



5 tons, 5 Sv/h, 2 mm Tolerance Exchanging the Plug JMA16 at FRM II

Elbio Calzada

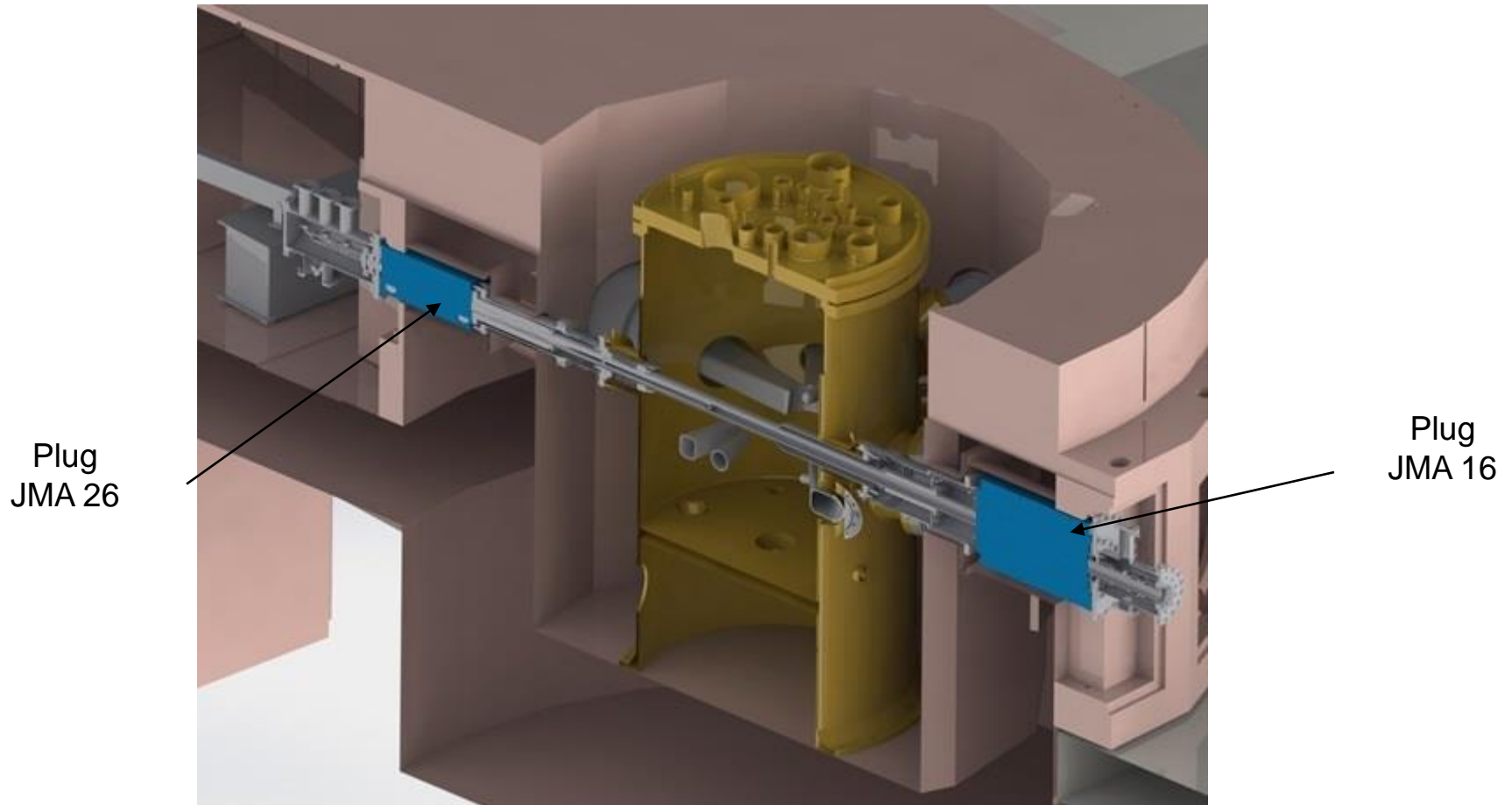
MLZ is a cooperation between:

➤ Overview:

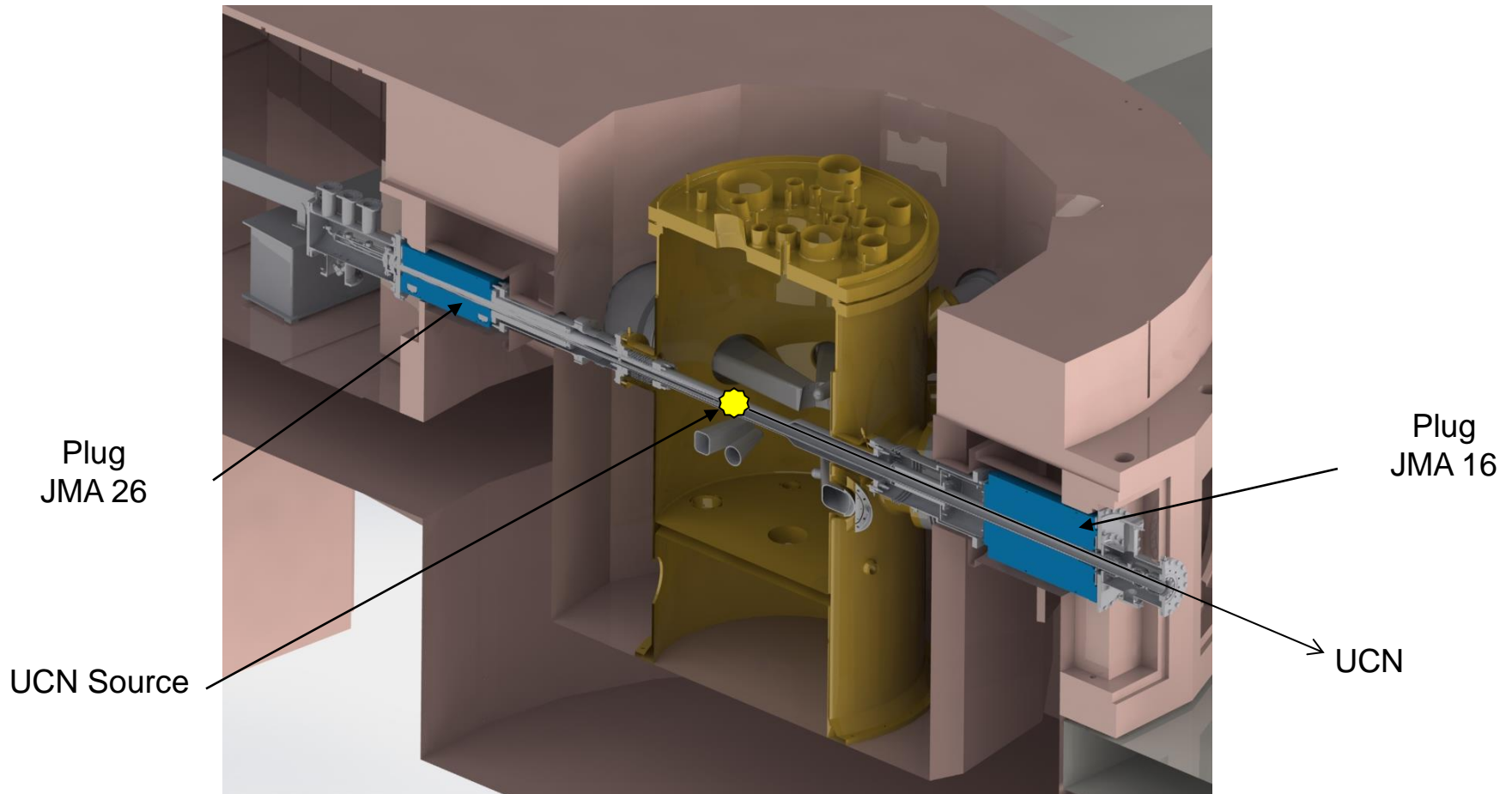
- Introduction: Why are plugs being replaced?
- Strategy
- Components
- Mock-up
- Situation in der E-Hall
- Execution
- Unexpected issues (DENIM favorites)
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Schematic Representation of the FRM II Reactor



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The Challenge

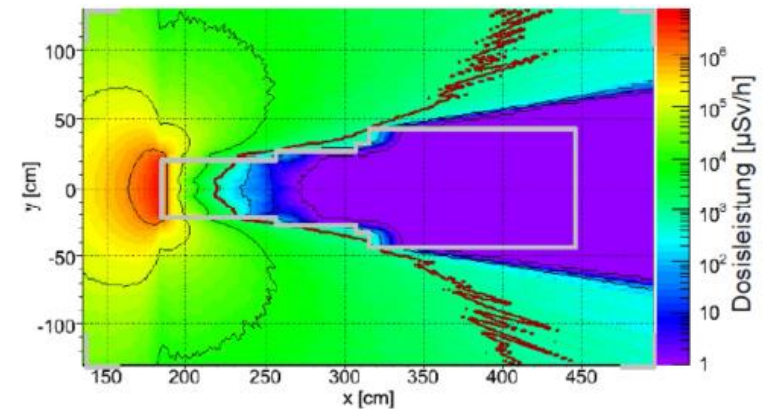
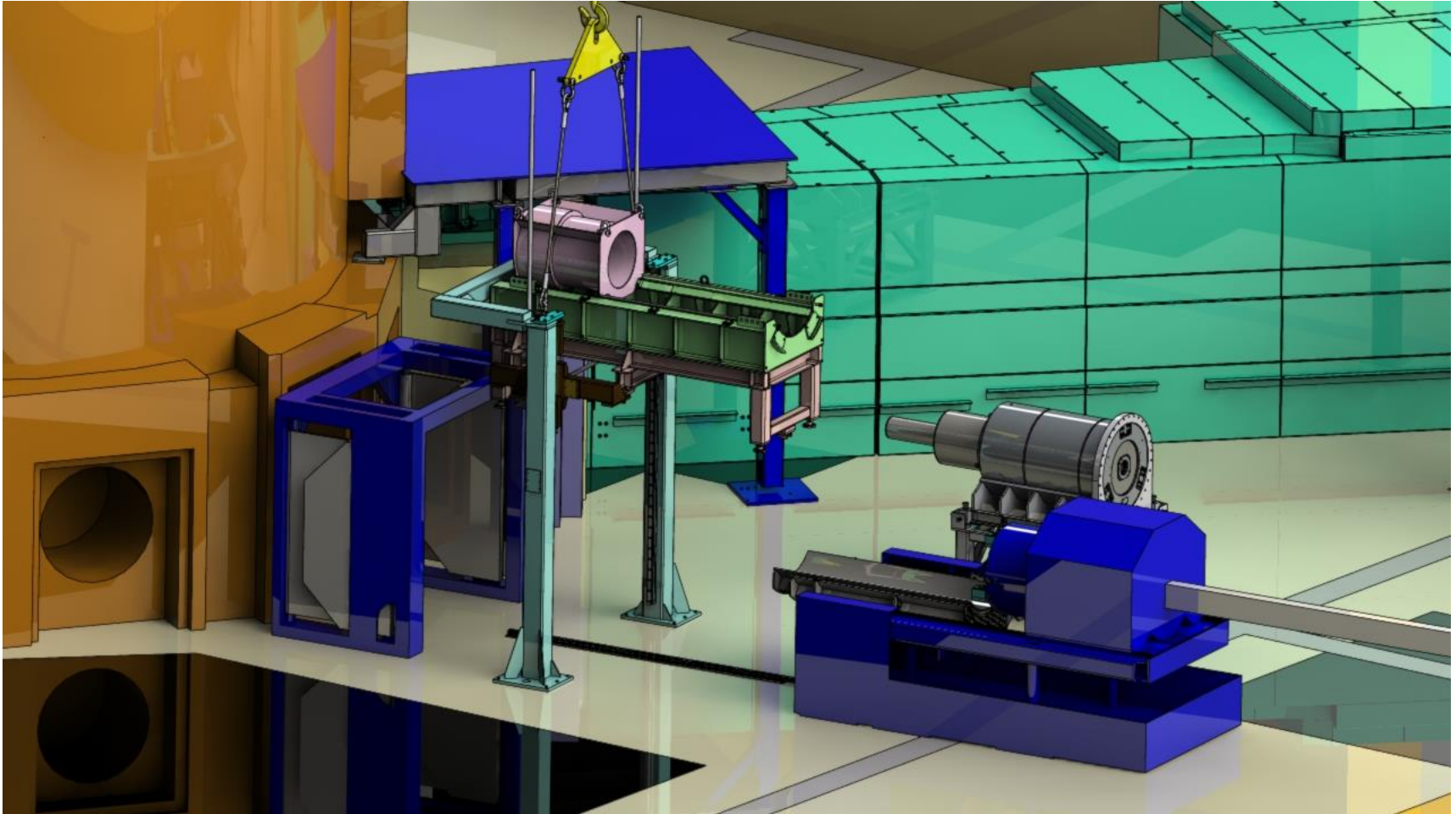


Abbildung 5: Gammadosisleistung in der horizontalen Ebene durch den Stopfen JMA16 aus den Co 60 und Fe-59 Zerfällen (nach einer Abklingzeit von 50 Tagen). Die dunkelrote Linie gibt die 1mSv/h-Grenze an [1].

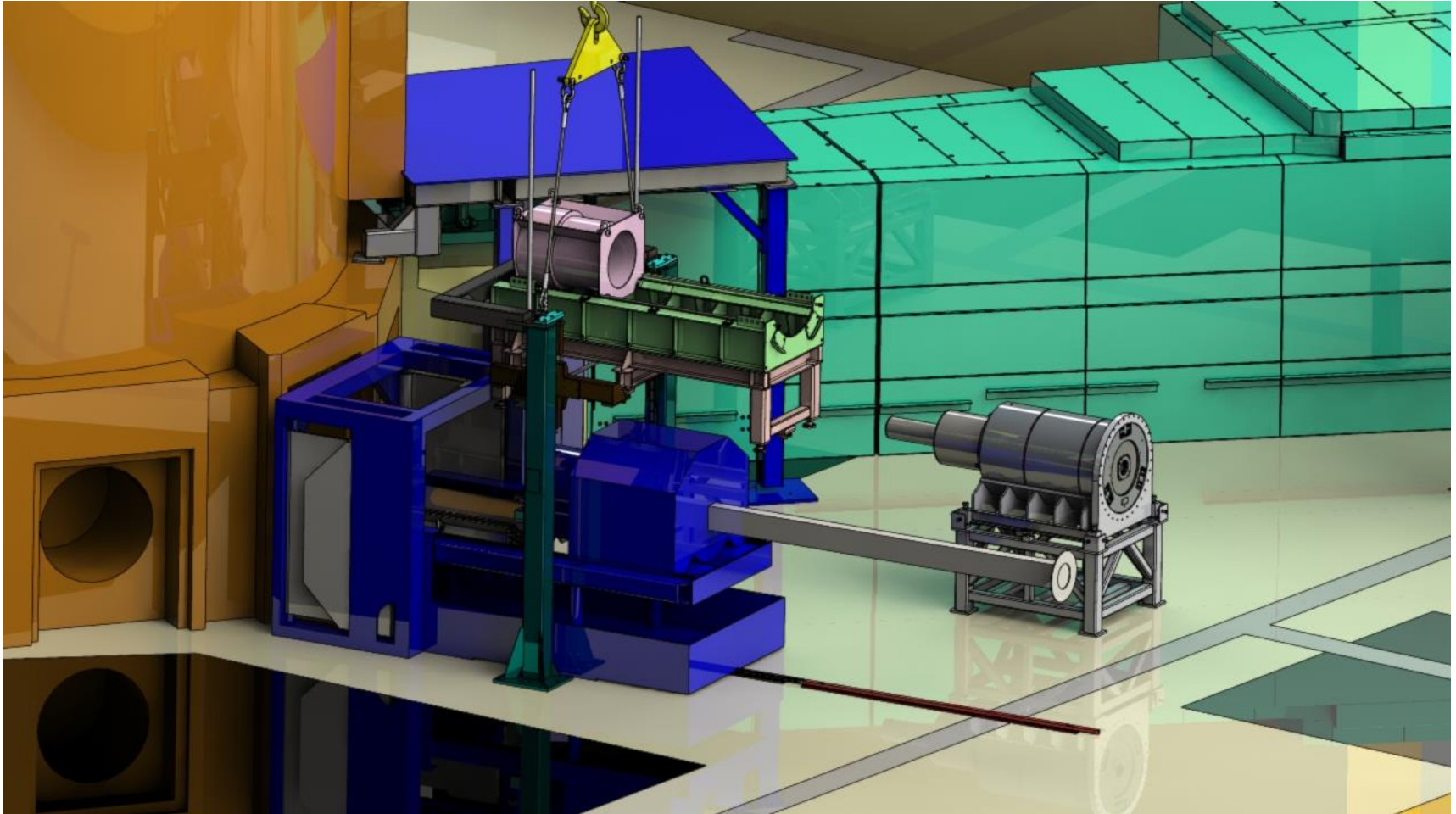
5t, 5Sv/h, 2mm tolerance

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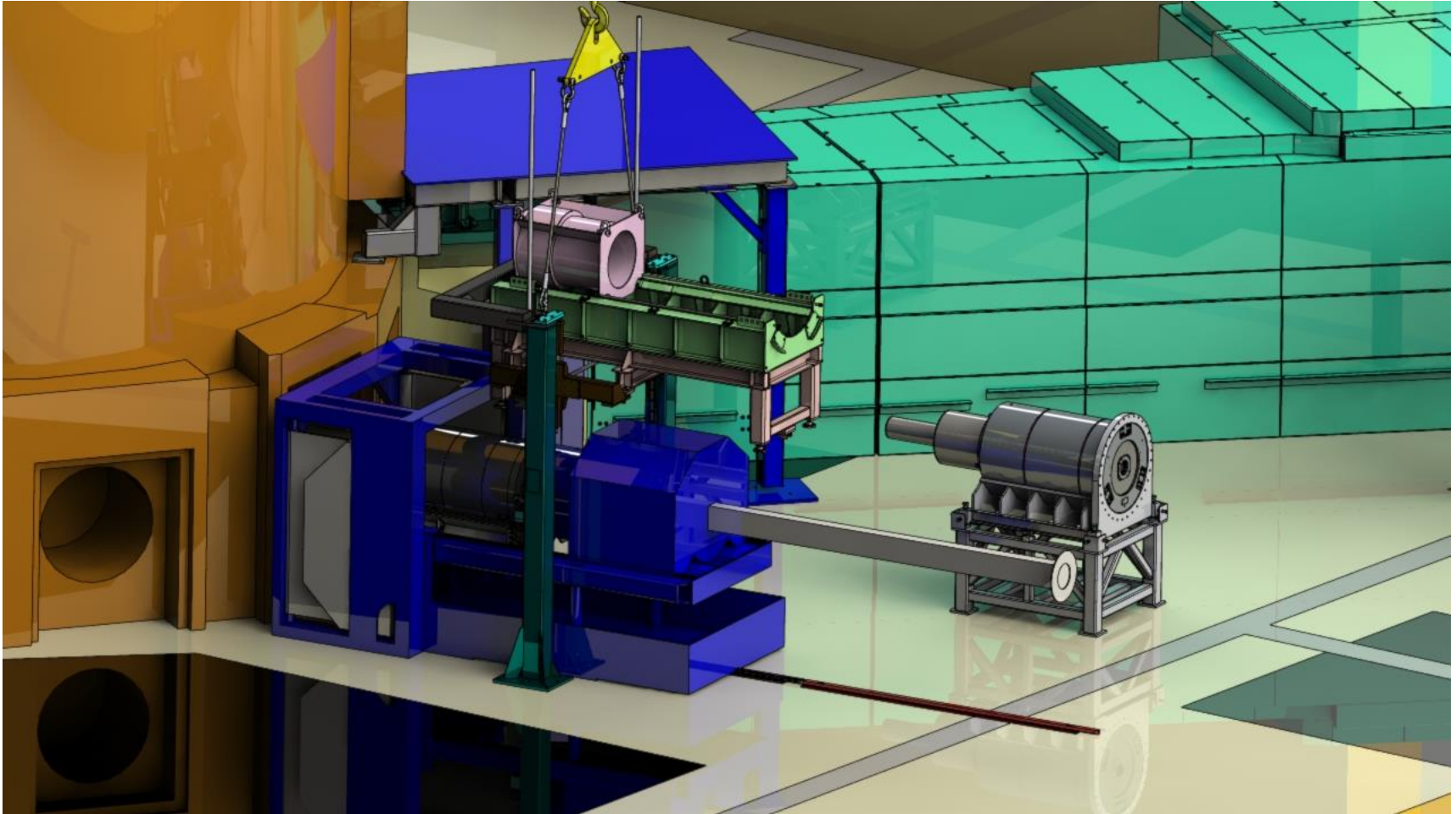
Strategy to change the plug JMA16 at FRM II



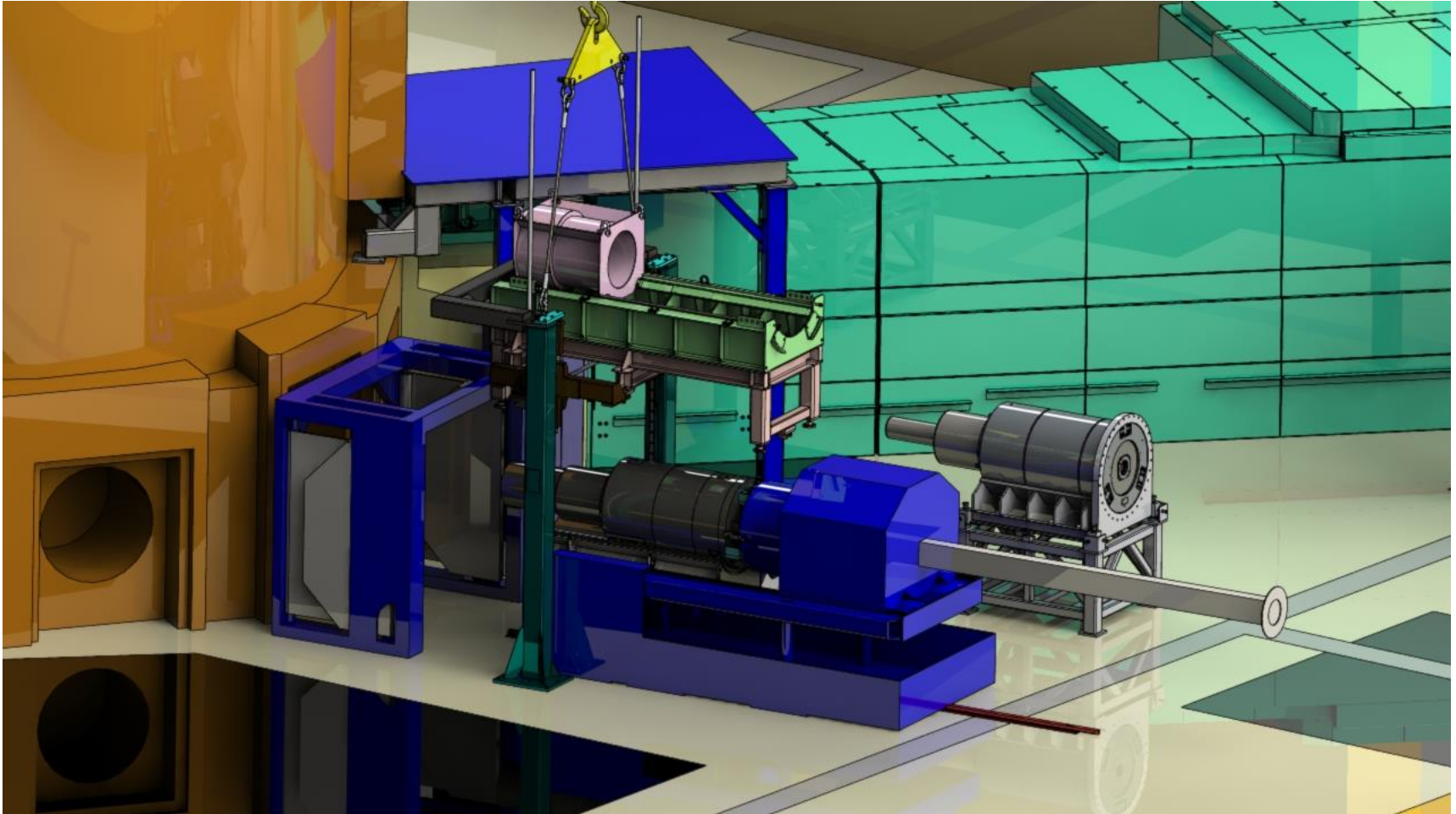
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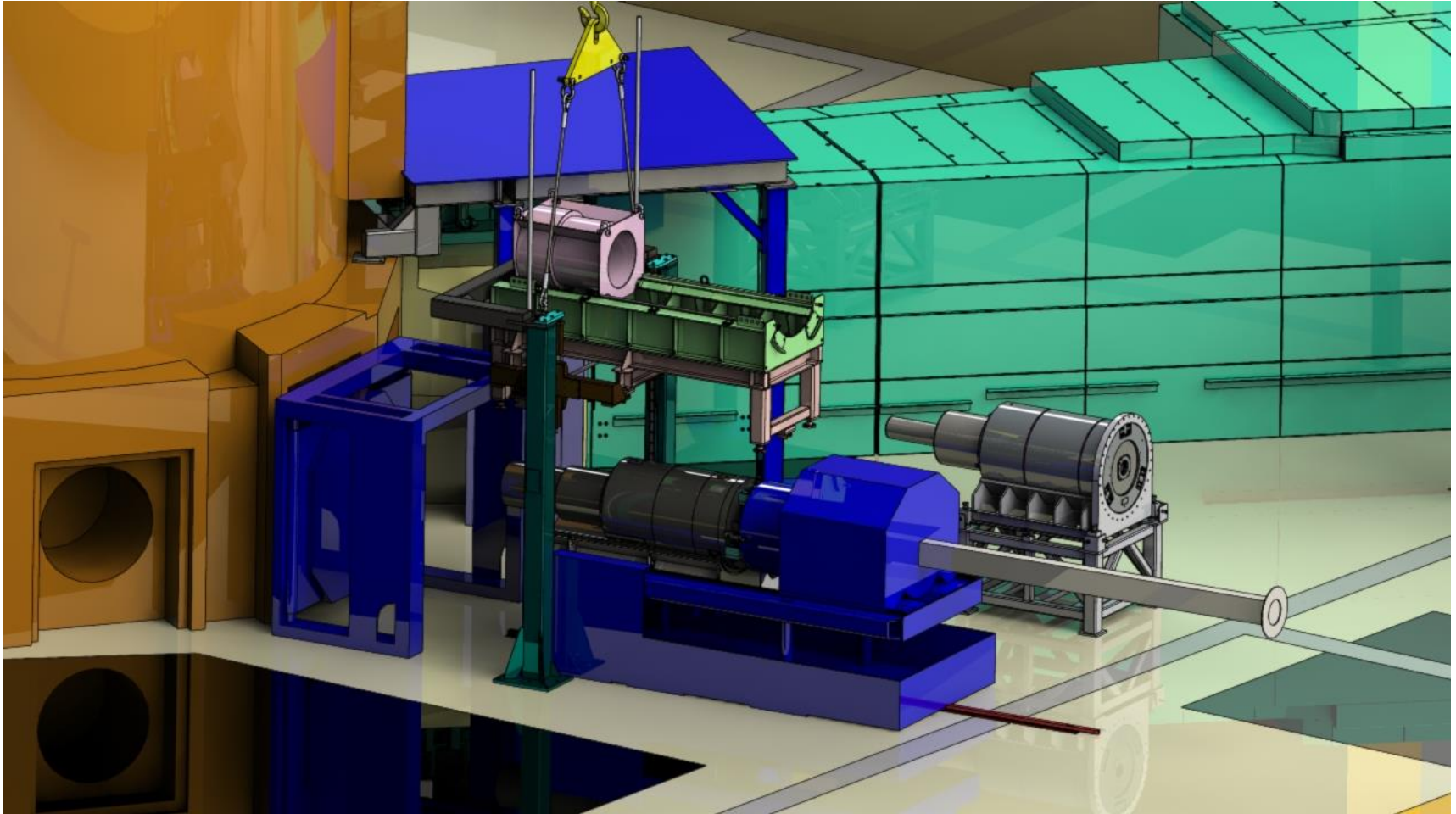
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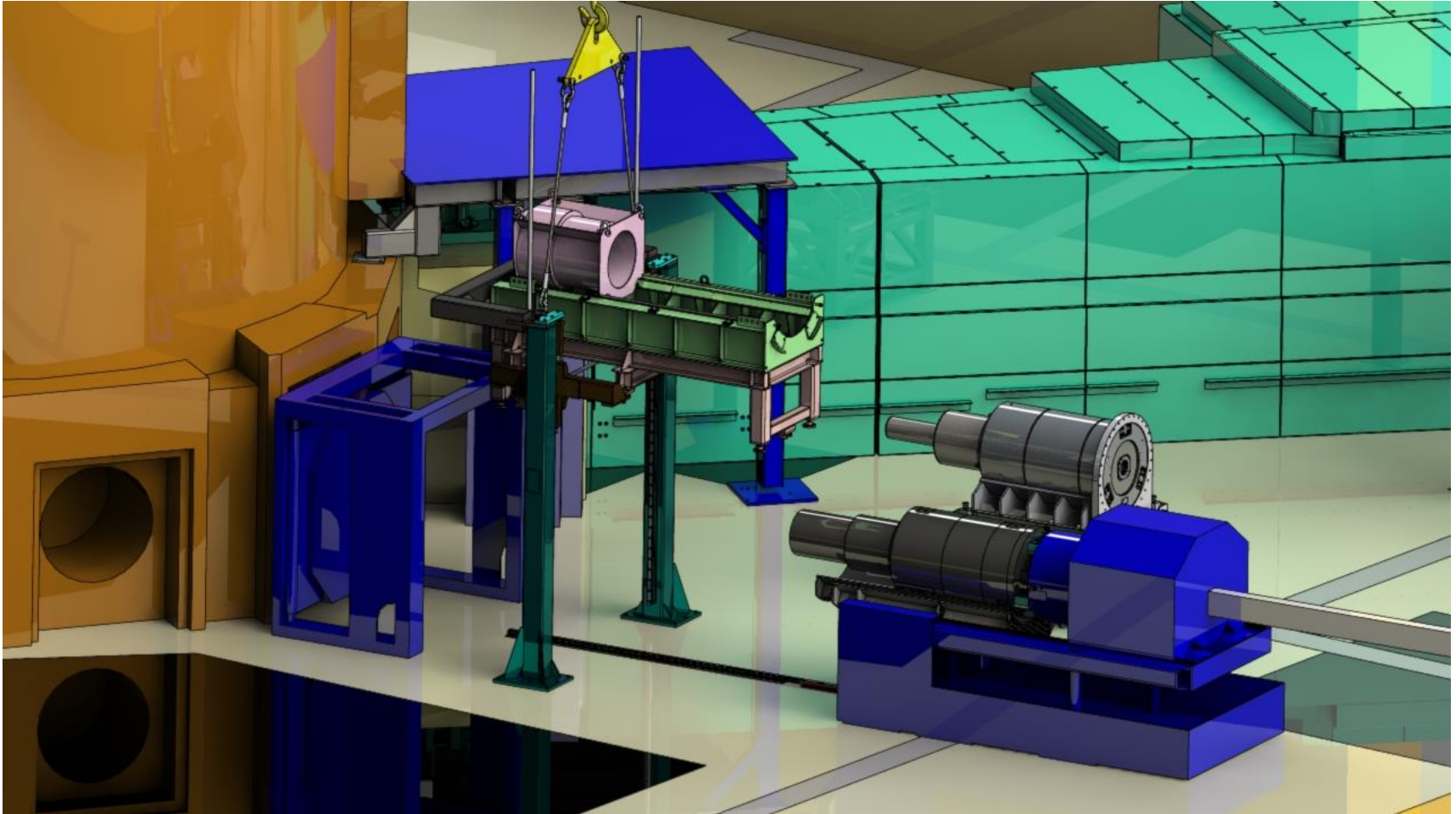
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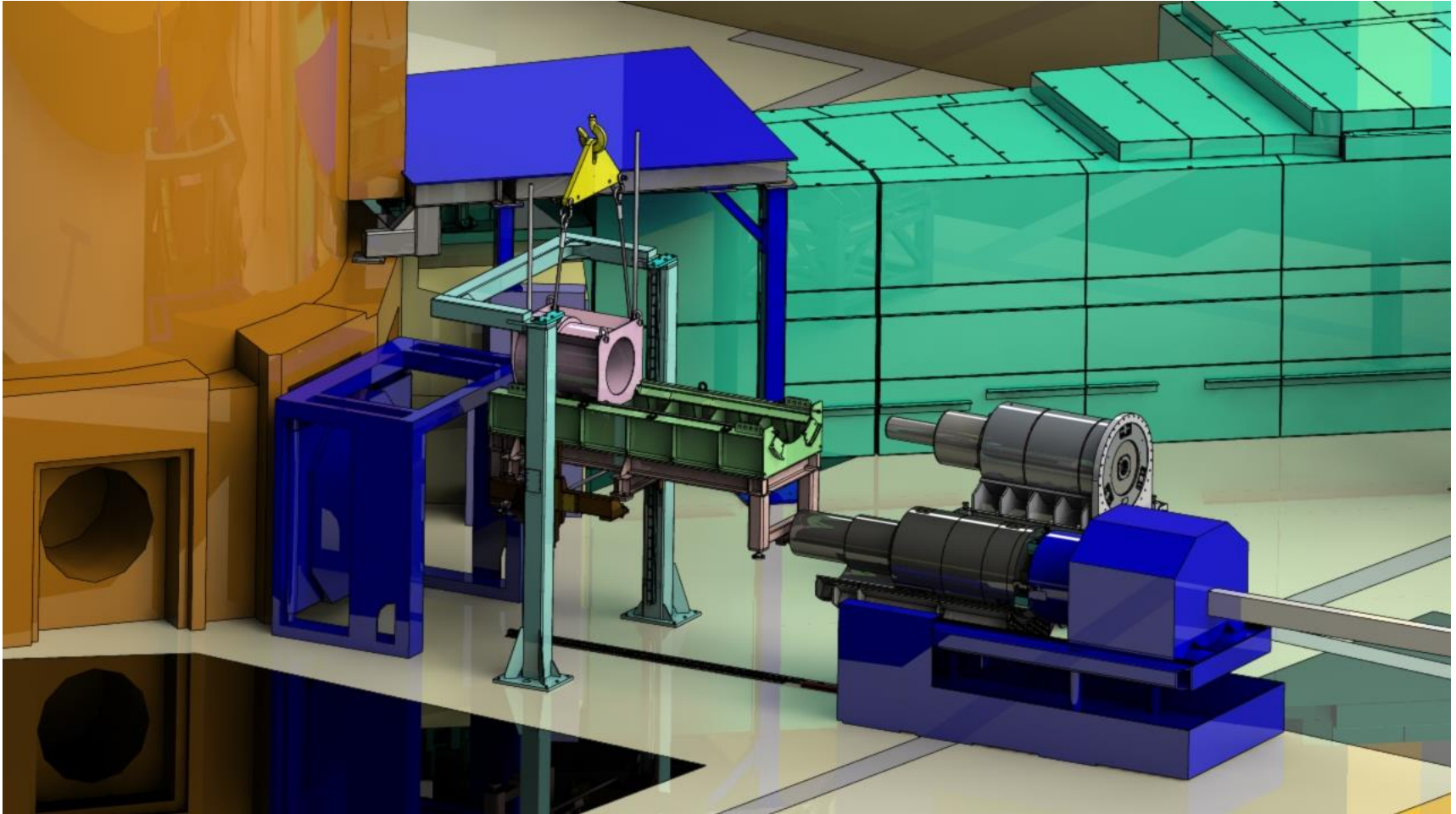
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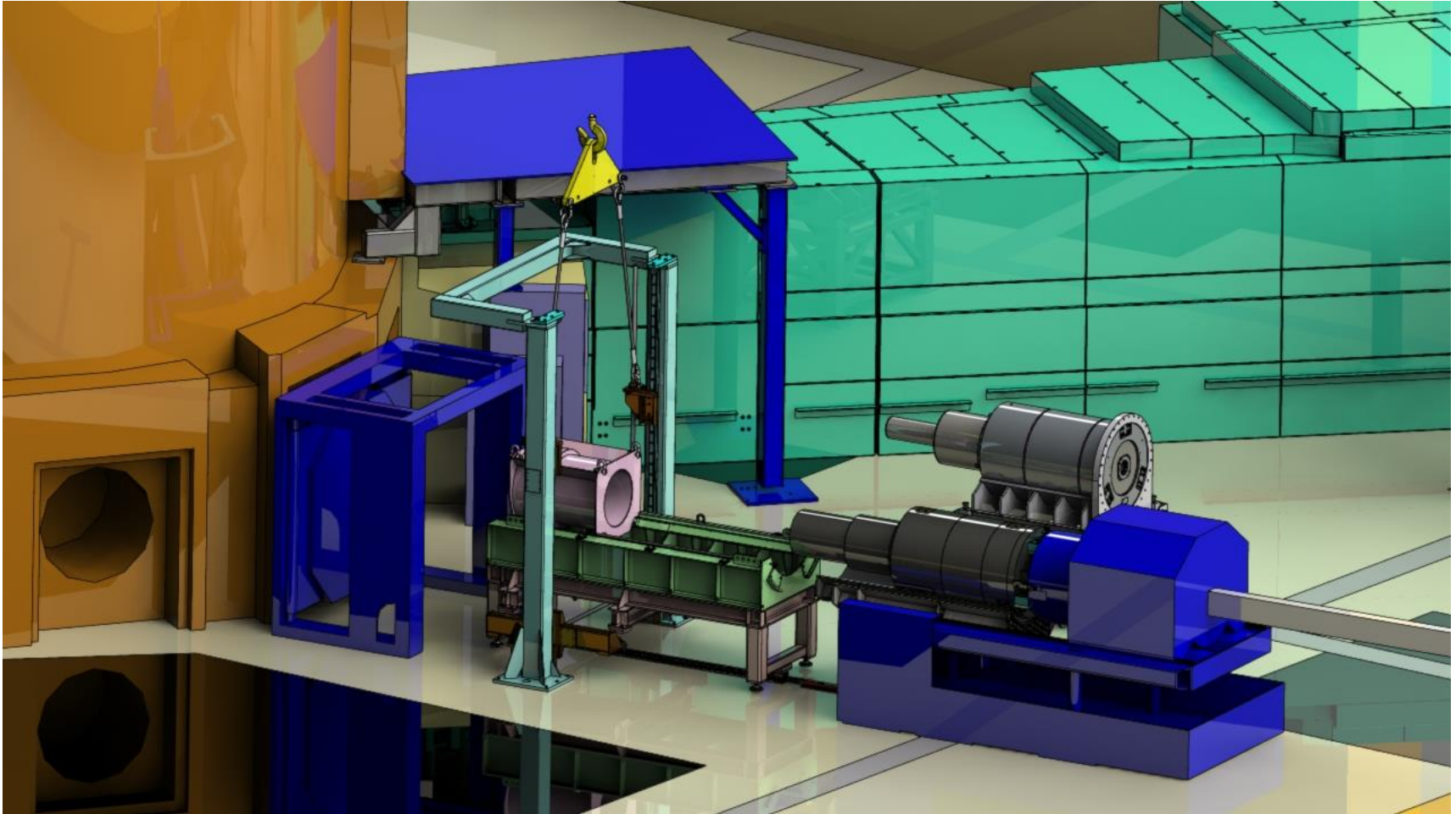
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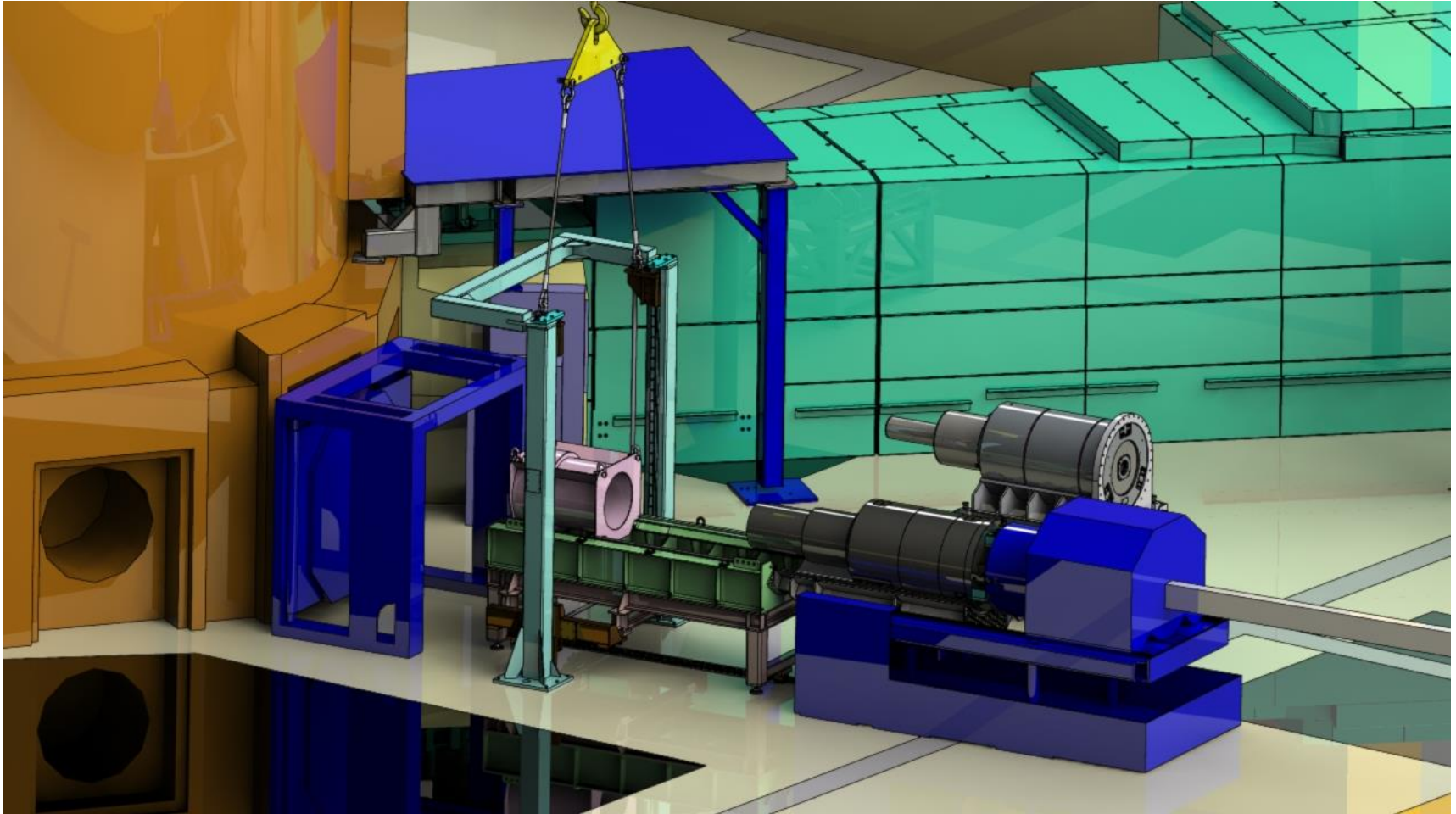
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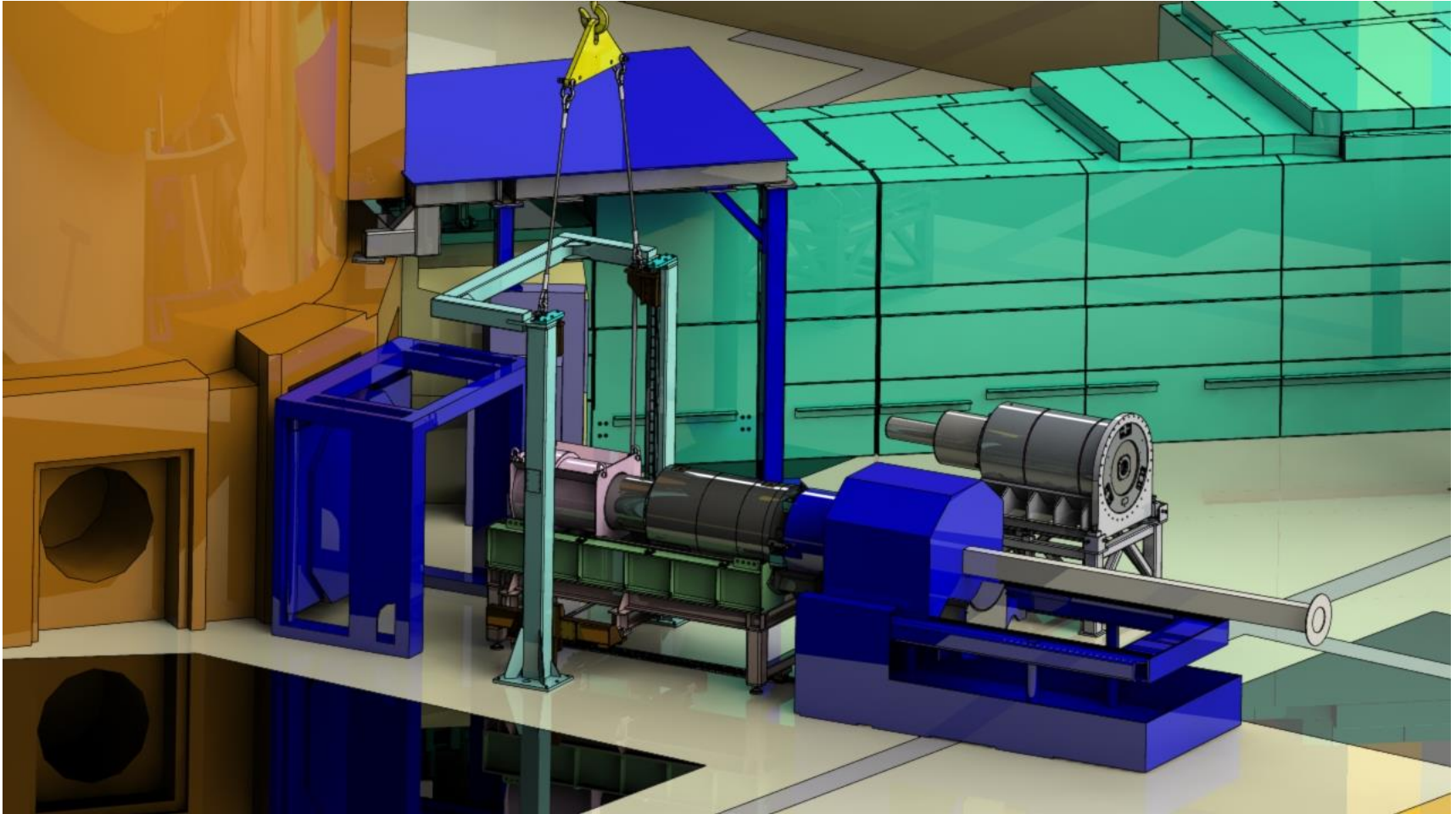
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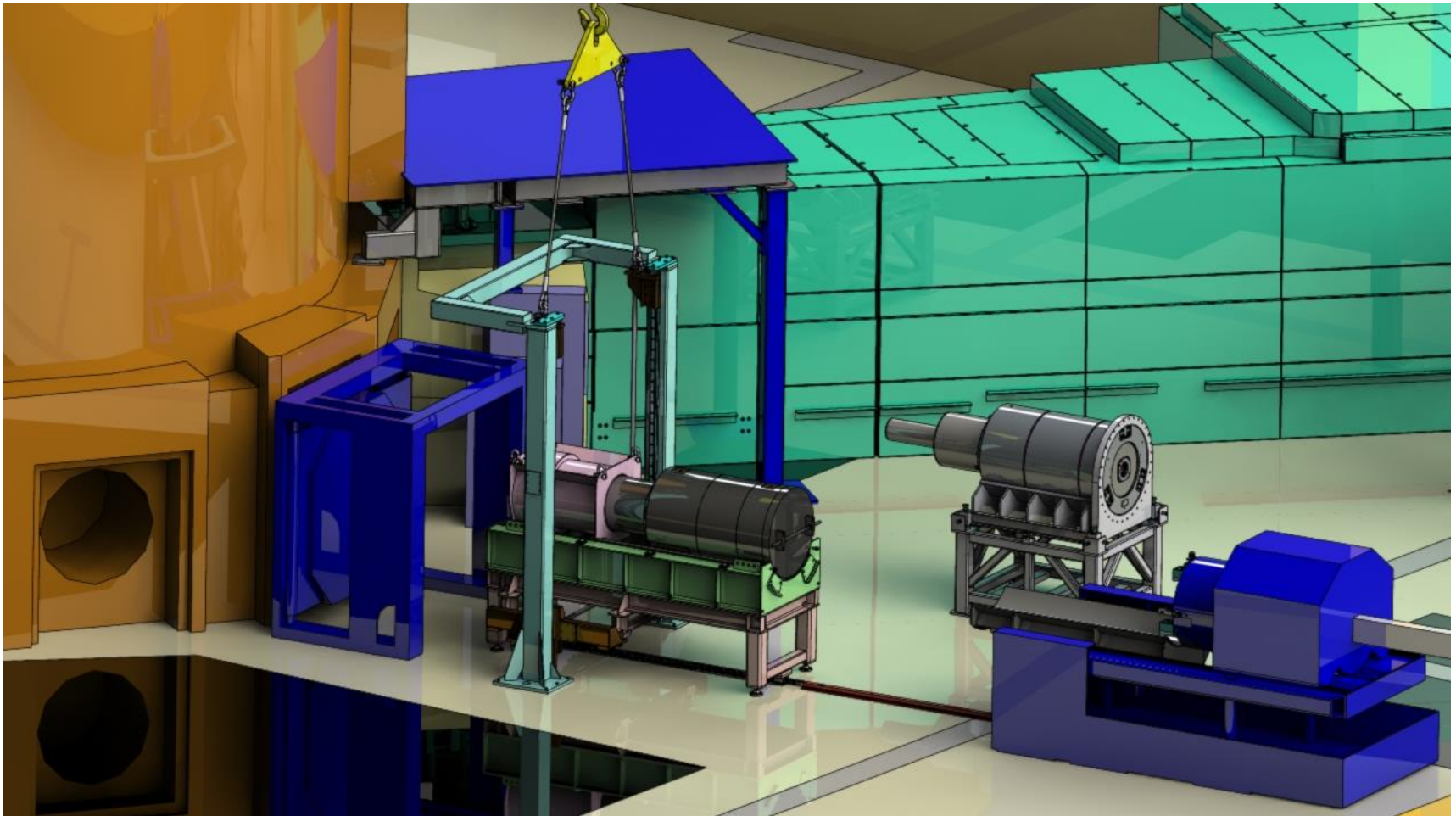
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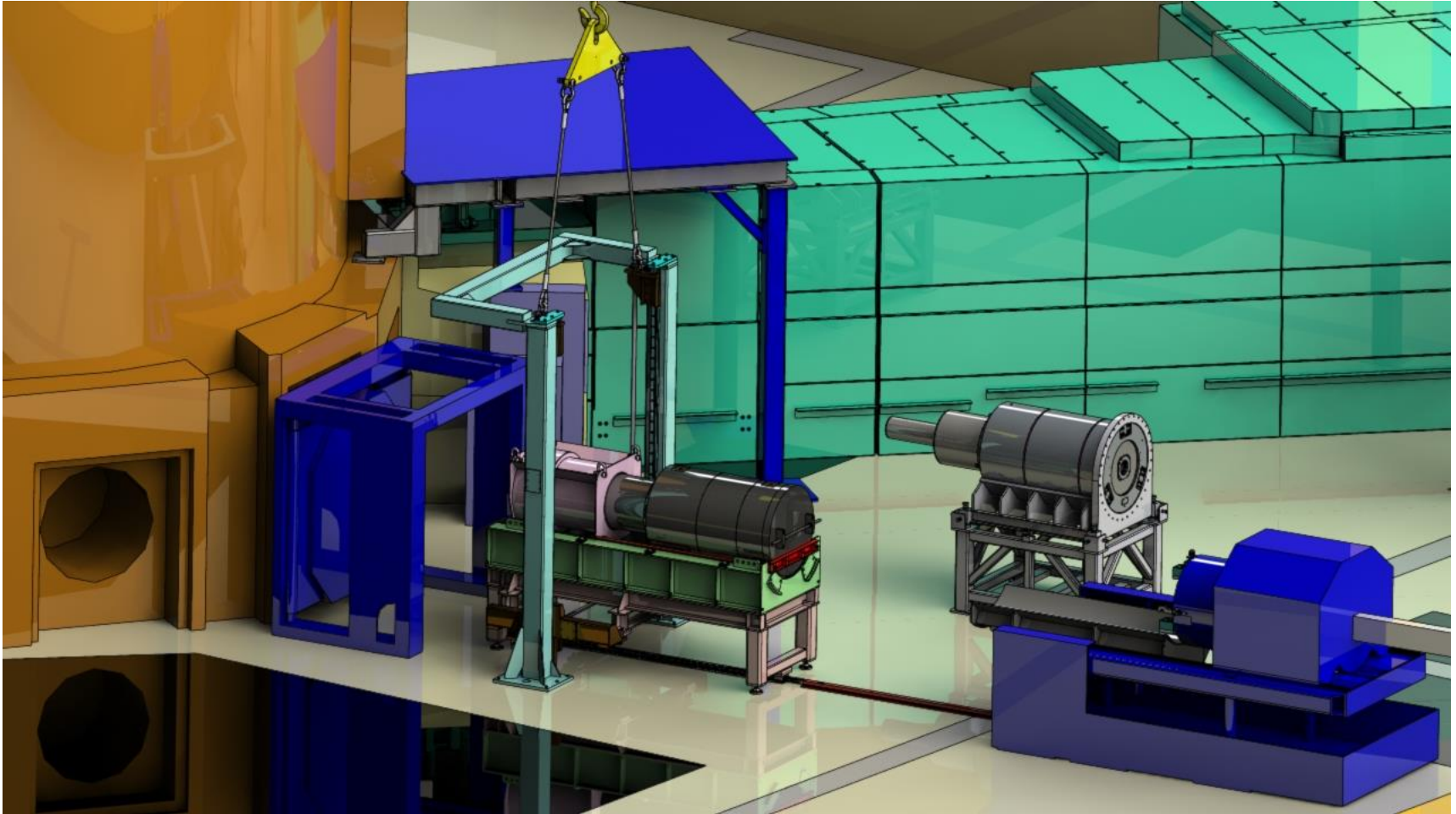
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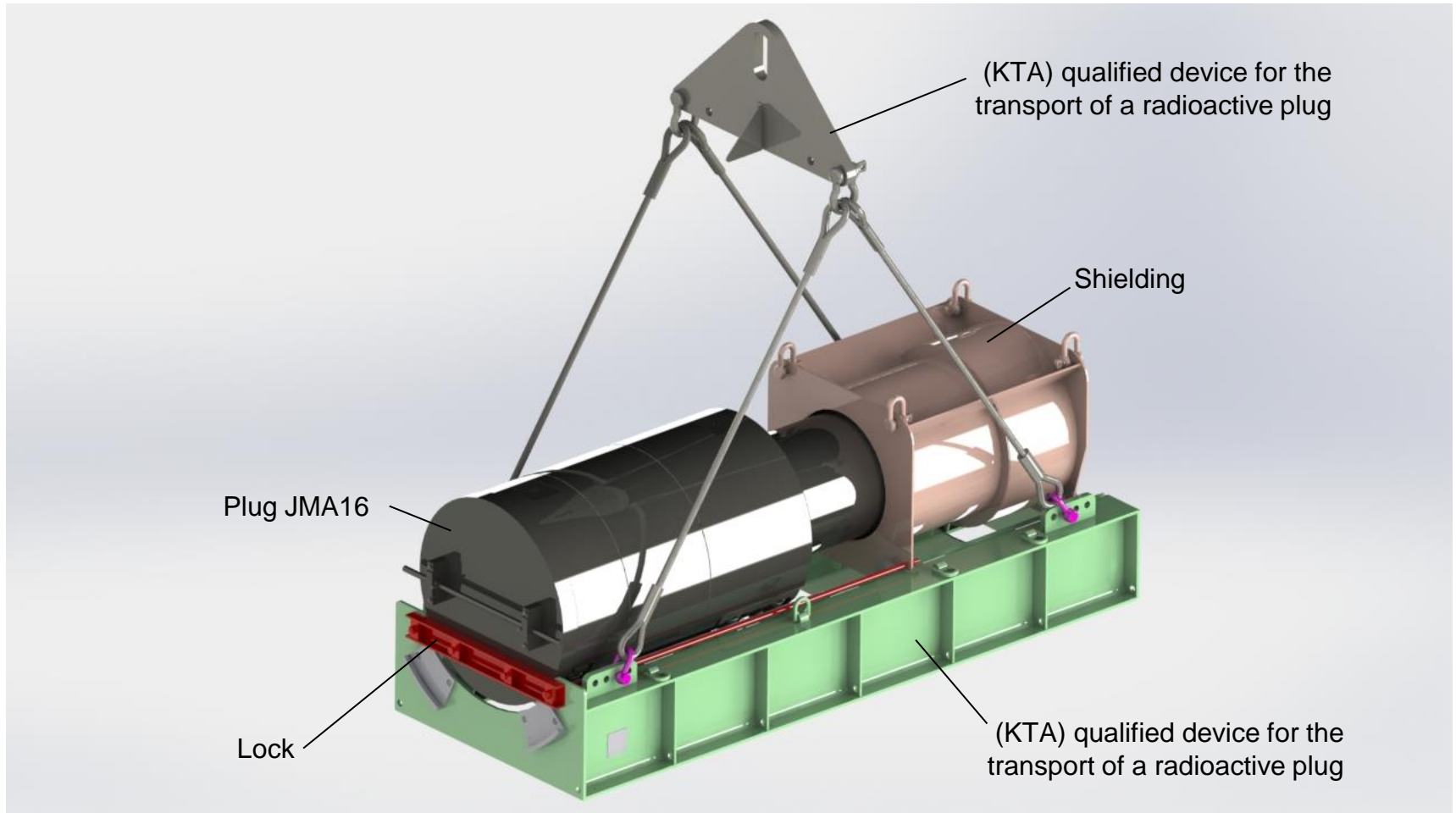
Strategy to change the plug JMA16 at FRM II



Strategy to change the plug JMA16 at FRM II



Transport of activated plug JMA16 in the E-Hall in shielded condition

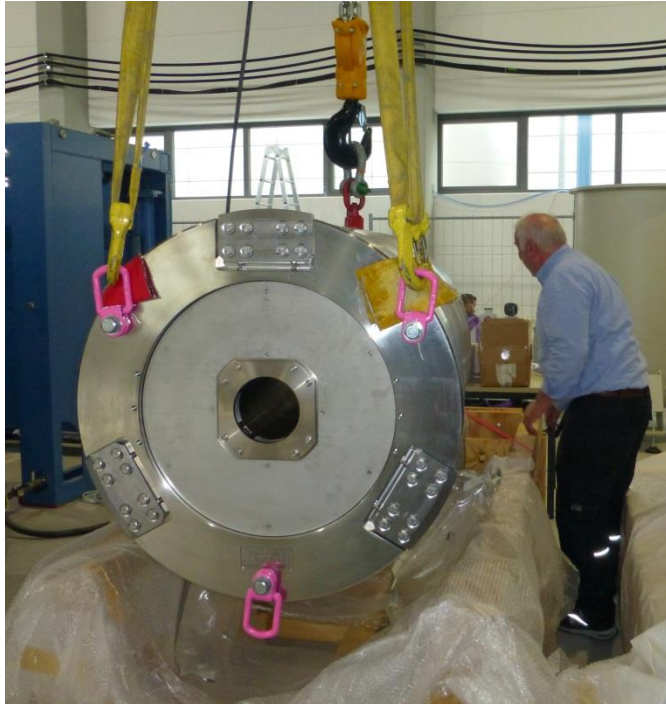


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Planning, Construction, Production and Delivery of Components

- New plug JMA16
- KTA transportation device
- Dummy of the built-in shielding plug JMA16
- Dummy of the beam tube SR6
- 2nd guide rail for the Plug changing machine (SRWM)
- Redundant carrying system
- Cover plate for floor duct in the E-hall

New Plug JMA16



(KTA) qualified device for the transport of a radioactive plug

Hersteller:	Dokument:	SB-Nr.:	Seite: 18
Babcock Noell GmbH	Statische Berechnung	S931161-EBS-BNG-00001	von: 74
			Rev.: 01

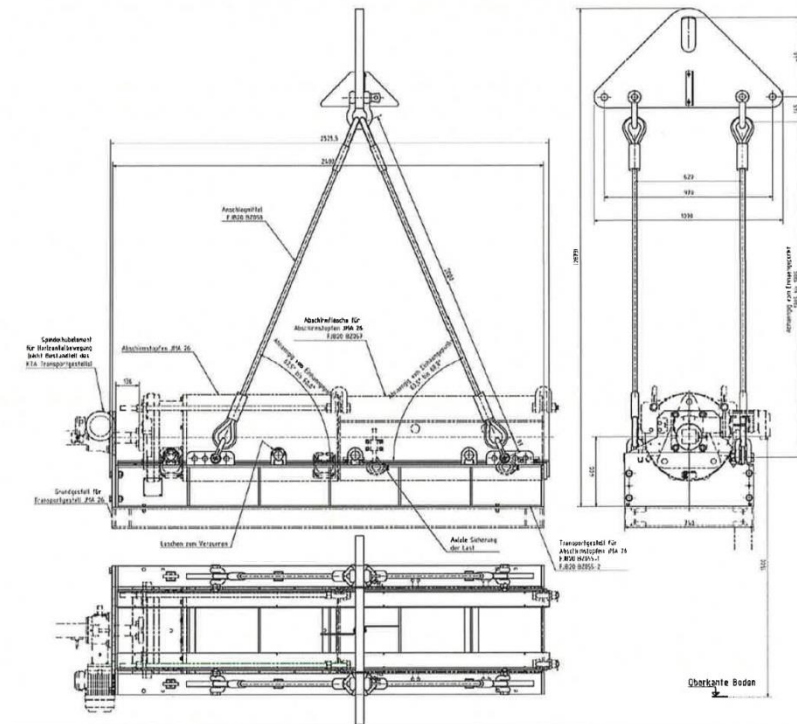
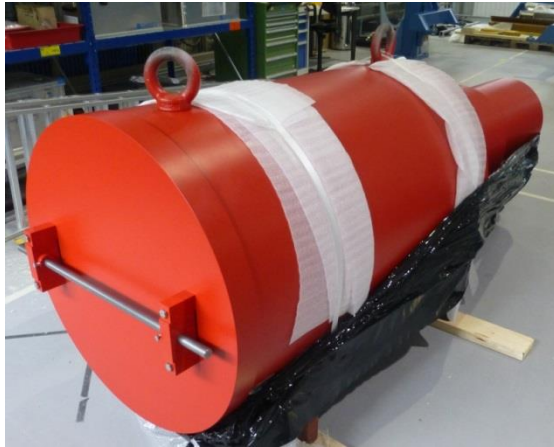


Abbildung 4 Transportmittel für Abschirmstopfen JMA26 – Übersicht



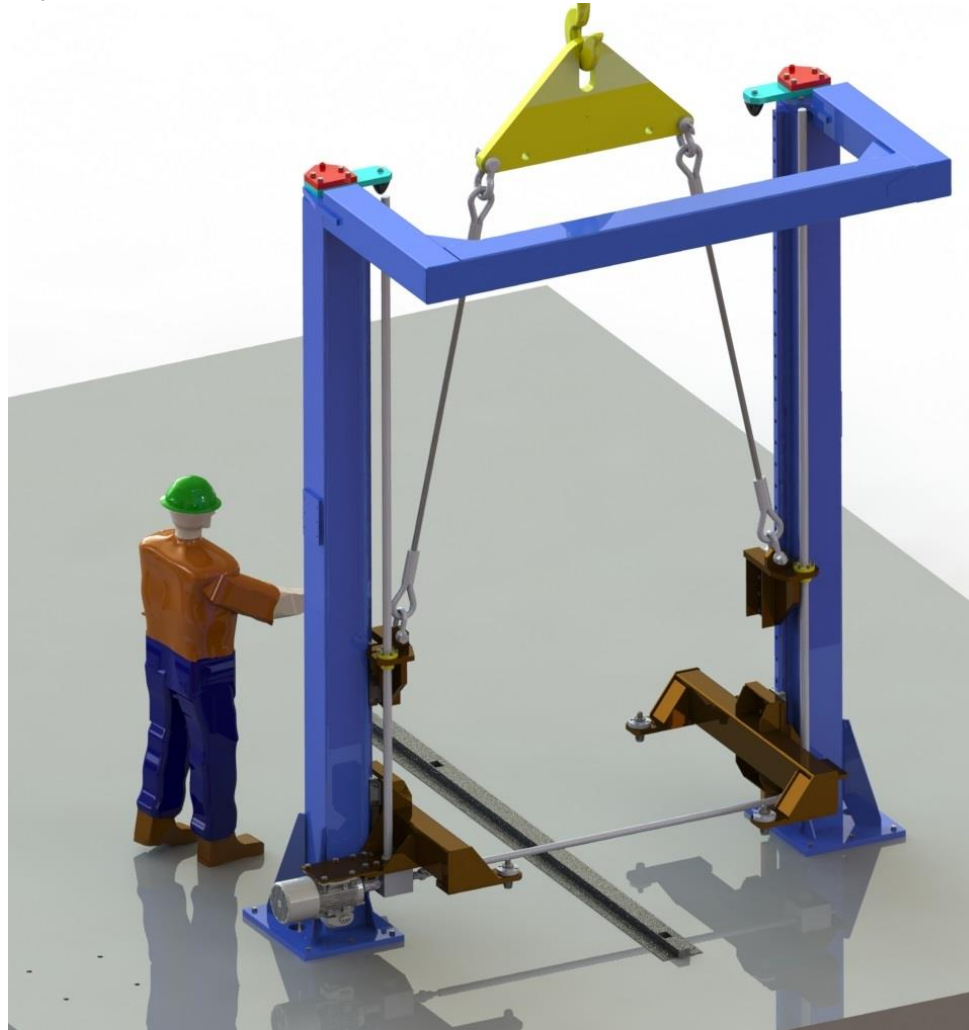
Dummy of the built-in shielding plug JMA16



Dummy of the beam tube SR6



Redundant Carrying System



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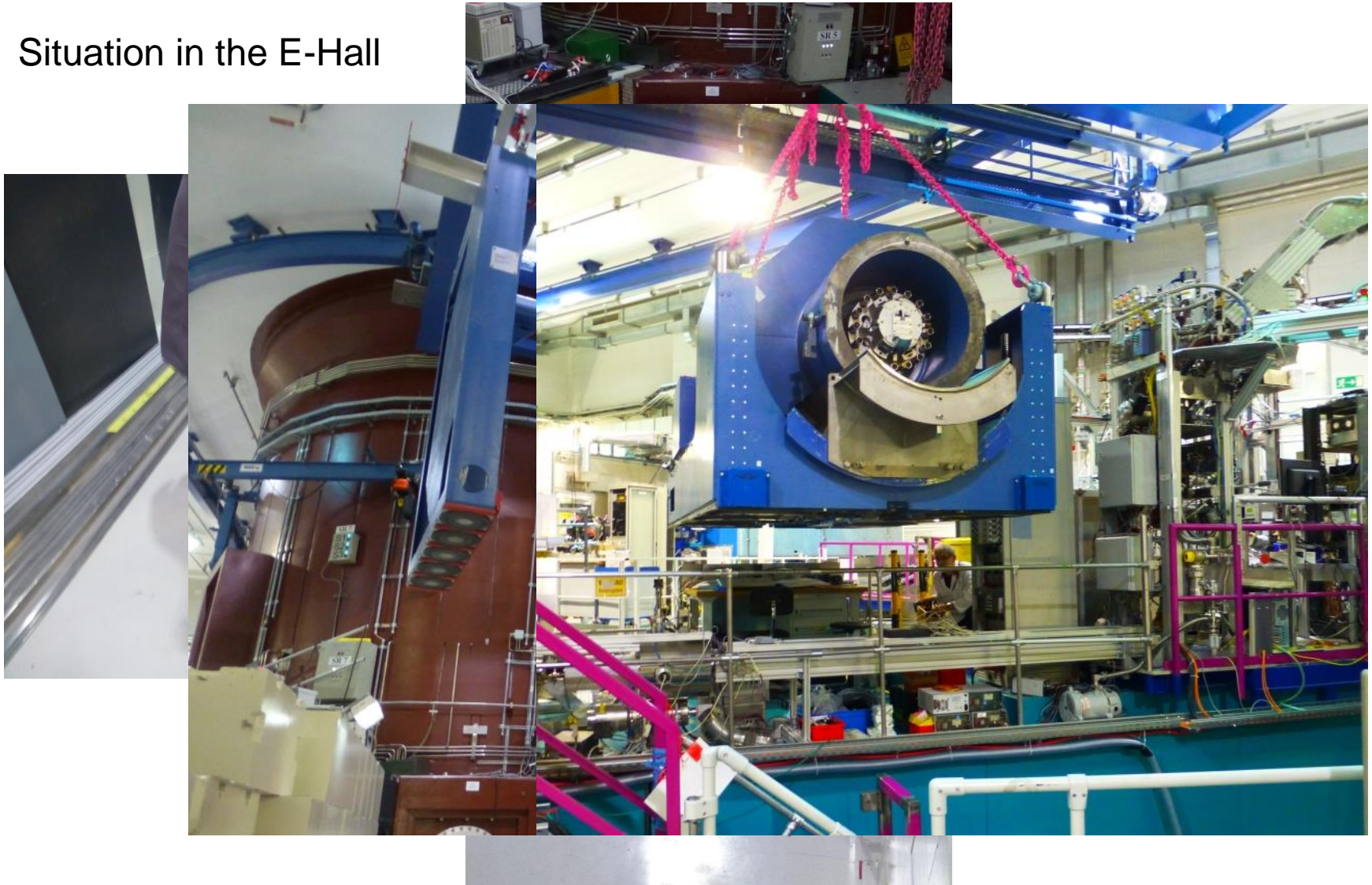
Situation in the E-Hall



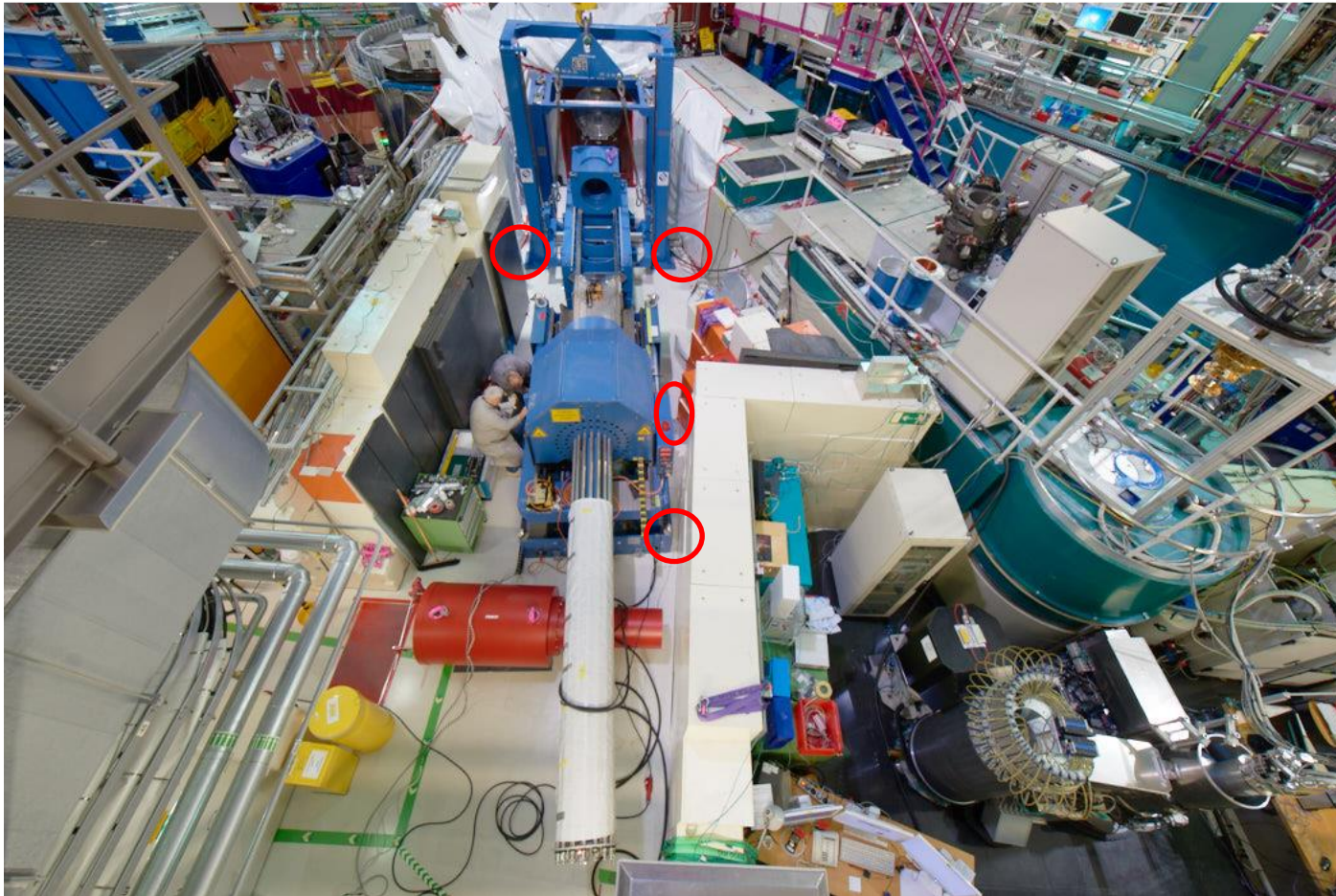
Situation in the E-Hall



Situation in the E-Hall



Situation in the E-Hall

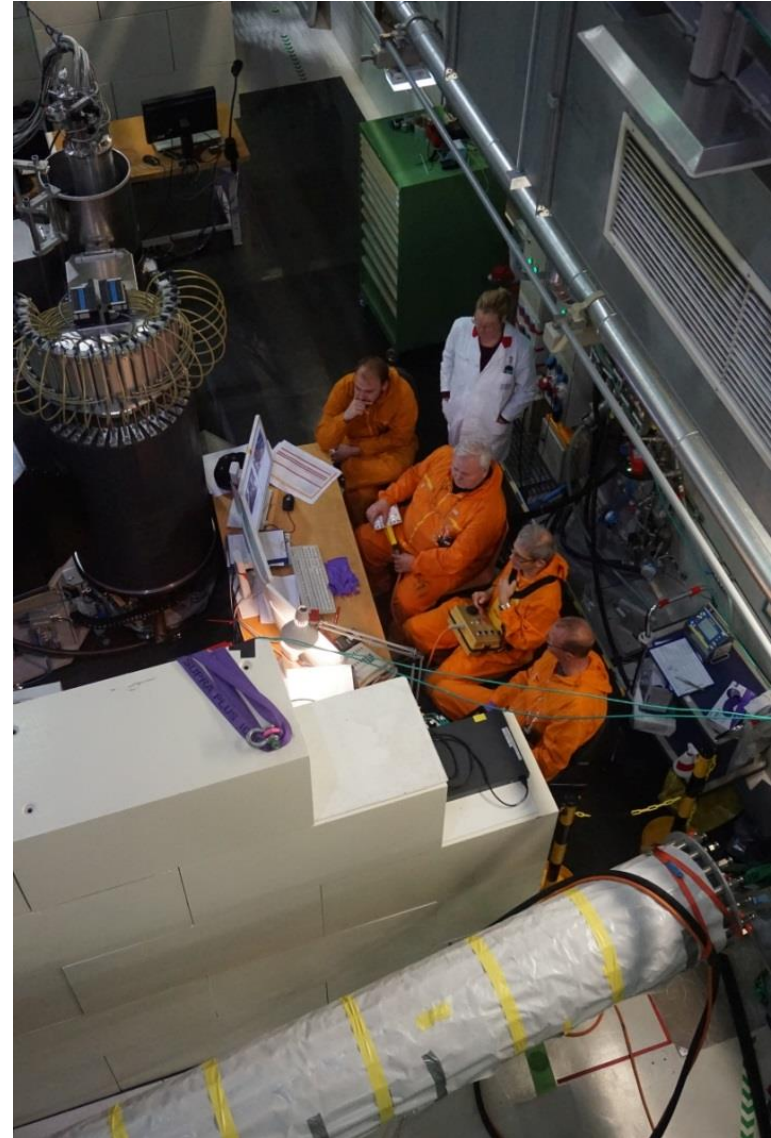


Situation in the E-Hall



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Pulling the built-in shielding plug



Pulling the built-in shielding plug



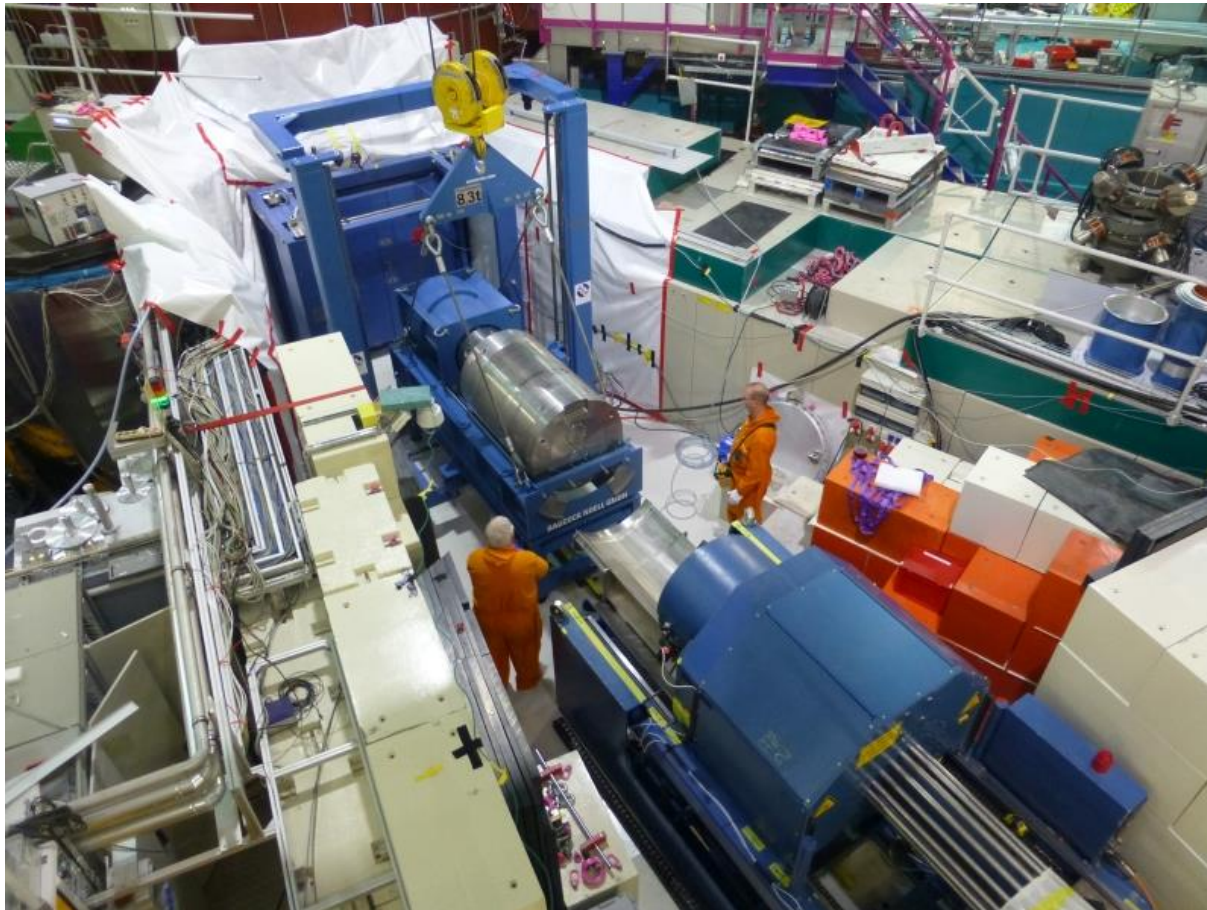
Pulling the built-in shielding plug



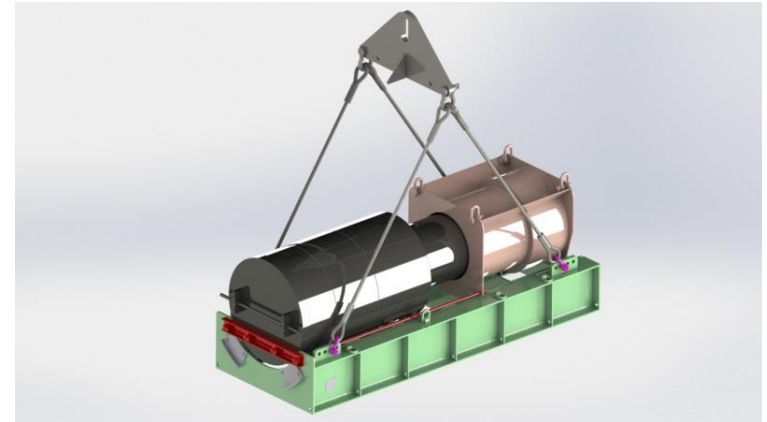
Pulling the built-in shielding plug



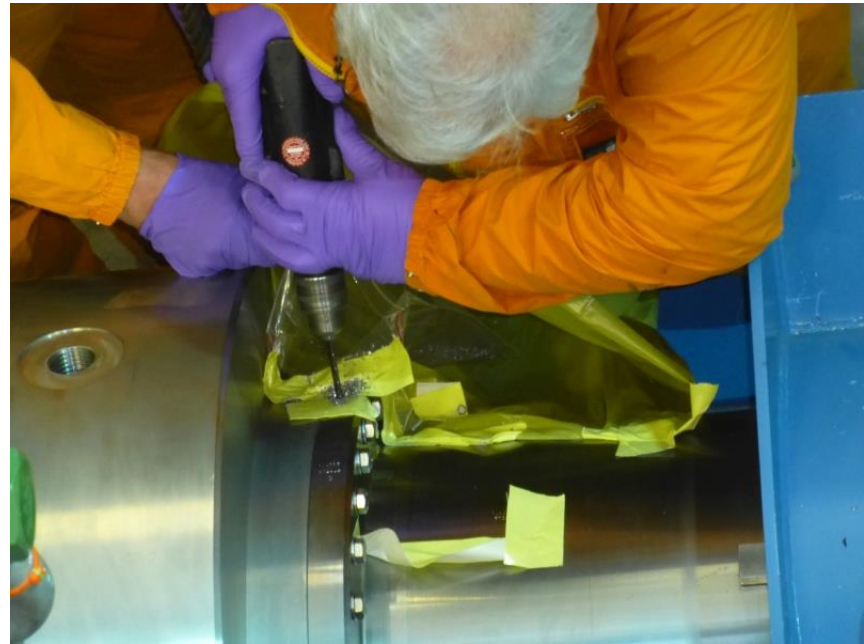
Shielded plug now accessible



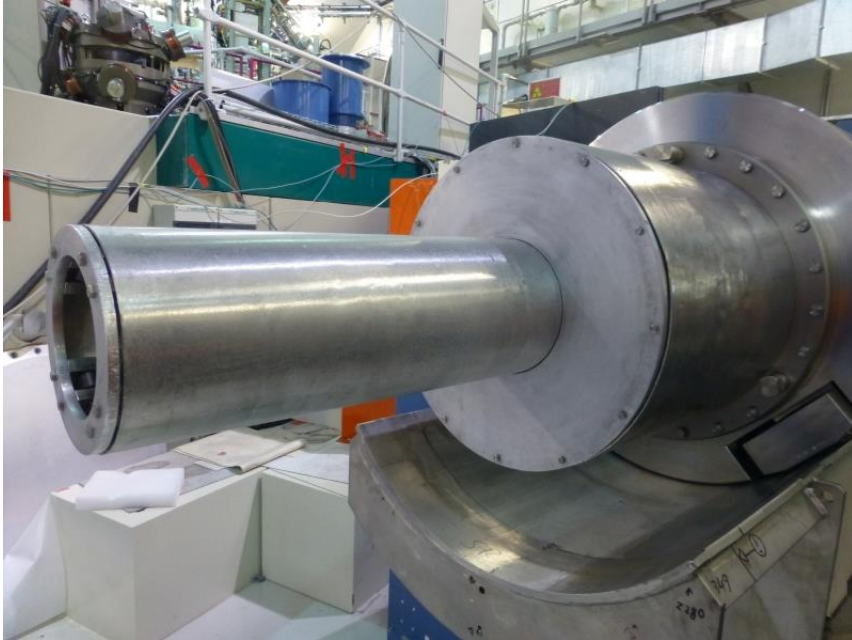
Transport of the activated shielding plug



Transport of the activated shielding plug



Installing the new shielding plug



Installing the new shielding plug

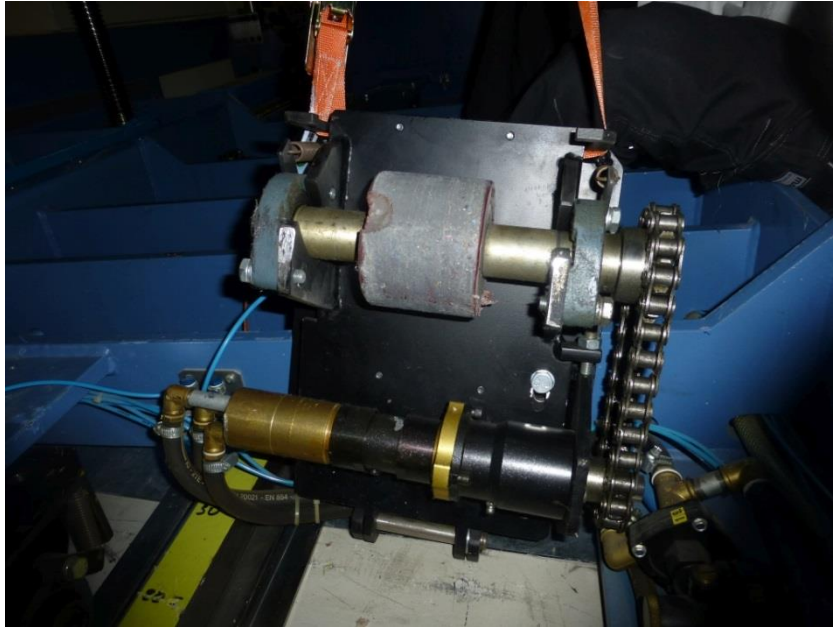


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Damage to the machine - urgent need of spare parts!



Damage to the machine - urgent need of spare parts!



Damage to the machine - urgent need of spare parts!



Damage to the machine - urgent need of spare parts!



Problem with the hook of the crane



Problem with the hook of the crane



Problem with the hook of the crane



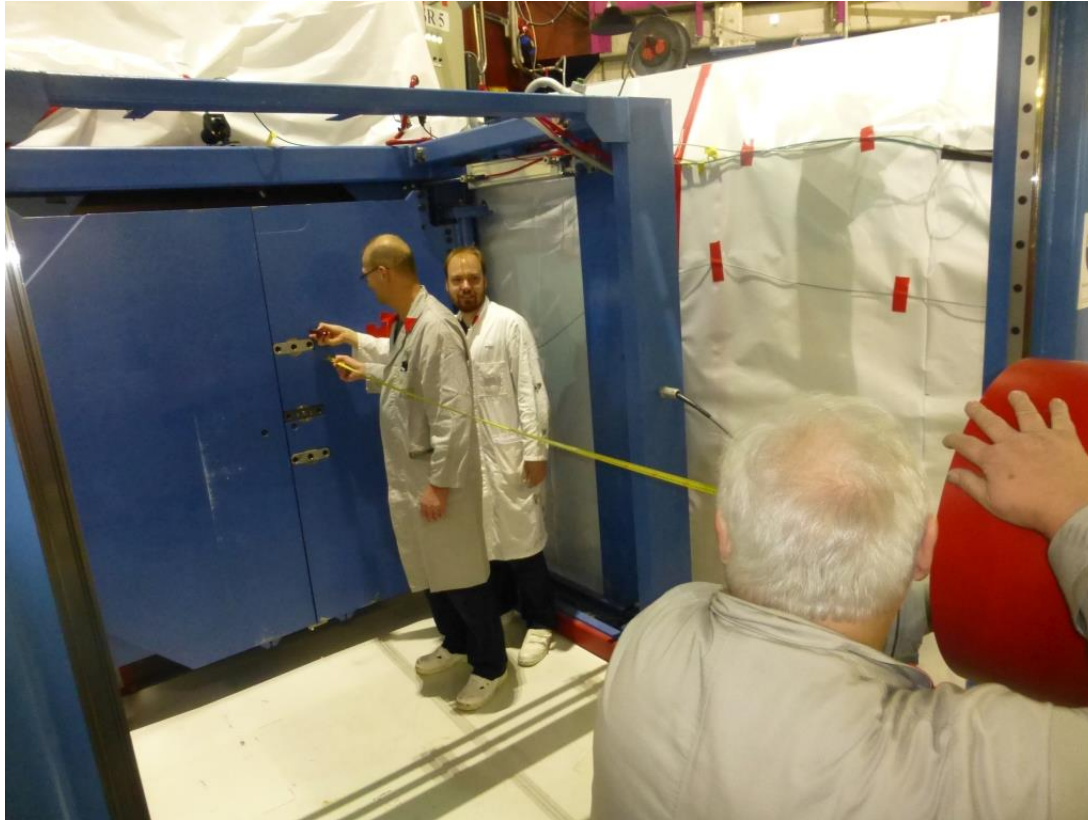
New conditions for the transport of radioactive components



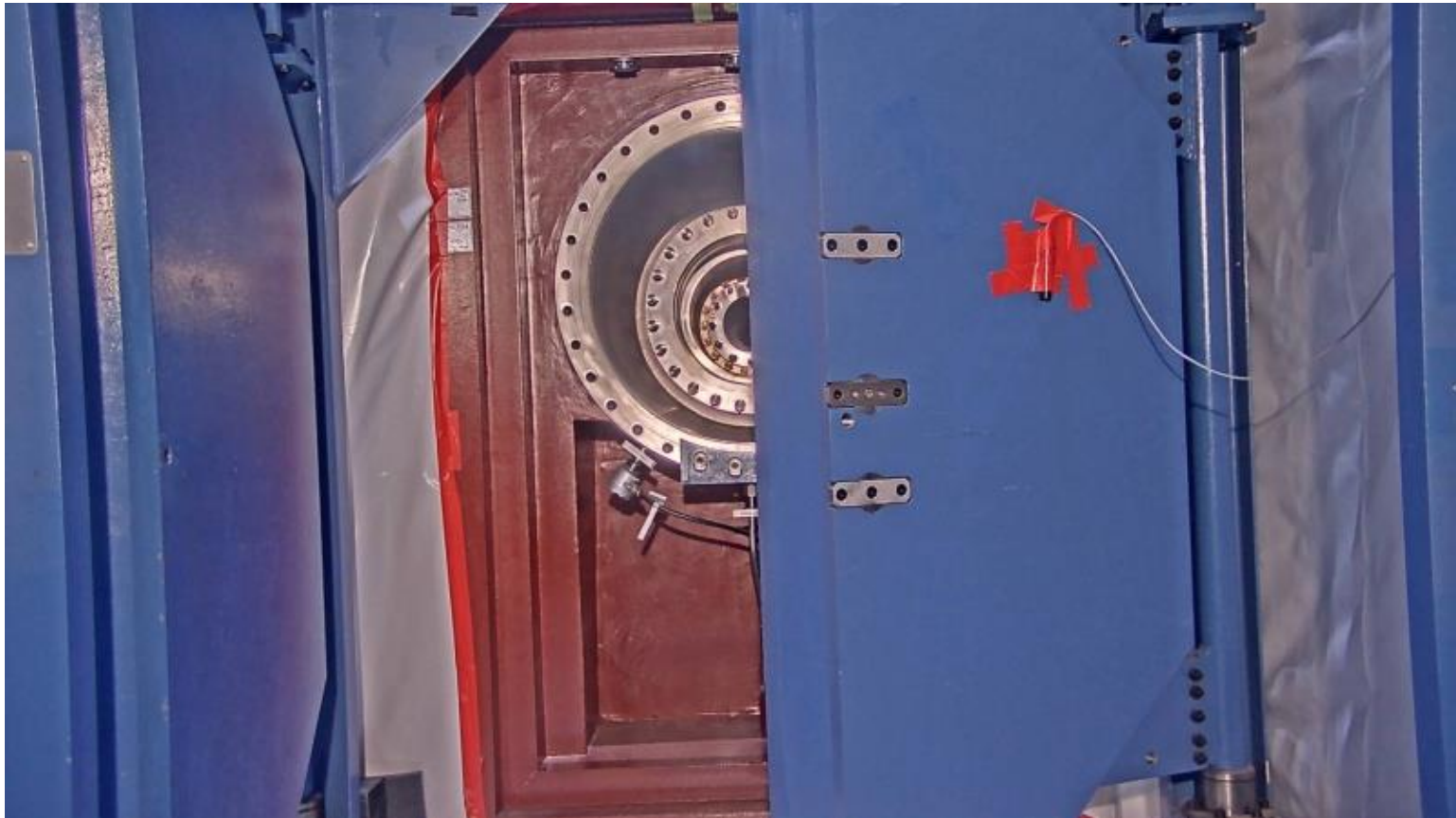
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Conclusion

- No accidents
- No contamination in Experimental Hall
- All newly developed handling devices worked perfectly
- Highly motivated crew eager to face new challenges, to learn, and get the job done
- Small and well-trained crew: only 4 operators and 2 radiation protection people. Each operator was assigned a specific job but was able to do each of the tasks.
- Clear communication (exchange of ideas).
- Respect for each other.
- About the radiation dosis:
 - Max. estimated individual dosis: 189 μSv
 - Max. measured individual dosis: 30 μSv
 - Max. estimated collective dosis: 826 μSv
 - Max. measured collective dosis: 150 μSv
- Only a well-trained and confident team can have a free mind to react to unexpected situations.

The Team



Mr. Blumenthal

Mr. Willerding

Mr. Fink

Thank you for your attention