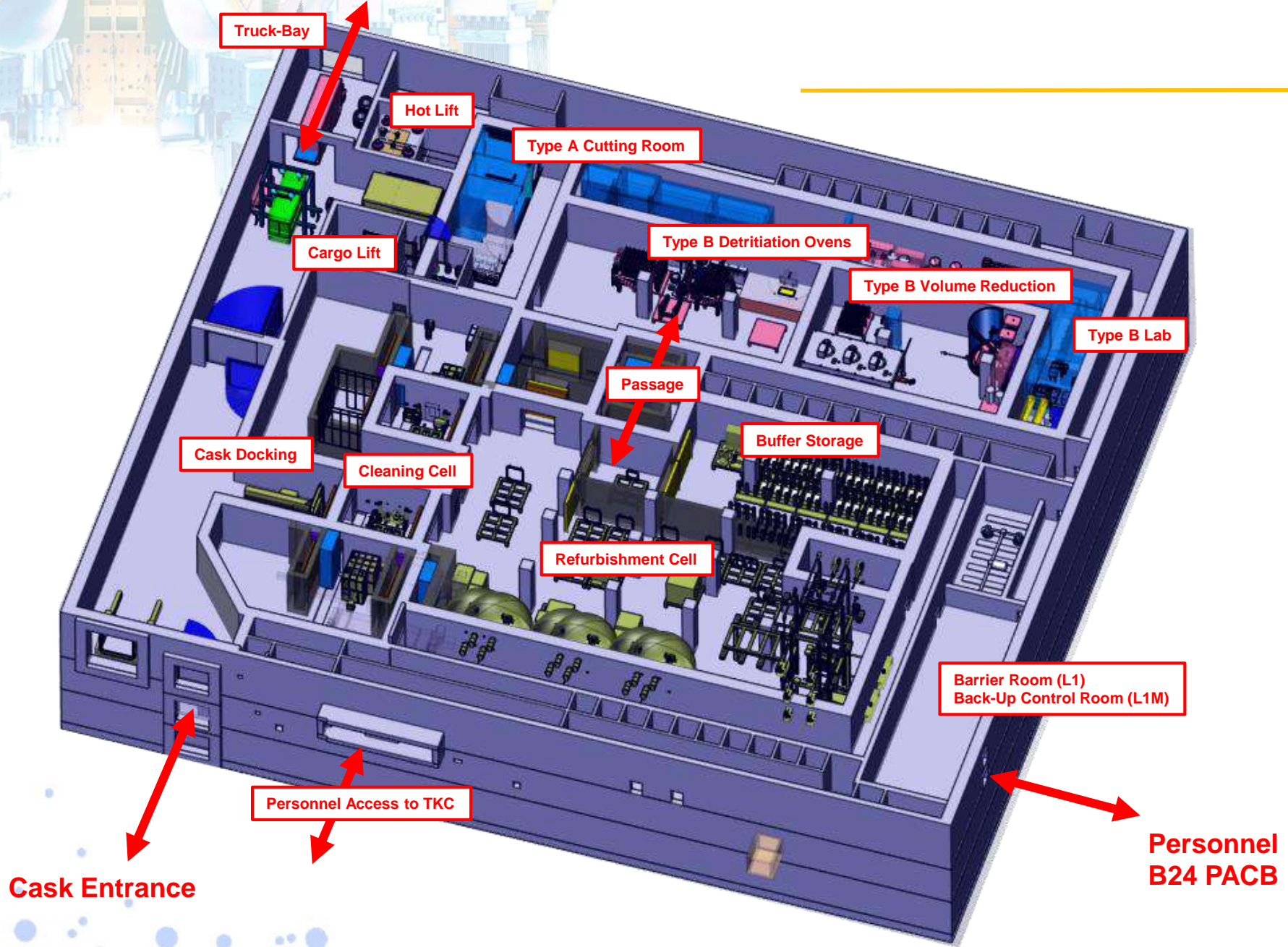
Flow TKM / HCC

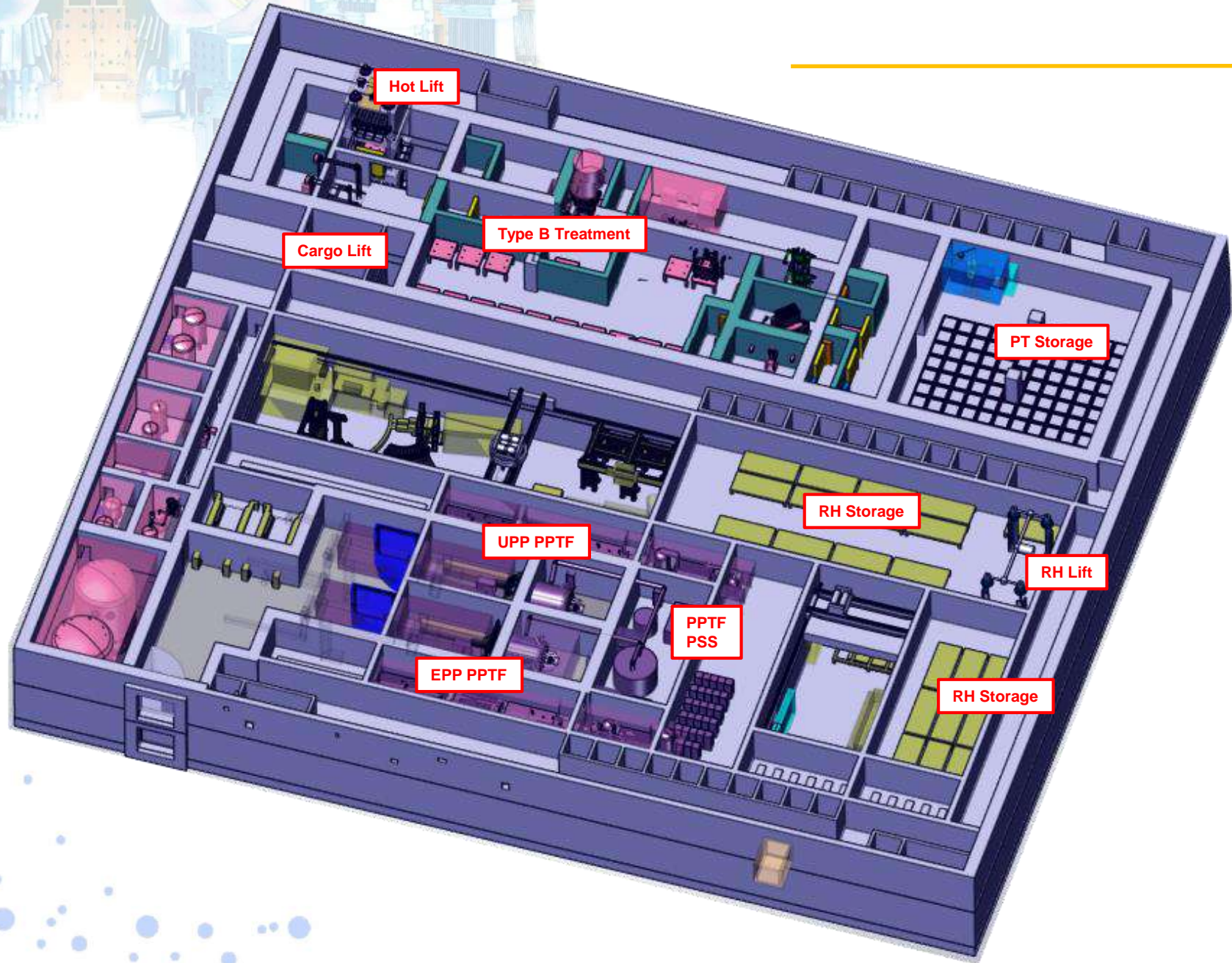


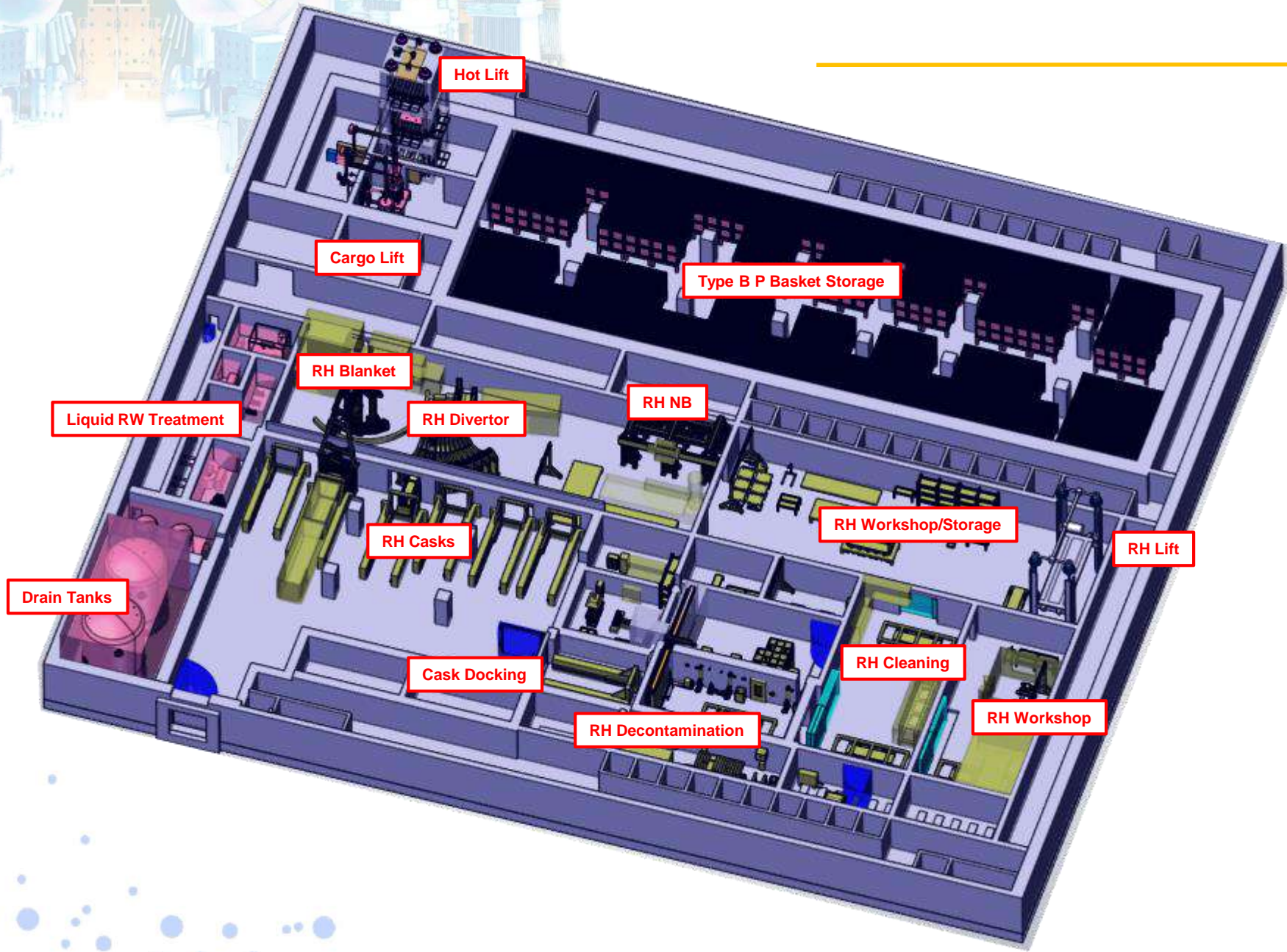
TKM

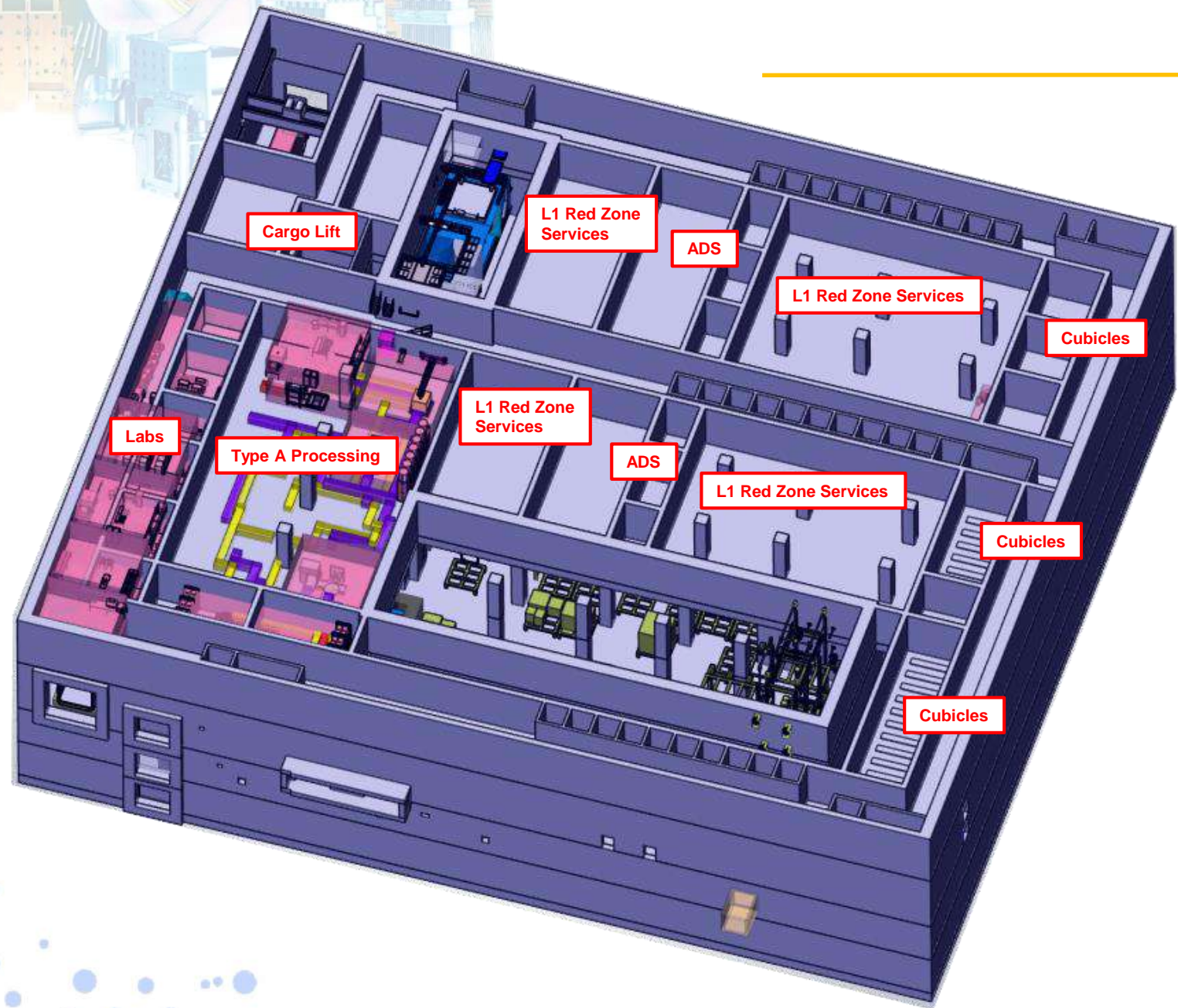
HCC

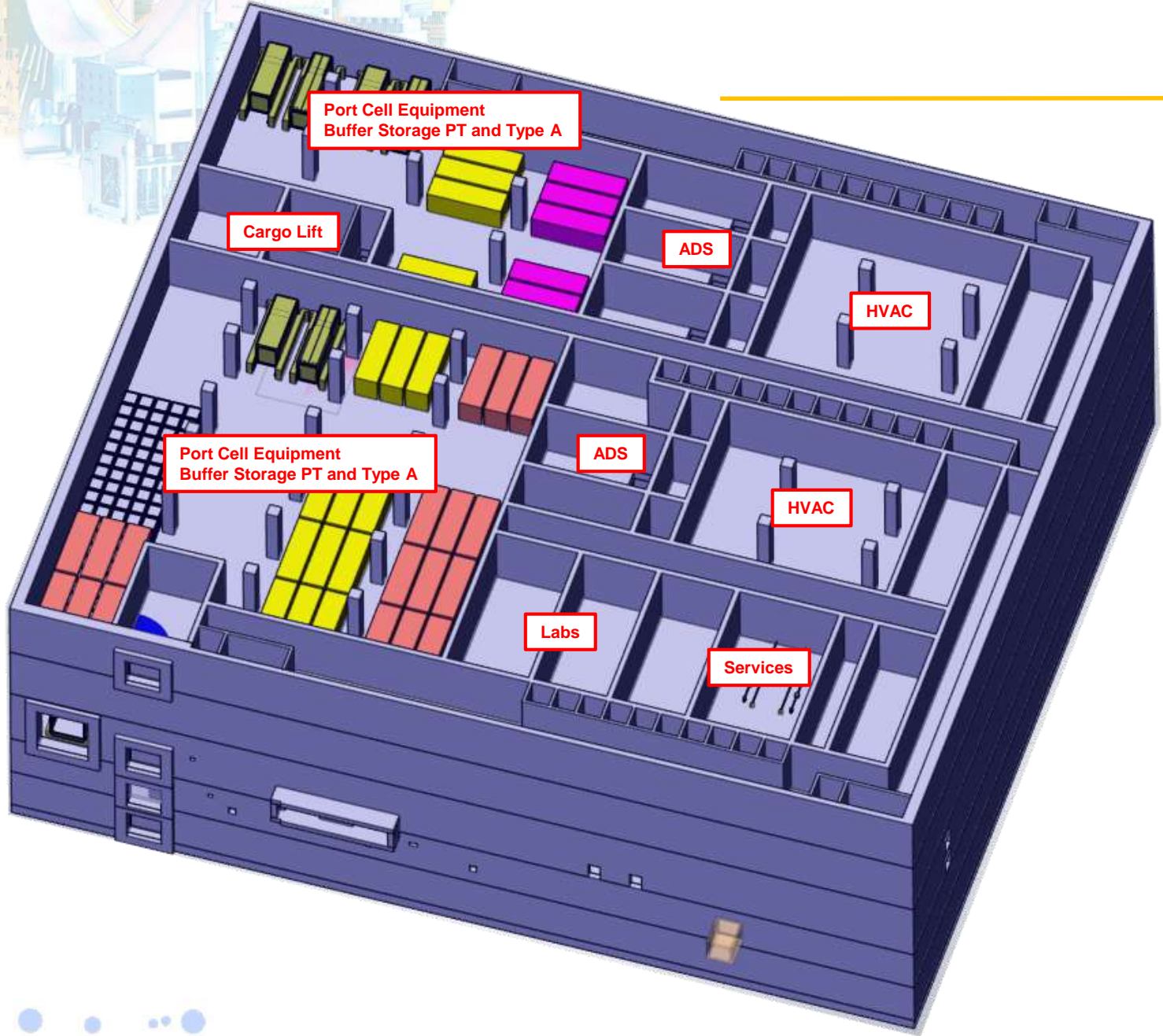






















Main Systems in the Hot Cell Complex – Scope Share IO vs DA's

Main system involved in the Hot Cell Complex	Procurement Responsibility	Current Status
Maintenance of In-Vessel Components		Conceptual Design
Maintenance of TKM Remote Handling systems		Conceptual Design
Radwaste Type B, Purely tritiated waste and TFA		Conceptual Design
Radwaste type A	   Transfer discussed	Conceptual Design
Hot Cell Detritiation System	 	Preliminary Design
Port Plug Test Facility		Final Design
Hot Cell Complex Buildings		Pre-conceptual

Integration activities HCC



To be organized within the HCC Collaboration



HOT CELL COMPLEX - REMOTE HANDLING / RADWASTE

Hot Cell Complex & Remote Maintenance

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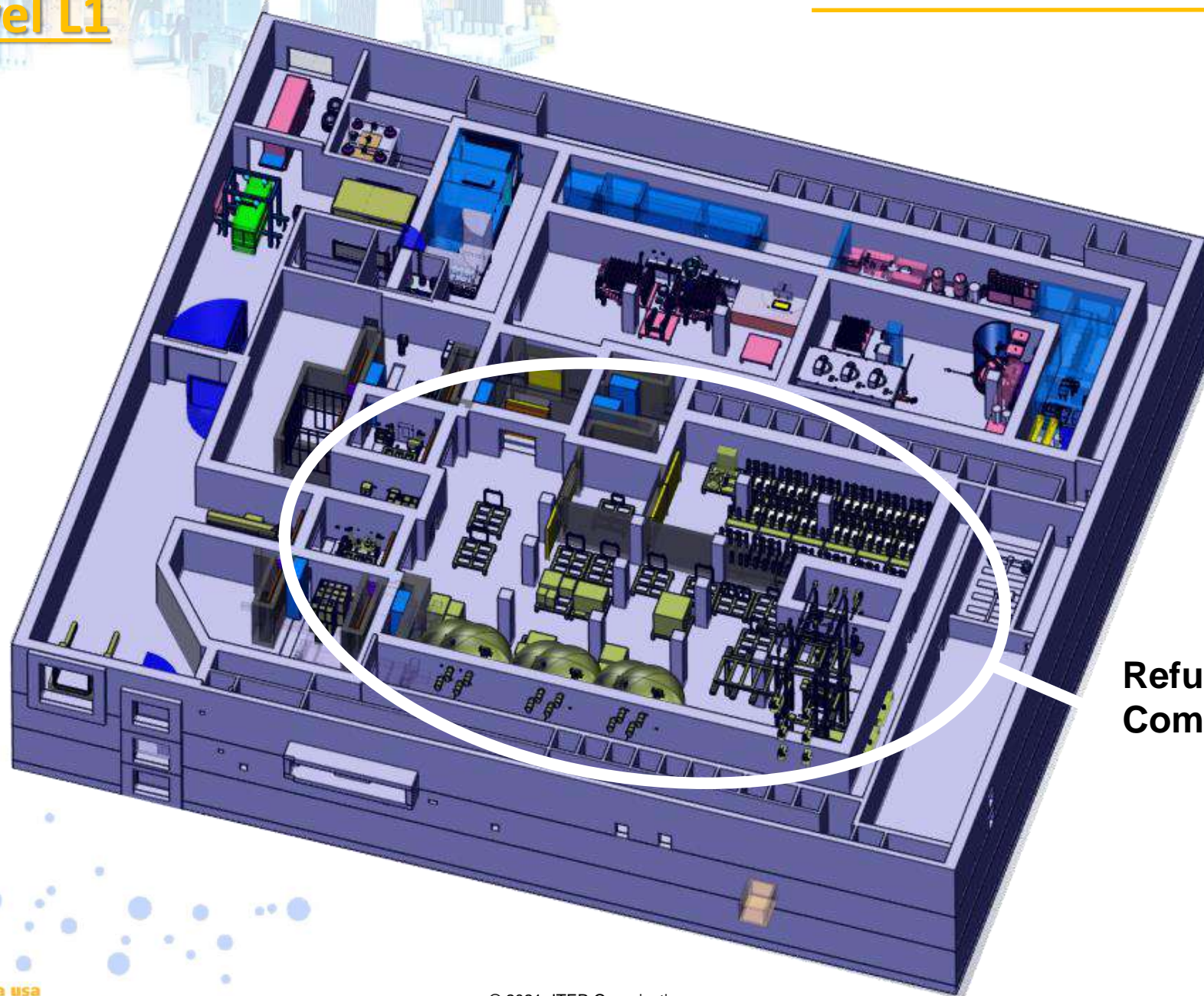
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Key functions of the Hot Cell Complex

- Maintenance TKM components:
 - Refurbishment and testing of activated and/or contaminated Tokamak components
 - Maintenance and testing of contaminated Remote Handling components
 - Buffer storage, maintenance of port cell equipment, slightly activated / contaminated
- Processing and storage of Radwaste:
 - TFA waste
 - Type A waste
 - Type B waste
 - Purely Tritiated waste
 - Liquid Waste
- Import/Export
- Remote Handling and Control Rooms

HCC Level L1

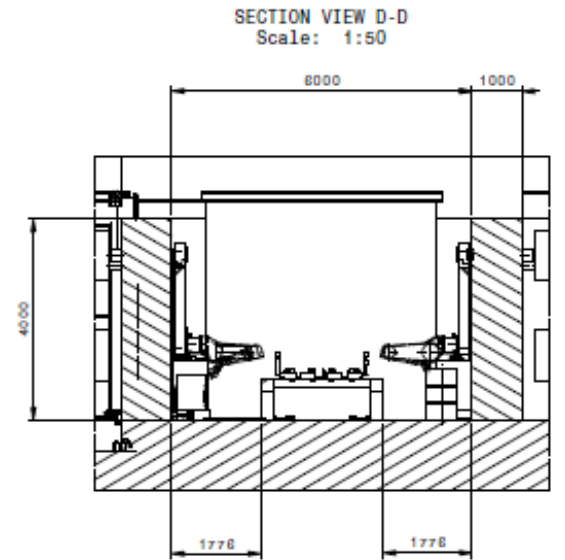
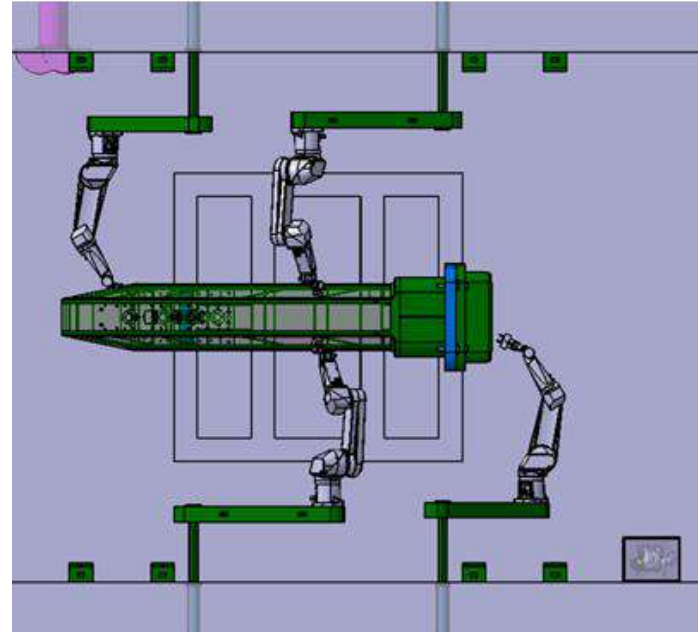
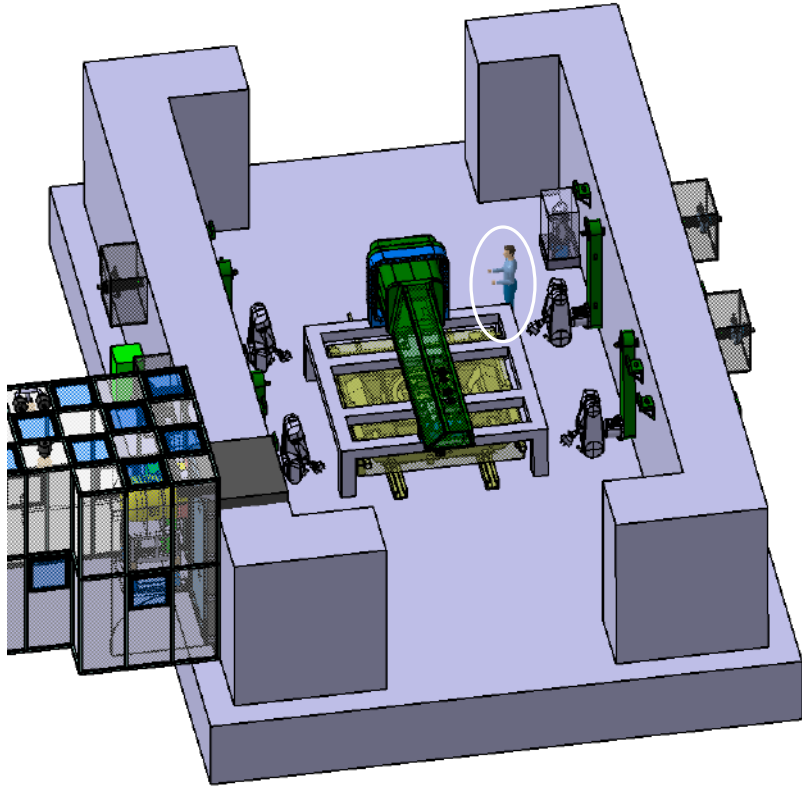


Refurbishment of In Vessel Components

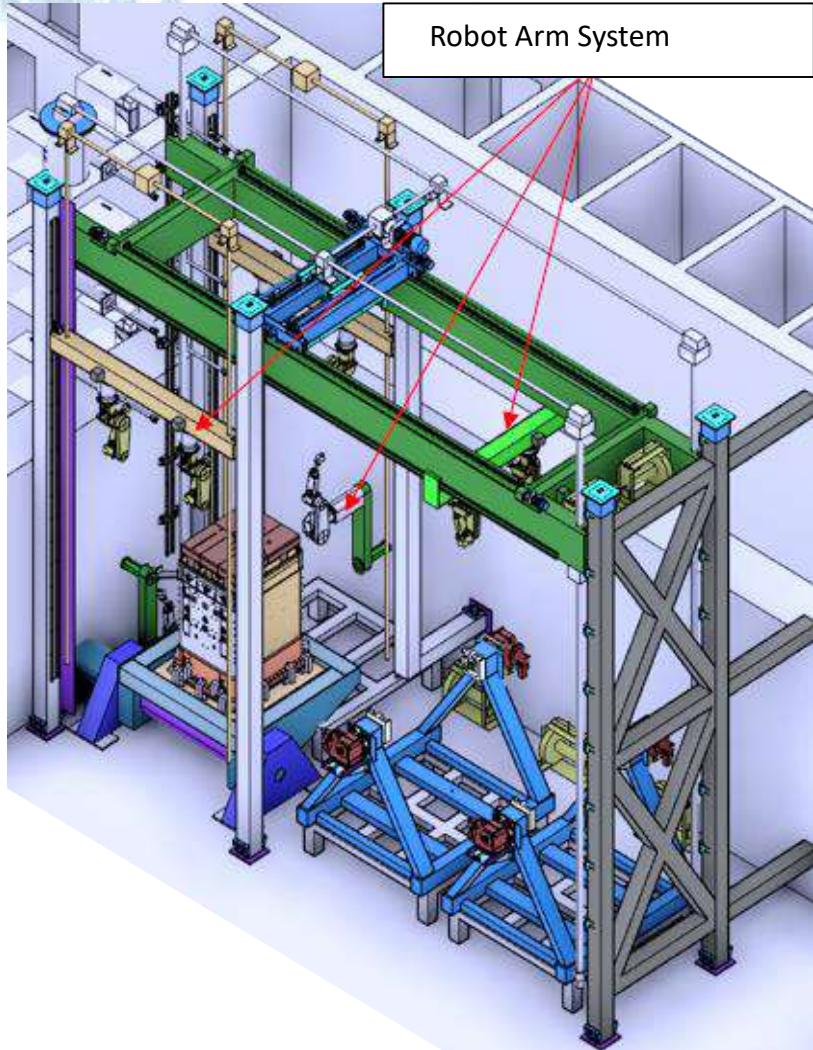
Overview of the refurbishment area



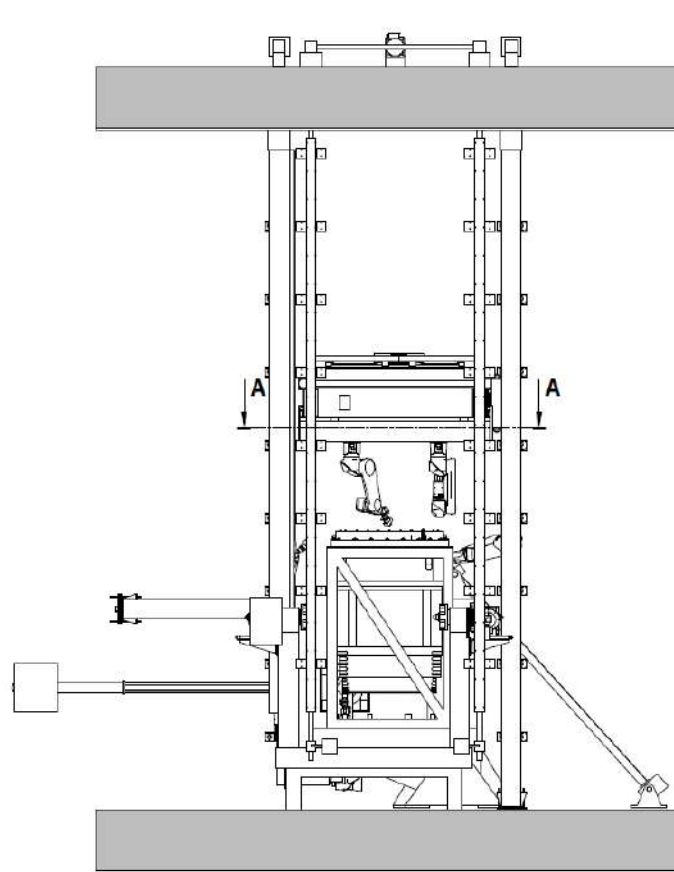
Reception / cleaning / decontamination cell



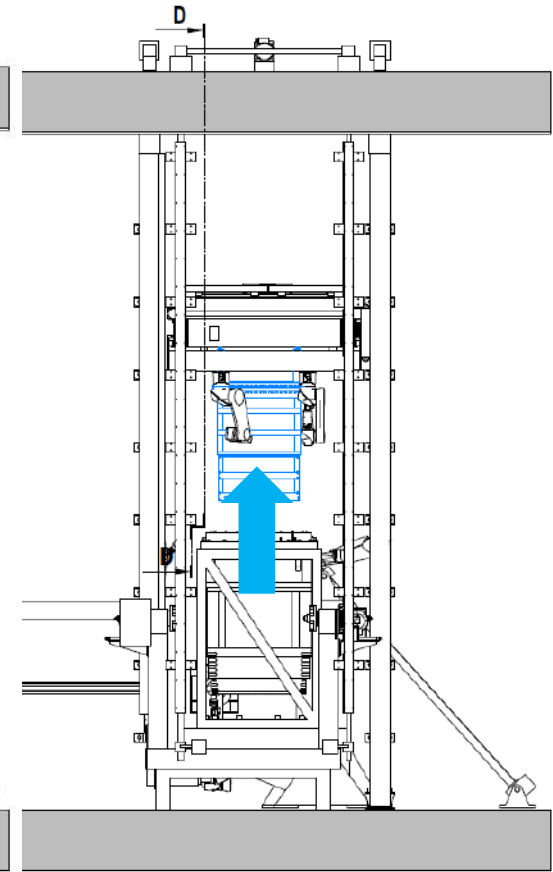
Tilting / lifting refurbishment tower



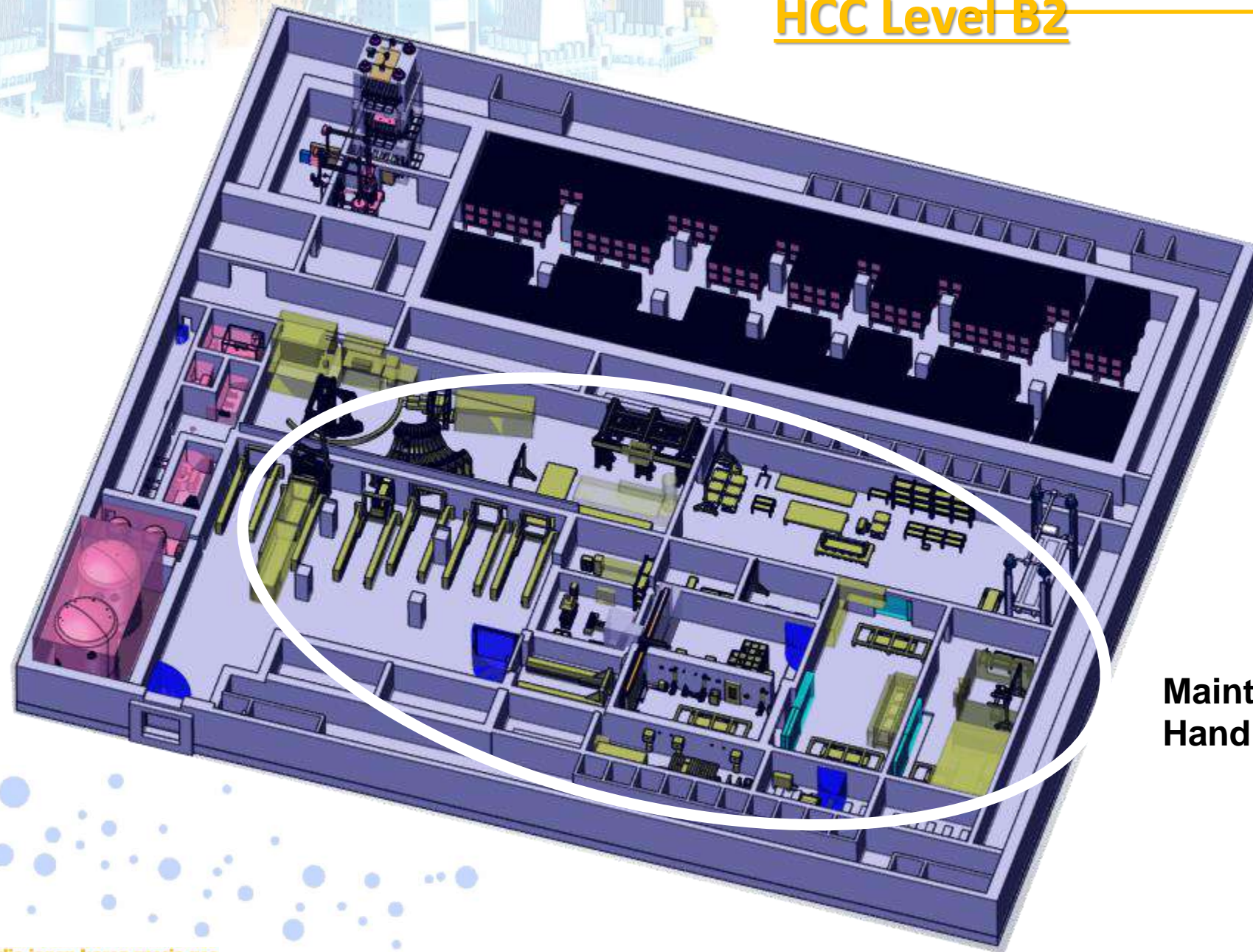
FRONT VIEW
ROBOT_ACCESS
Scale: 1:50



FRONT VIEW
TBM_DUMMY
Scale: 1:50

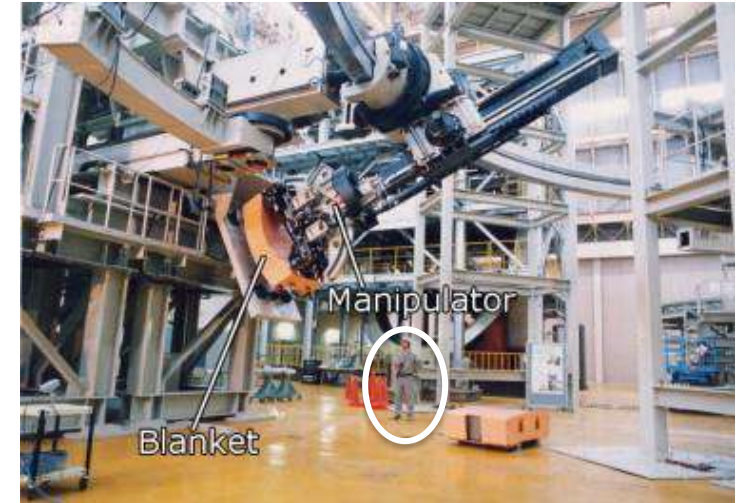
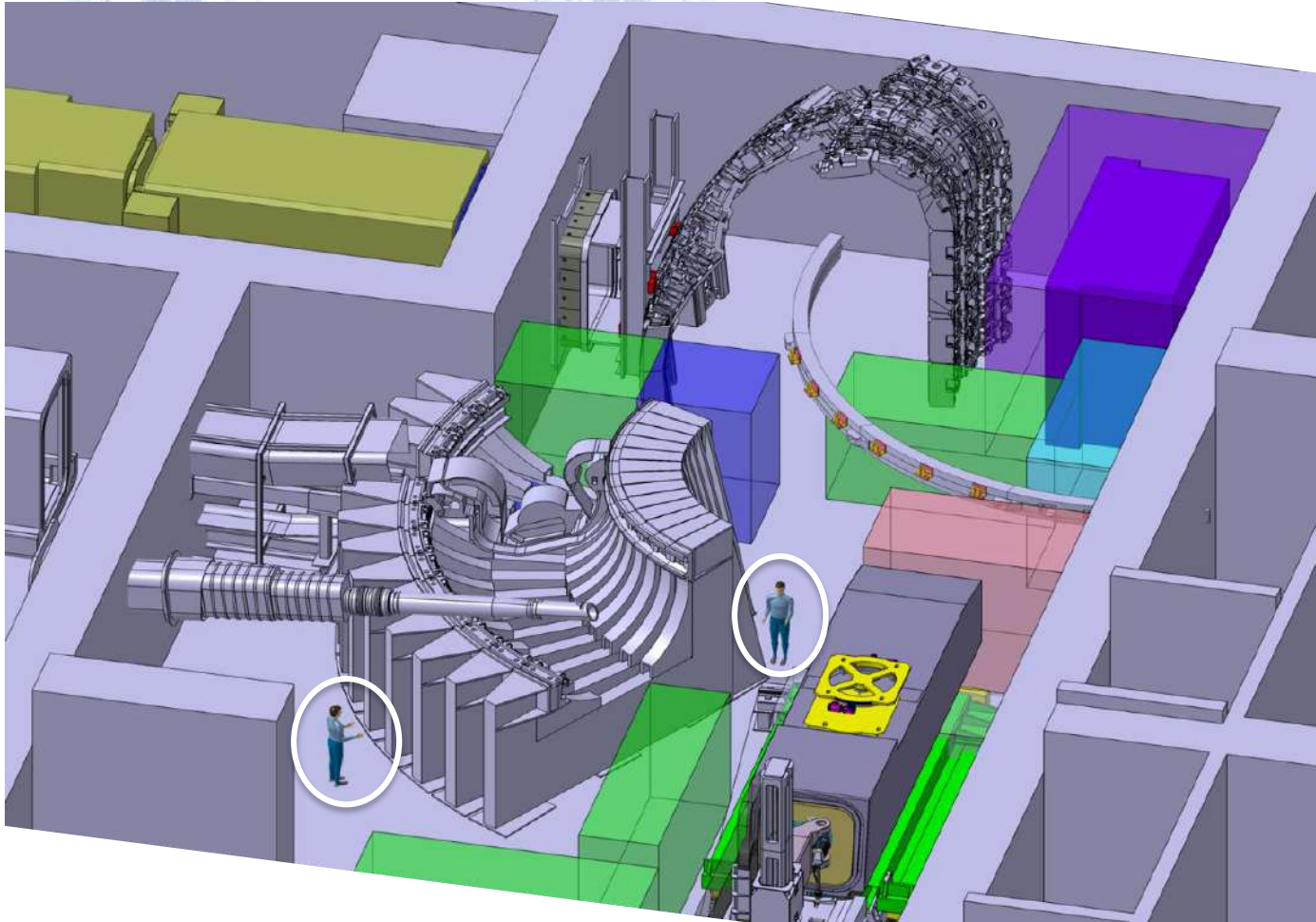


HCC Level B2



Maintenance of TKM Remote Handling Systems

Overview of the Hot Test Facility

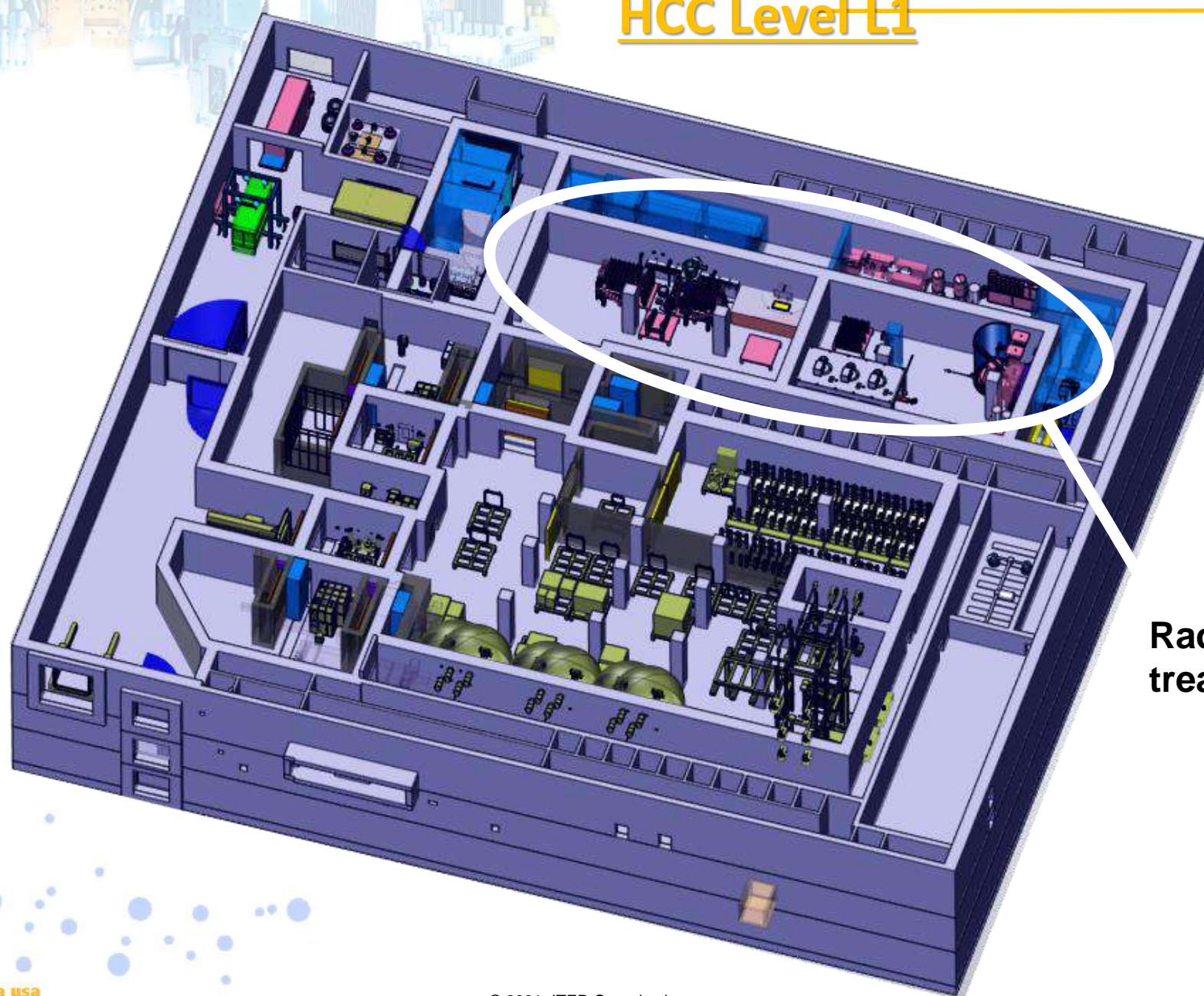


Japan Domestic Agency – mock-up BRHS



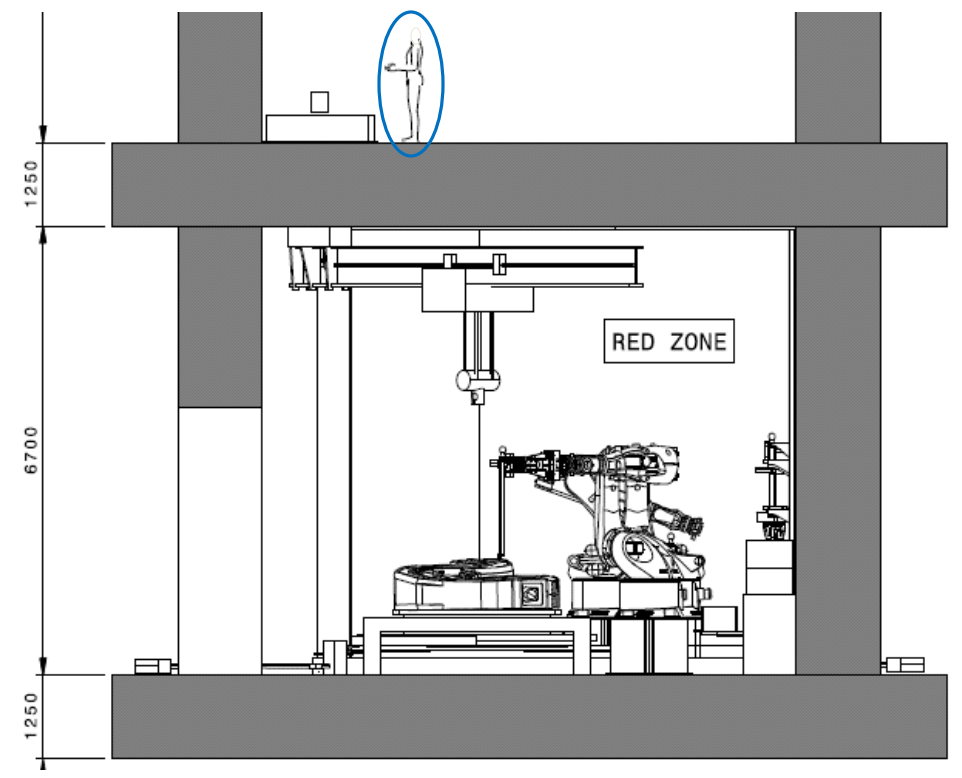
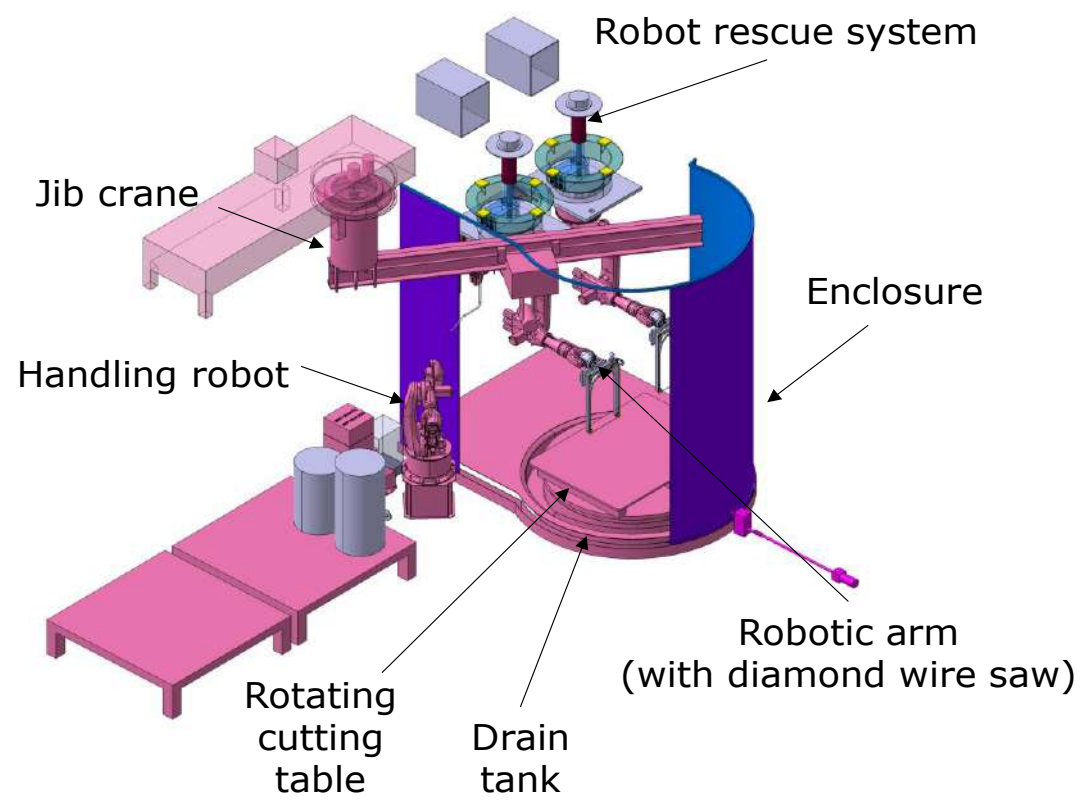
F4E – mock-up DRHS – Finland

HCC Level L1

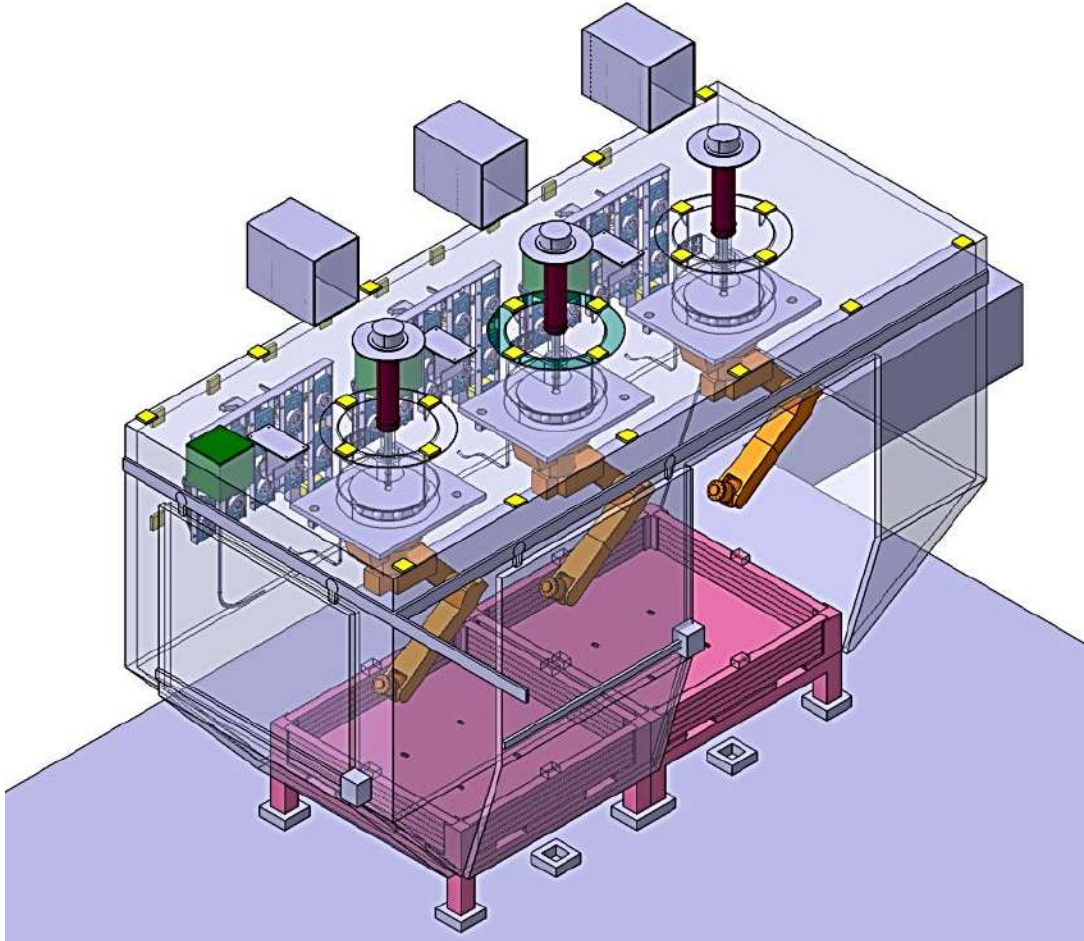


**Radwaste Type B
treatment**

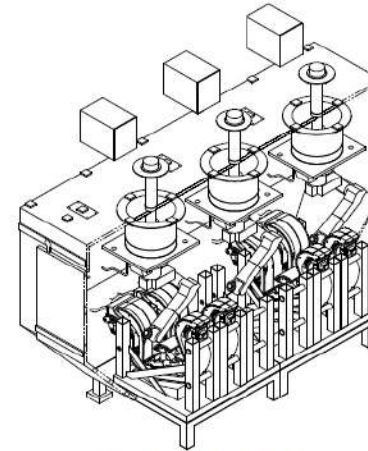
Size reduction



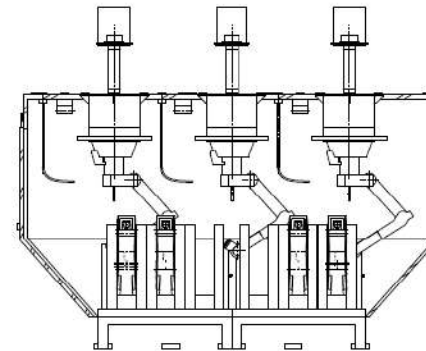
Milling workstation



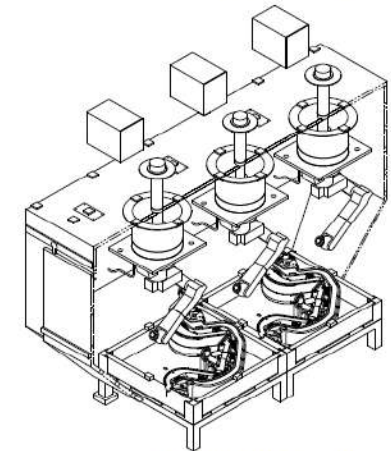
ISOMETRIC VIEW



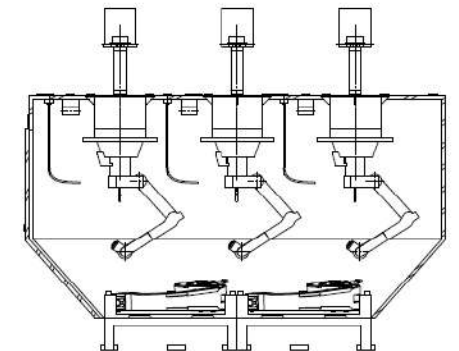
SECTION VIEW G-G



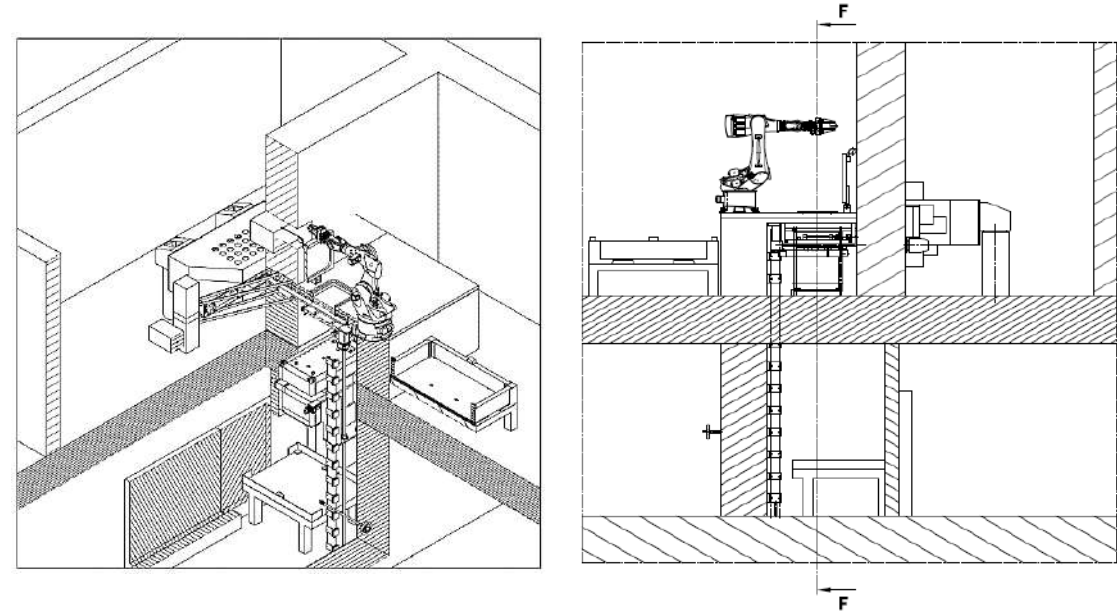
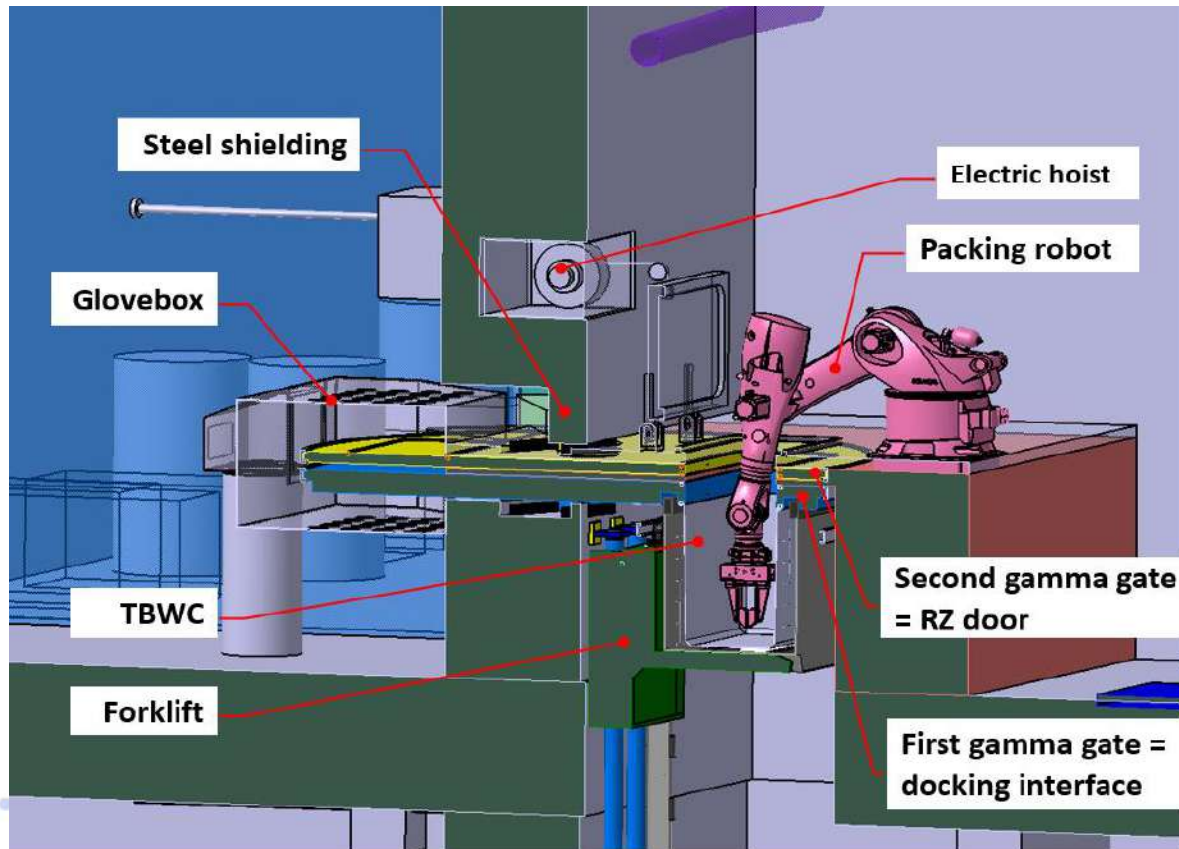
ISOMETRIC VIEW



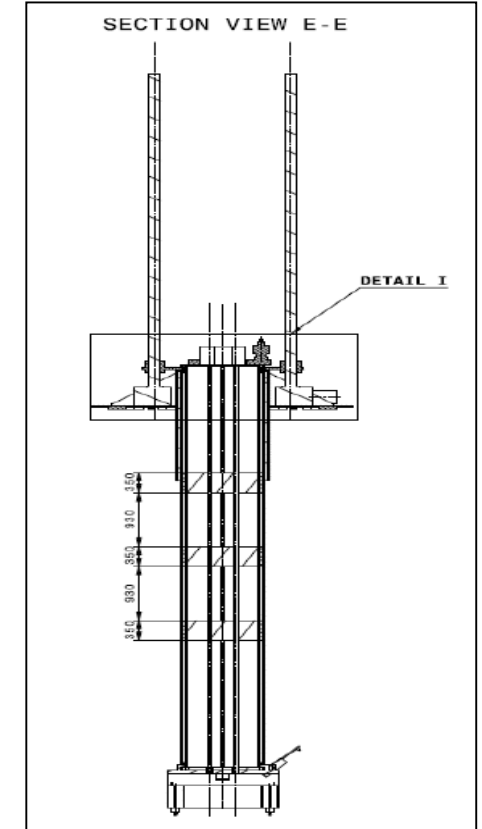
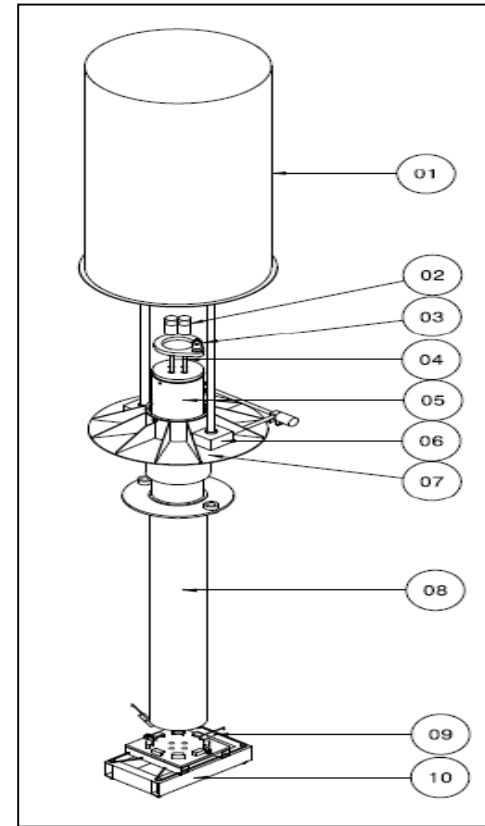
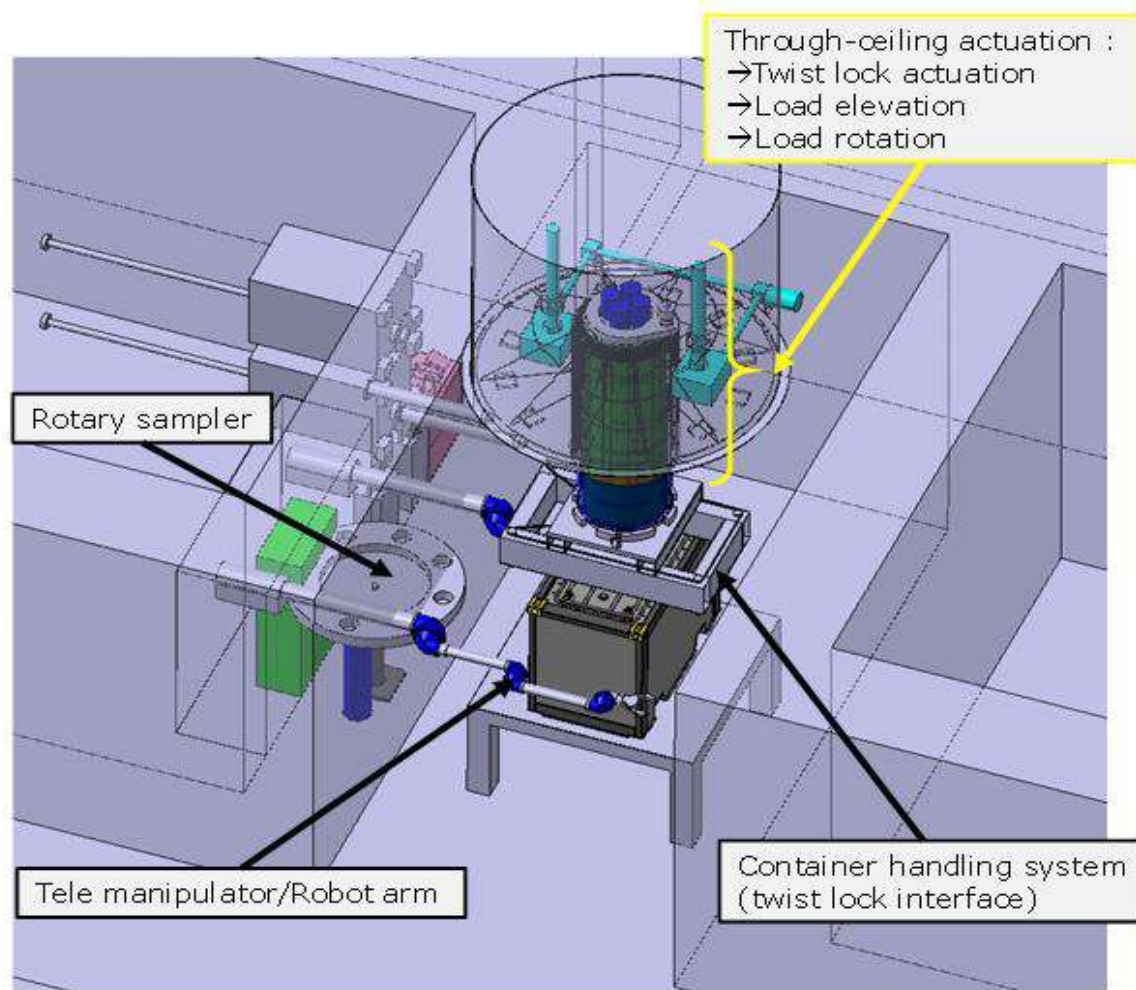
SECTION VIEW H-H



Packing Waste container

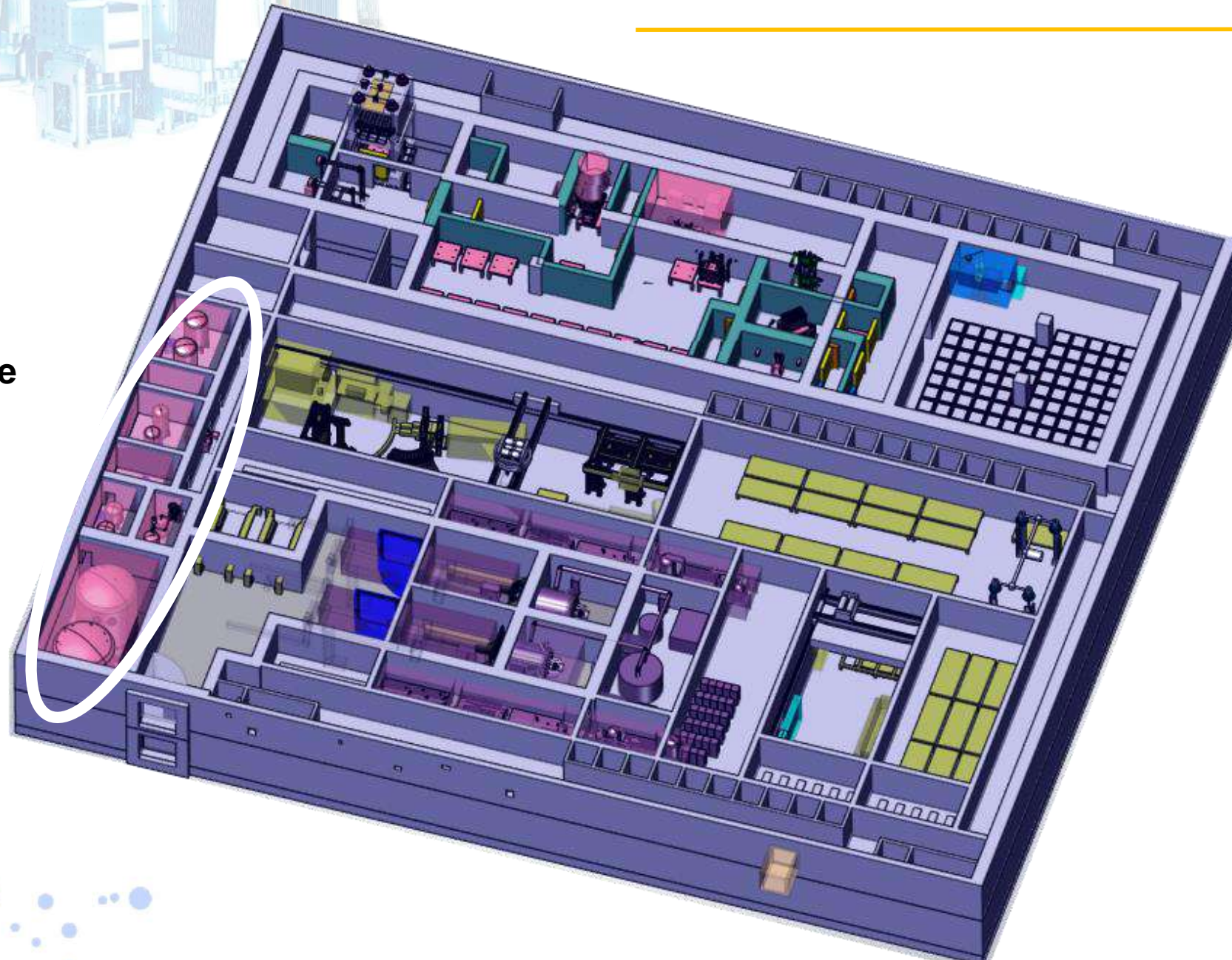


Lidding and bolting

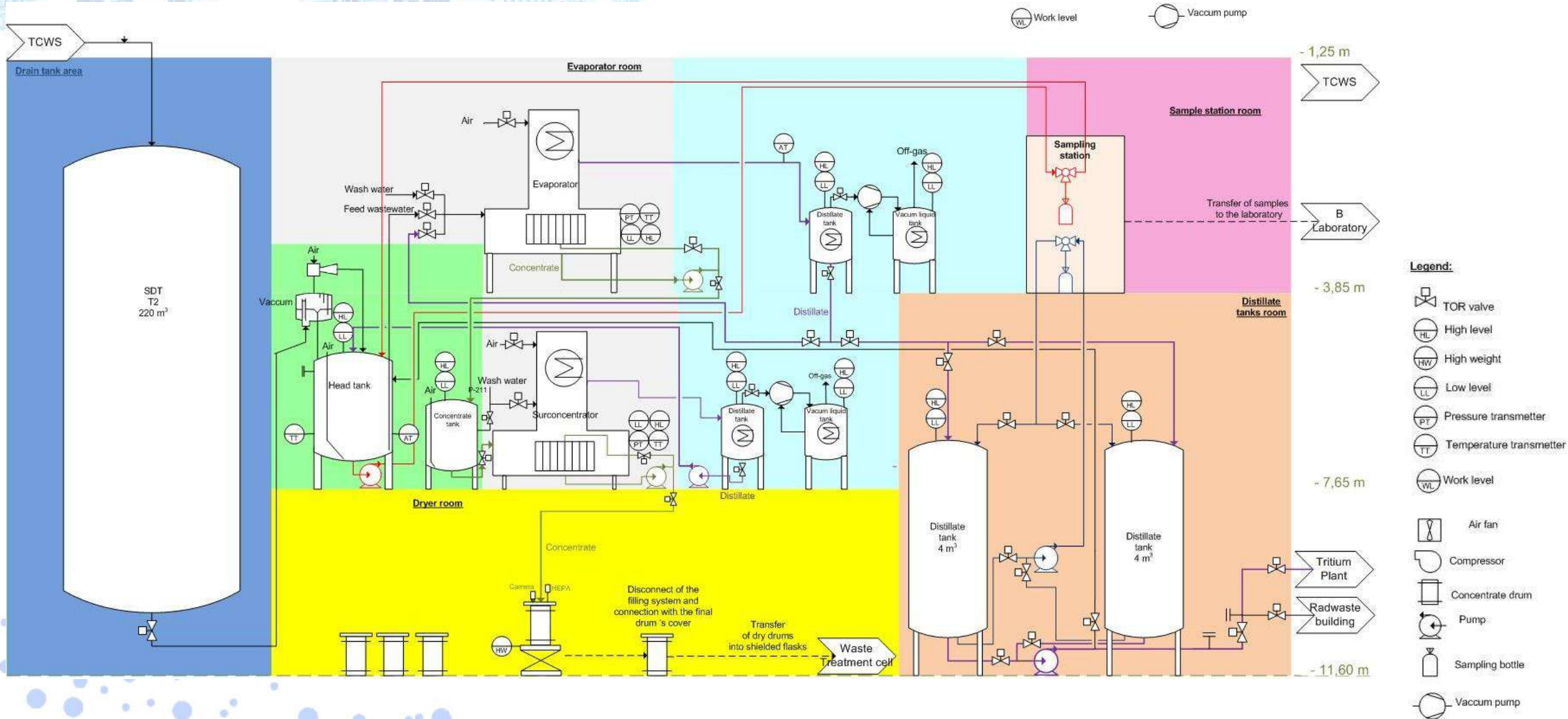


HCC Level B1

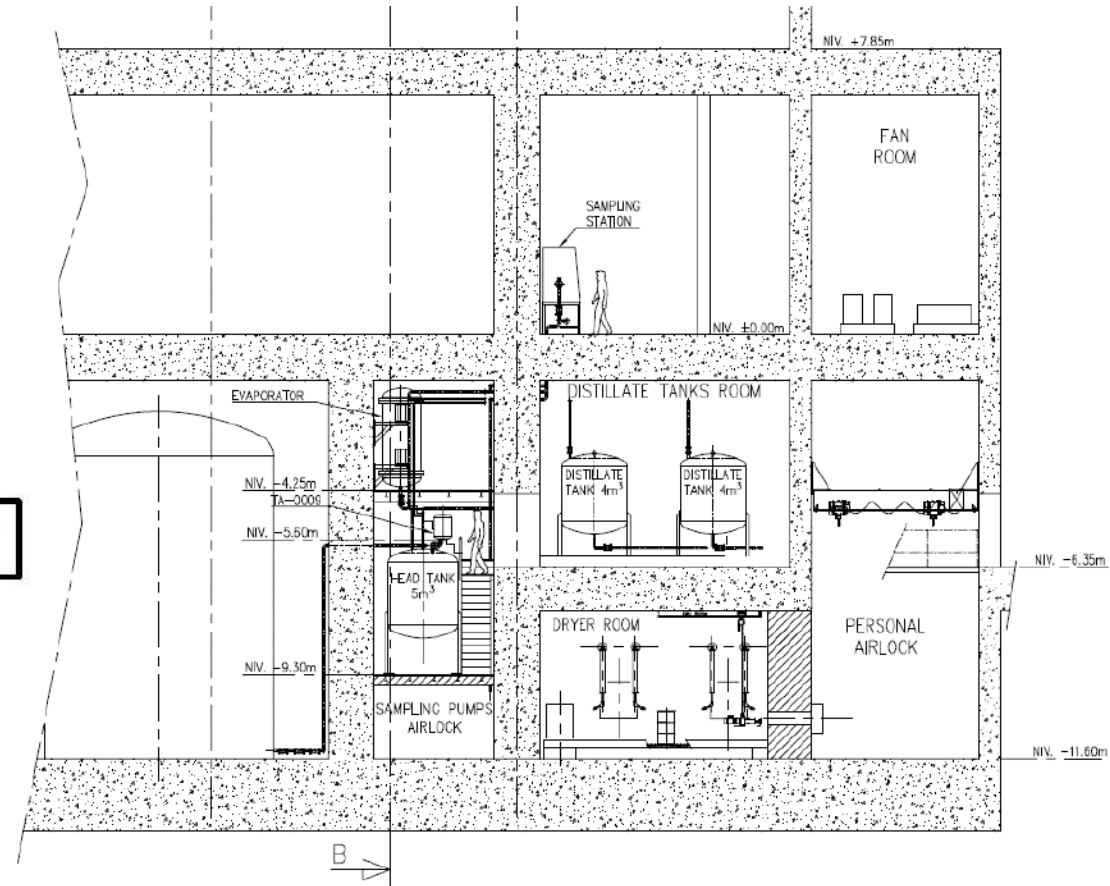
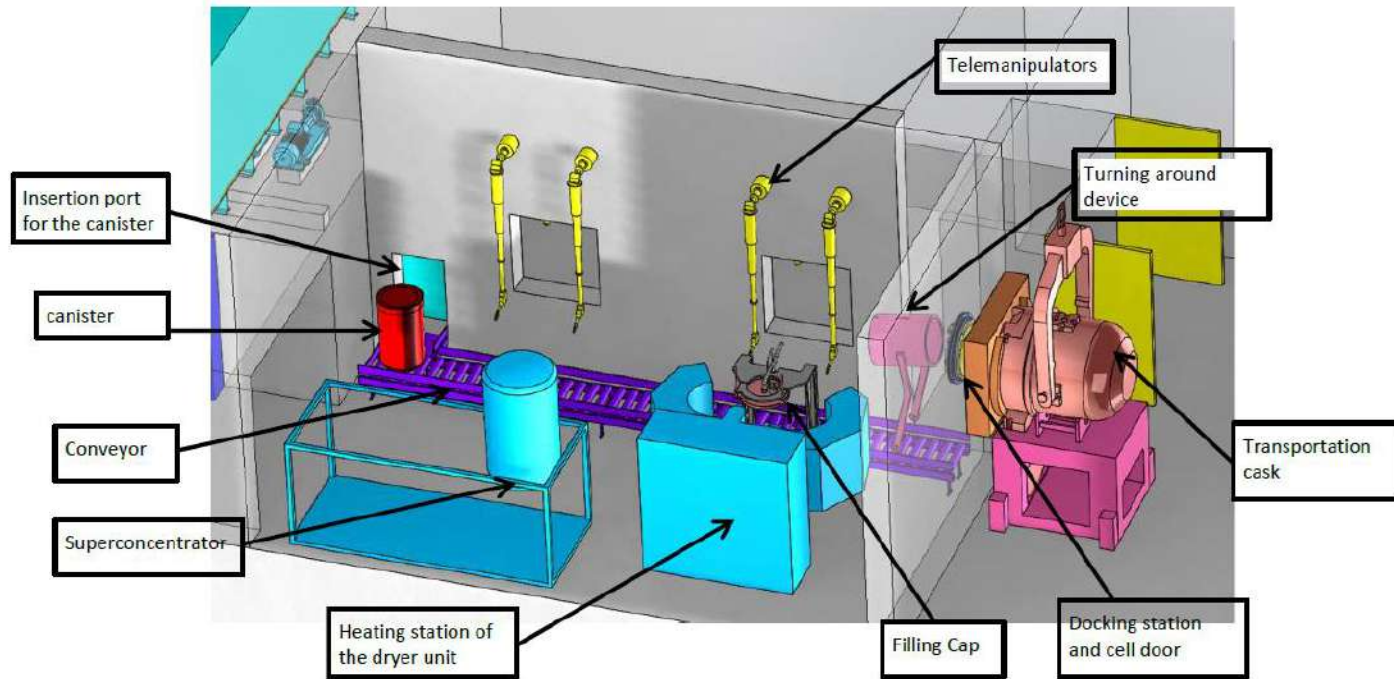
Liquid Waste Treatment



Liquid Radwaste Process Flow

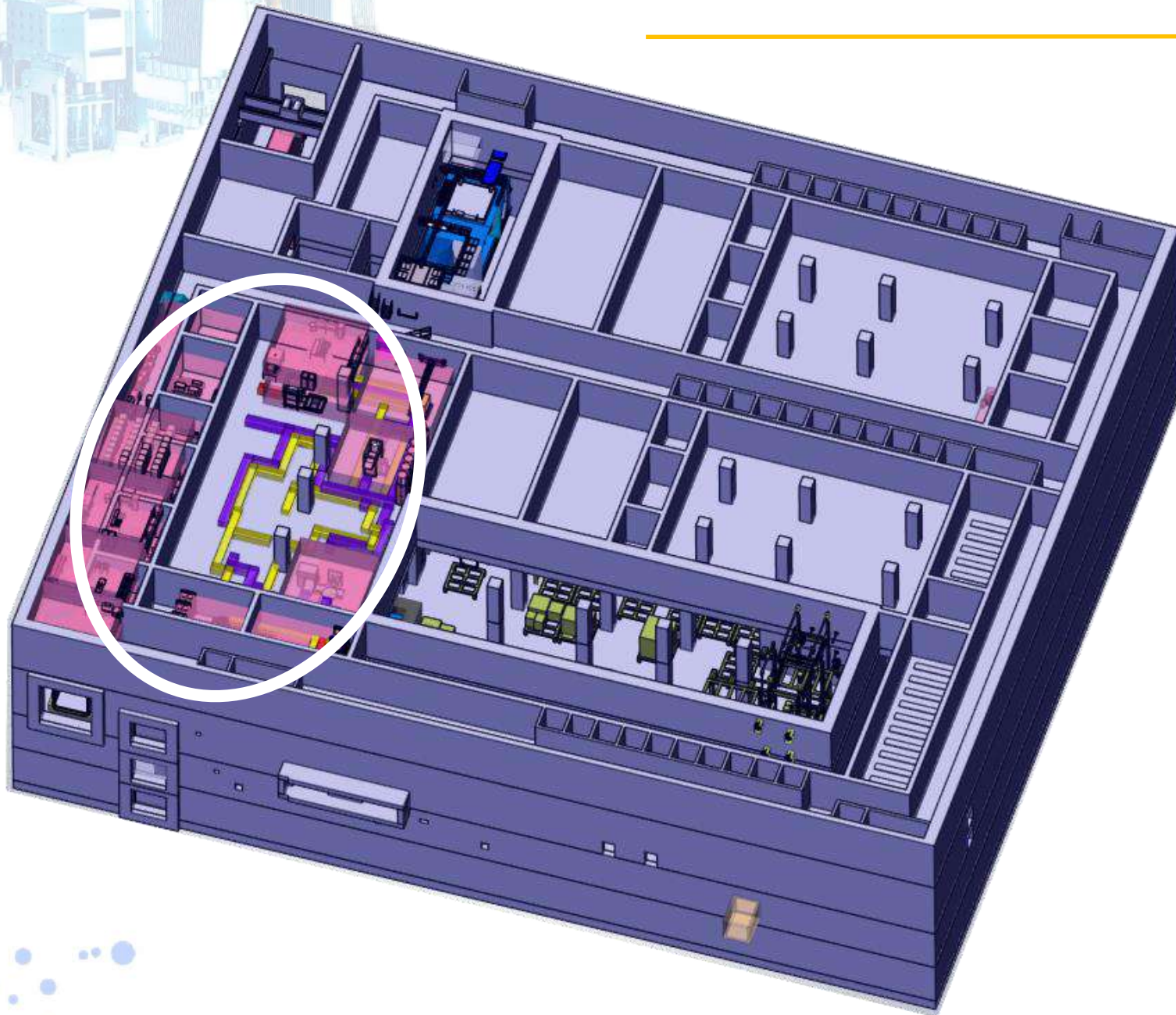


Overview of the Liquid Waste treatment



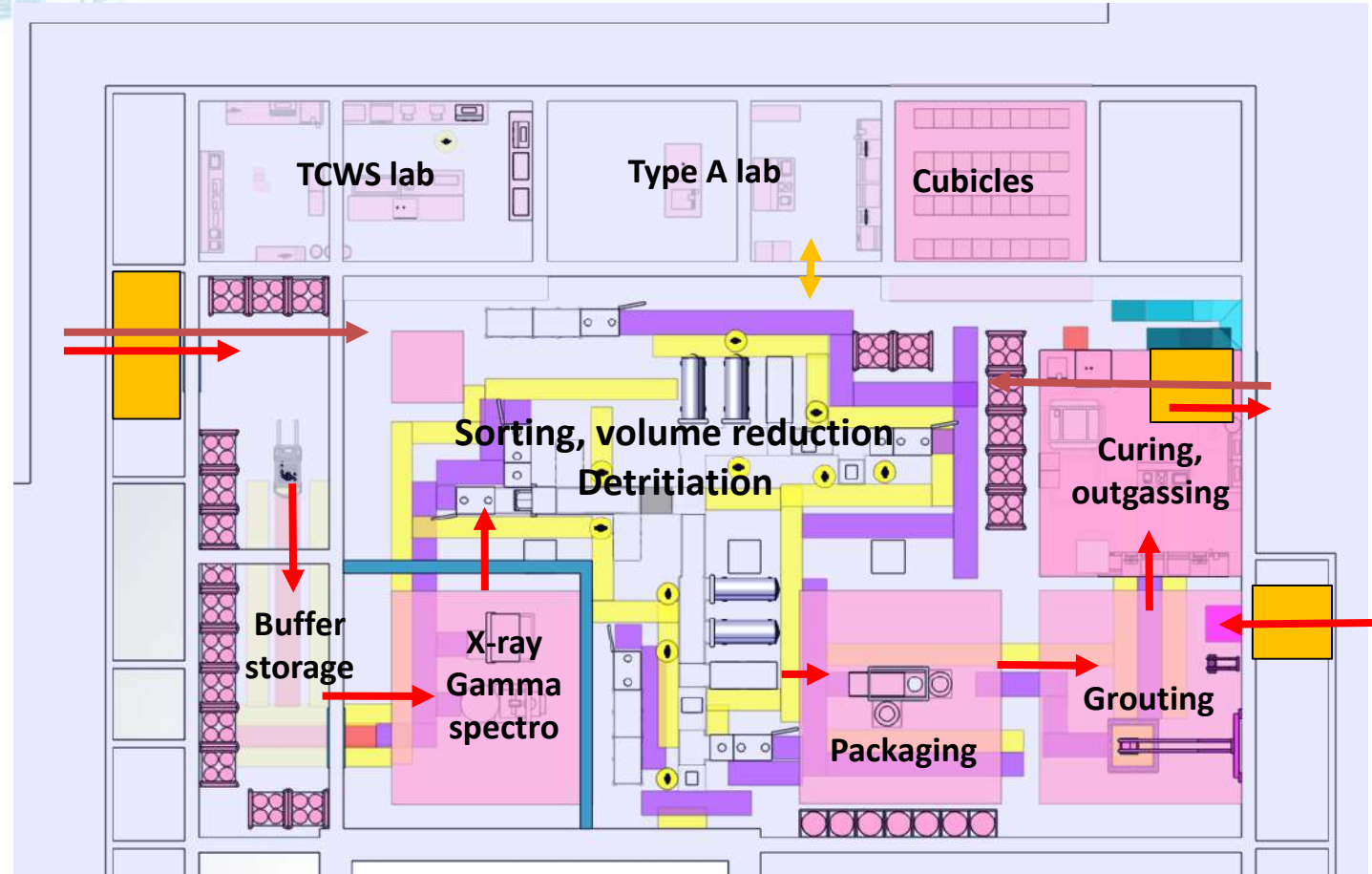
HCC Level L2

**Solid Type A
Radwaste
treatment**



Overview of the Type A solid waste treatment

Solid Type A Radwaste Treatment





HCC Procurement

Magnus Gohran

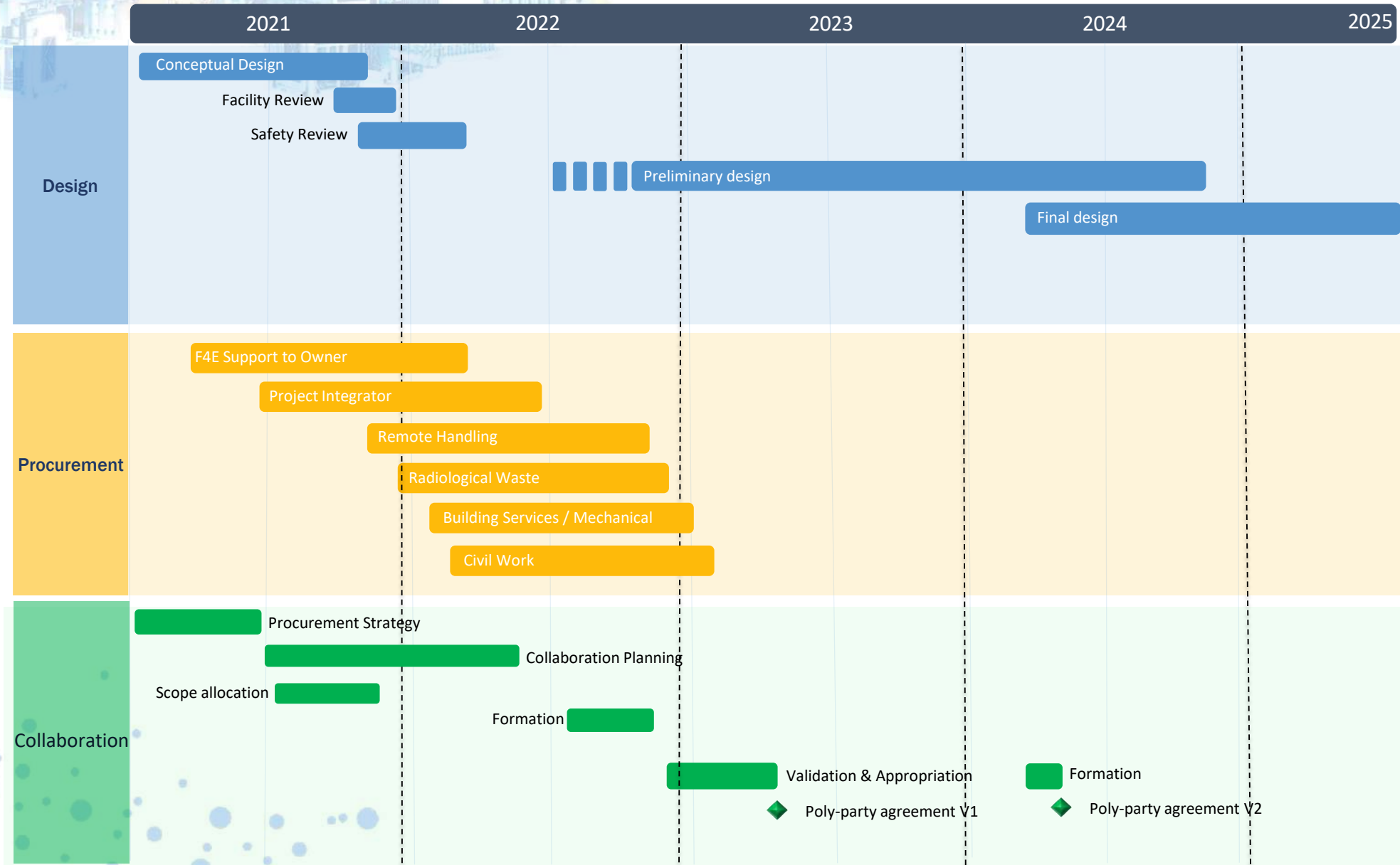
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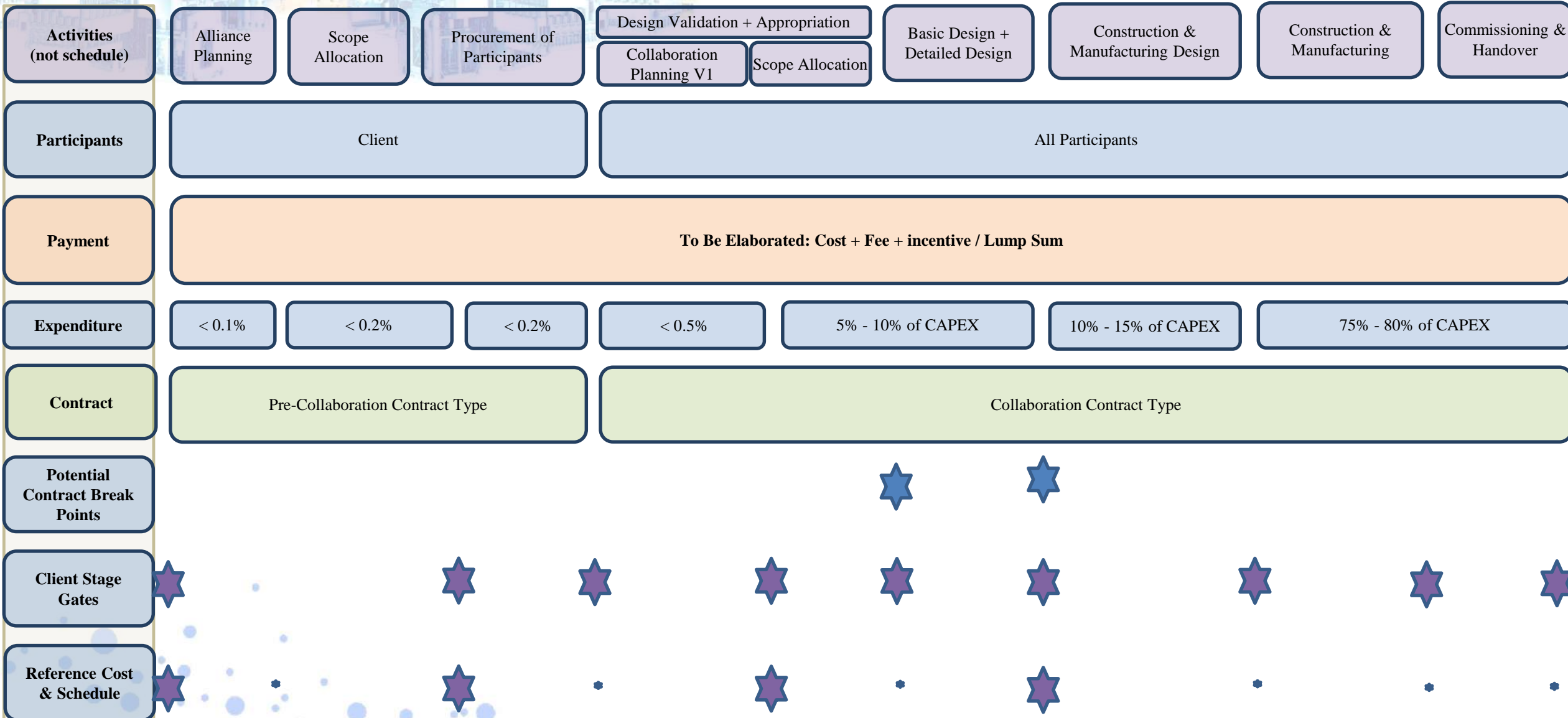
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Timeline



HCC Commercial Scheme



Collaboration Breakdown

3rd Party Support Contracts

Cost Control
Auditor
Experts
Support to Owner
Site Service
Etc.

Clients and Nuclear Operator
Steering Committee

Collaboration Board

Collaboration Management Team

Integrator

Civil Works

Tier 2

Service
Systems

Tier 2

Radiological
Waste

Tier 2

Mechanical
Systems

Tier 2

Remote
Handling

Tier 2

HCC Collaboration
Participants

This line describes the border between Clients and Participants. The Collaboration will have certain self governance within the line; the clients set the input rules and guidelines for this through the Collaboration Agreement.

The Clients will also be participants – matrixed into the collaboration organization

Clients and Nuclear Operator Steering Committee

Main Roles:

- Owner and Nuclear Operator
- Delivery of Concept Design
- Establishment of first Program Baseline
- Quality Program
- Retain control of project quality, cost and schedule
- Issue resolution

Collaboration Board

Main Roles:

- All Participants are represented typically senior executives
- High level management
 - Provide governance
 - Set Policies
 - Monitor Performance
 - High Level leadership
 - Issue resolutions
- Structured for consensus decisions – best for project
- Will be accountable for Collaboration performance
- Report to the Client Steering Committee

Collaboration Management Team

Main Roles:

- All Participants are represented
- Led by an Alliance Manager
- Deliver the project outcomes as defined by the Clients
- Day to day management and leadership
- Decisions and Issue resolution – best for project basis
- Report to the Alliance Board

Integrator

Main Roles – The Global Picture:

- *Behavioral role model*
- *Role will change with the phases of the project*
- *Control and maintain the technical and program baselines*
- *Prepare and maintain the Collaboration Implementation Plan*
- *Lead and Integrate*
- *Issue resolution – best for project decisions*
- *Lead propagation of Safety Requirements*
- *Lead Design to Cost and Value Engineering efforts*
- *Ensure buildability, RAMI, Standardization, etc.*
- *Lead Project wide Risk Management including Mitigation implementation*
- *Support Clients (Stage gates, reviews, audits, etc.)*
- ...

➤ **Timeline for Upcoming Procurements**

- *Project Integrator is the first Contract to be launched*
- *This is aiming for the middle of the summer*
- *Thereafter procurements will follow progressively*

➤ **Strategy for project Phases/Stages**

- *Early engagement is envisioned, specifically for the Project Integrator*
- *Once the Collaboration is formed, there will be a number of project phases, each can be a re-formation of the collaboration to suite the phase ahead*

➤ **Governance and Roles**

- *IO and F4E are Clients forming the Steering Committee*
- *The Collaboration Board – typically senior executives from each Participant – High level management*
- *The Collaboration Management Team – Support the Participants in the day to day work*
- *Participants – Executes the Works*



Questions/Comments?