



Nuclear situation in the Czech Republic

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NRI Group Řež



What I am going to say

- NRI introduction
- Nuclear Power plant situation
- GTRI project
- New build
- Jules Horowitz reactor project



What I am going to say

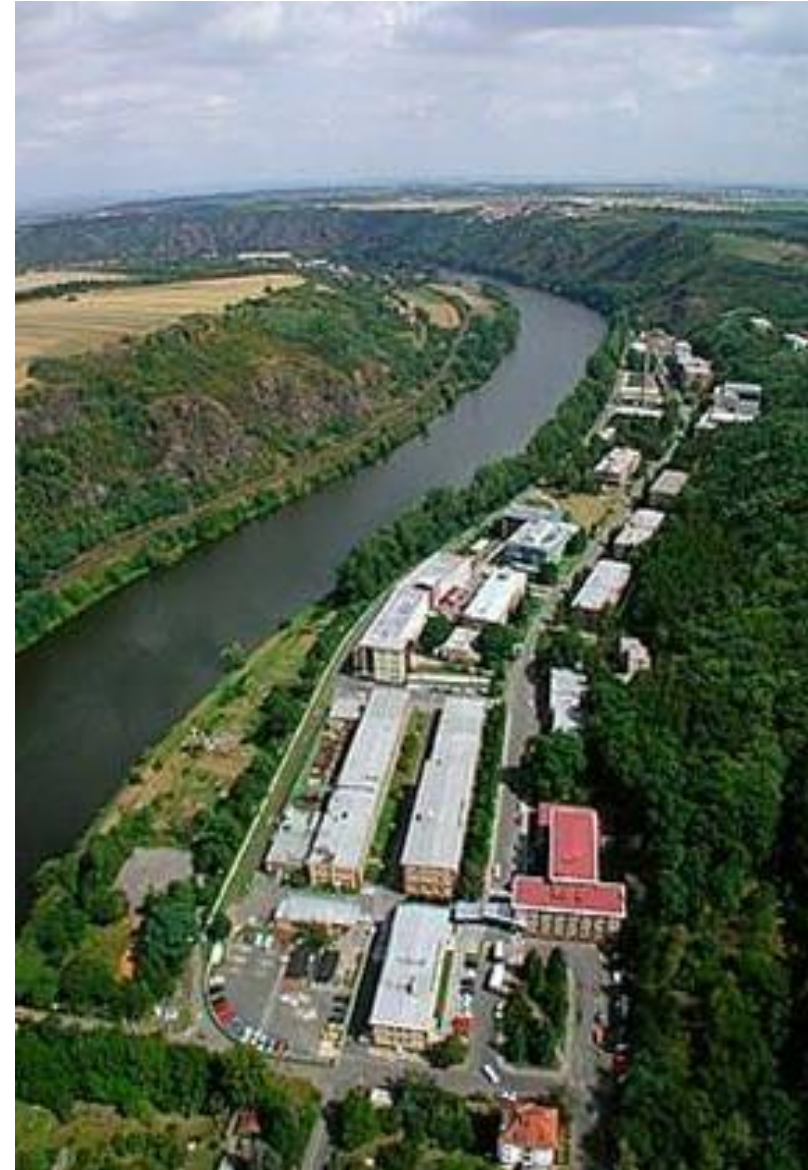
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Nuclear Research Institute Rez

Nuclear Research Institute Rez plc

- Offers broad range of expert advice and services to the operators of nuclear power plants in the Czech Republic and abroad
- Supports state agencies in the strategic management of power engineering and the management of radioactive wastes
- Provides independent support to the State Office for Nuclear Safety
- Facilitates development in the use of ionizing radiation and irradiation services for the basic and applied research, health-care and industrial facilities
- Carries out research and provides services aimed to dispose radioactive waste
- Provides training and education of students, technicians and scientists
- Private company owned by CEZ, SE, Skoda
- Staff 1300 experts





Nuclear Research Institute: Key areas

Nuclear Research Institute Řež plc

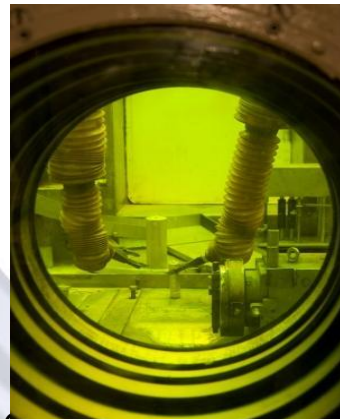
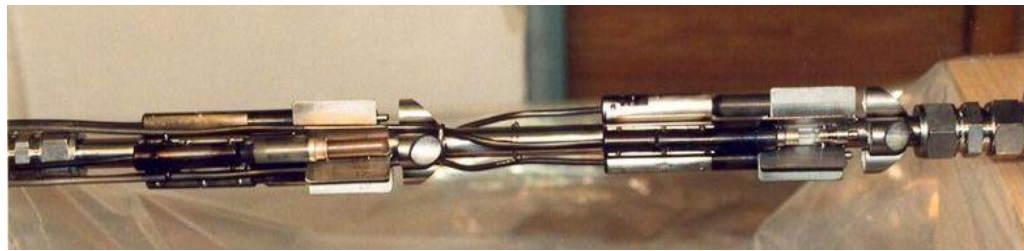
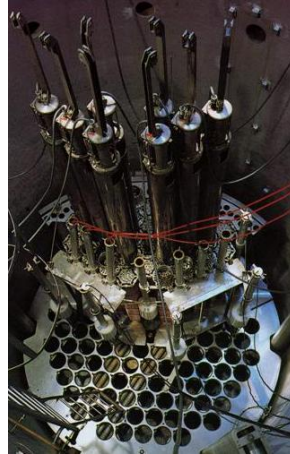
- **Material & technical engineering:**
Integrity analysis, EQ, LTO
- **Safety:**
safety analysis, THD analysis, fuel and physics
- **Design:**
power plants, large infrastructures,
engineering services
- **Fuel cycle and waste management**
- **Reactor physics:**
material testing, irradiation services,
large research infrastructures
- **TSO :**
Technical support of regulatory bodies
- **Radiopharmaceuticals:**
SPECT, PET, special kits





Nuclear Research Institute & Research Centre Rez: Research Infrastructure

Nuclear Research Institute Řež plc



- 15 MWt research reactor: LVR15
 - Irradiation
 - Irradiated material testing
 - Fuel and spent fuel testing
- Critical assembly: LR 0
 - EQ and NDE qualification
- Hot and semi hot cells
- Cyclotrons
- Experimental loops:
 - HT He,
 - PB, PB-Bi
 - Super critical H₂O
 - Super critical Co₂
 - VVER
- CAL laboratories



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Dukovany NPP , Temelín NPP



- ❑ **Dukovany – „ five year fuel“ since 2008, with burning absorber
- equipment modification power up rate till 500 MW
(unit 3 2009, unit 4 2010, unit 1 2011, unit 2 2012)**
- ❑ **Temelin – shift fuel from Westinghouse to TVEL since September 2010**
- ❑ **Spent fuel temporary storage**



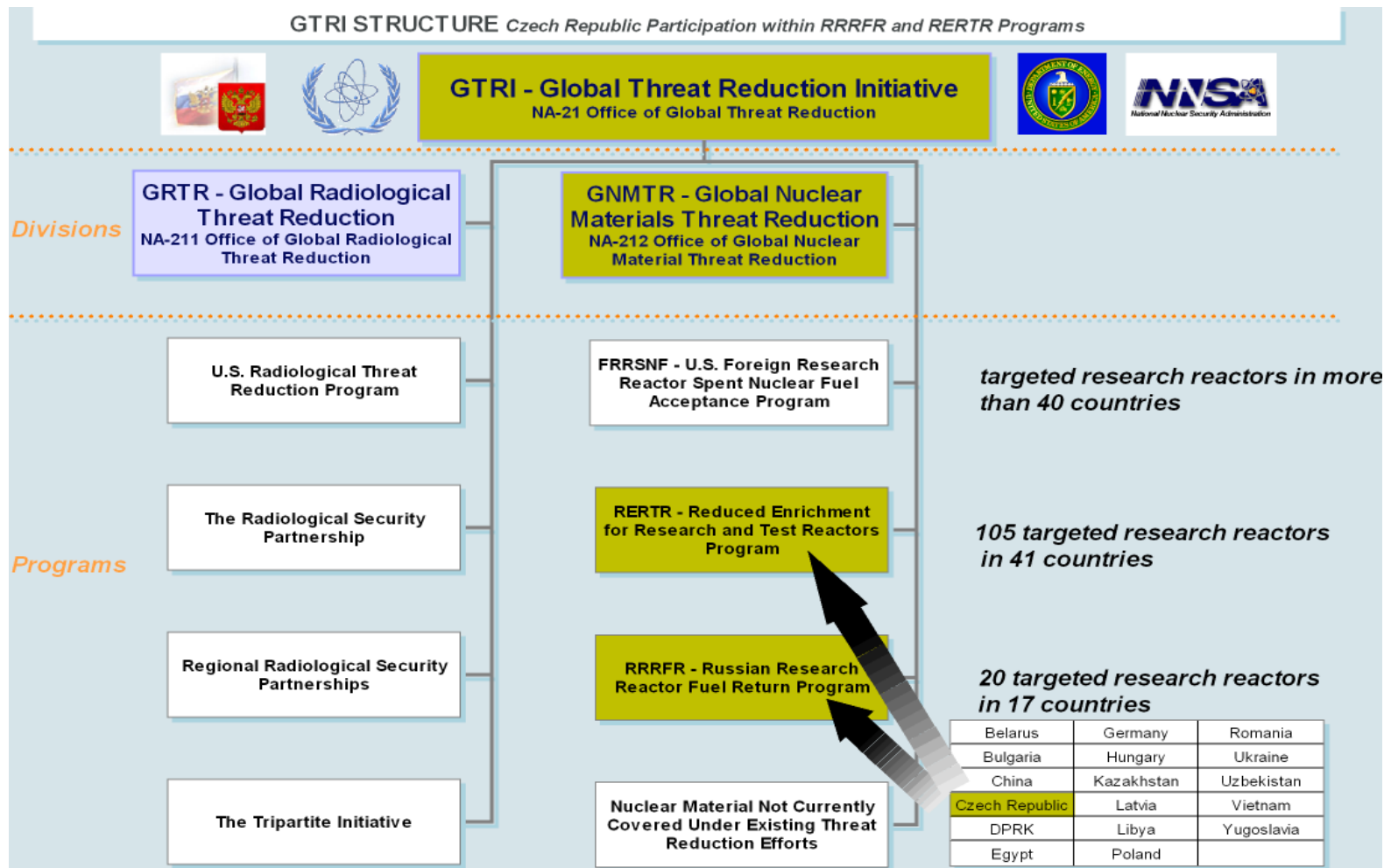
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GTRI – Global Threat Reduction Initiative

HEU to LEU fuel shift



GTRI structure and participation of the Czech Republic



GTRI Goal

- Remove HEU fuel from research reactors in middle and south east Europe
- Replace them by LEU fuel – below 20% enrichment
- Transport spent HEU to Majak
- NRI + Skoda developed transport cask
- Finance support of US DOE
- All manipulation provided by NRI Rez



Transport cask developed and manufactured in NRI and Skoda

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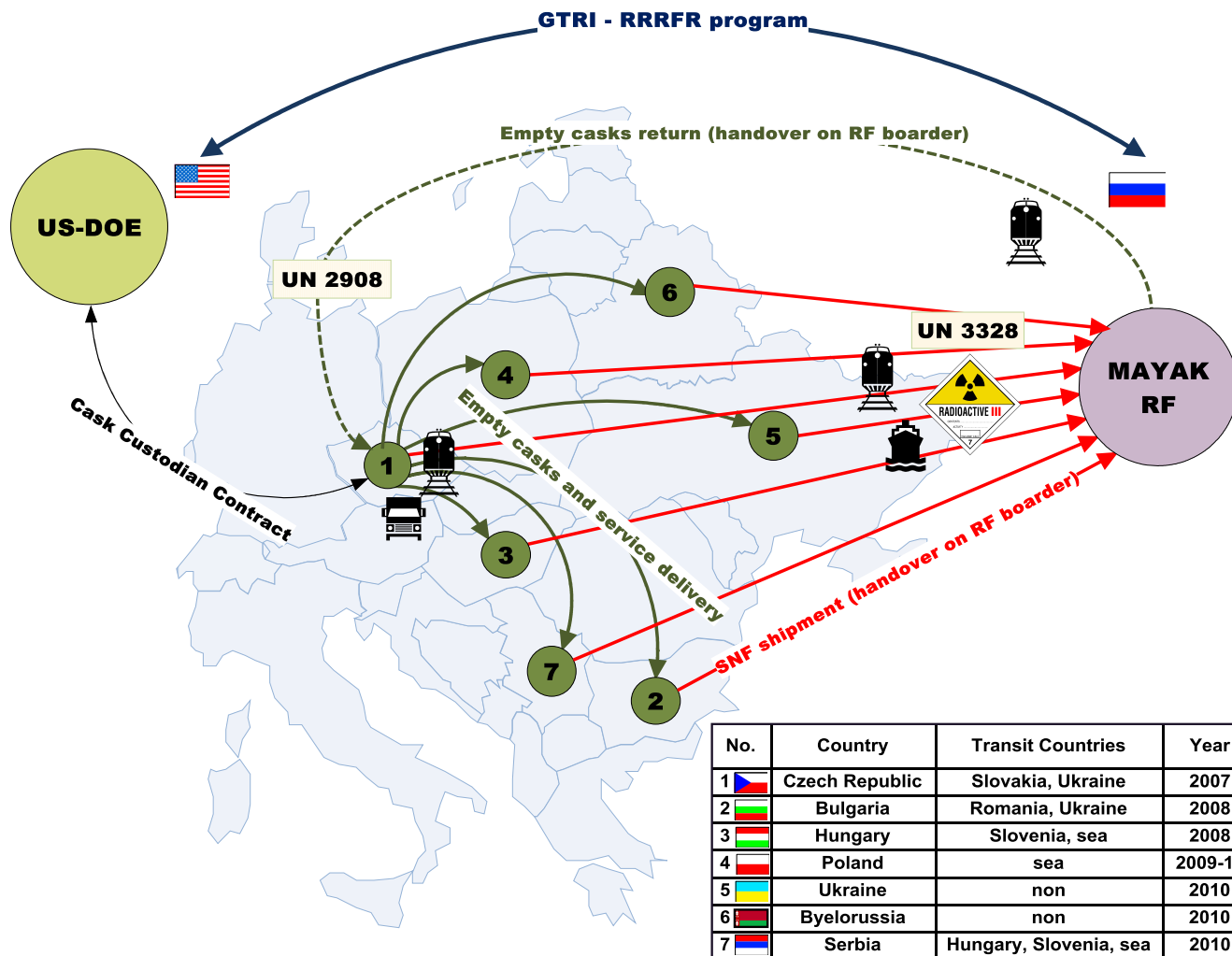
VPVR/M cask onto the trolley

Loading the basket into the hot cell

Cask is owned and operated by NRI Group



SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES



Countries using the ŠKODA VPVR/M casks



6. SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES

- ❑ **NRI participated in shipments of SNF from**
 - **Bulgaria (2008)**
 - **Hungary (2008)**
 - **Poland (2009 and 2010)**
 - **Ukraine (2010)**
 - **Belarus (2010)**
 - **Serbia (2010)**



SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES



Bulgaria: cask manipulation platform on the reactor top



SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES



Hungary: Road transport



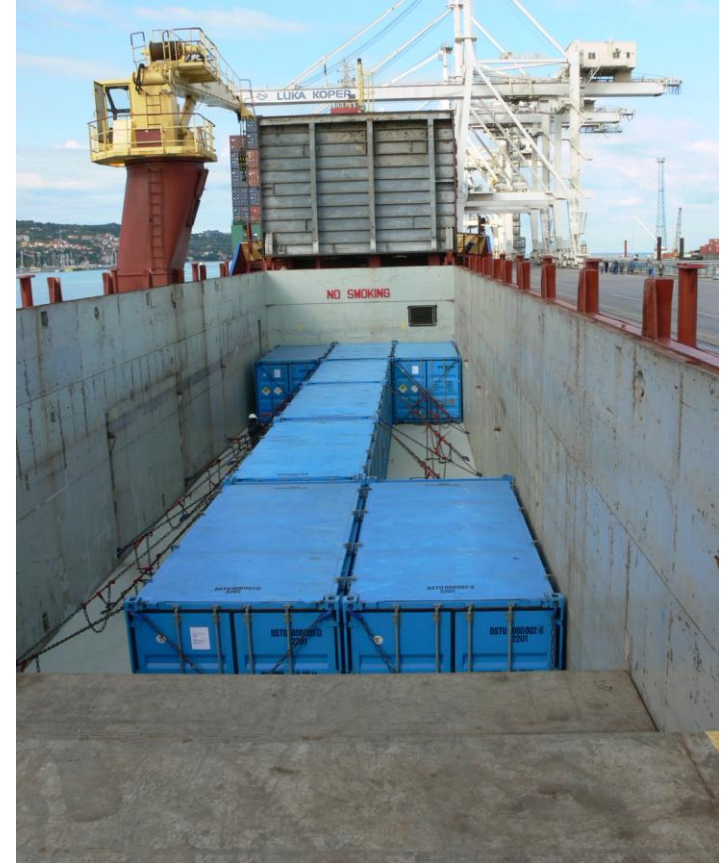
SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES



Hungary: Rail transport



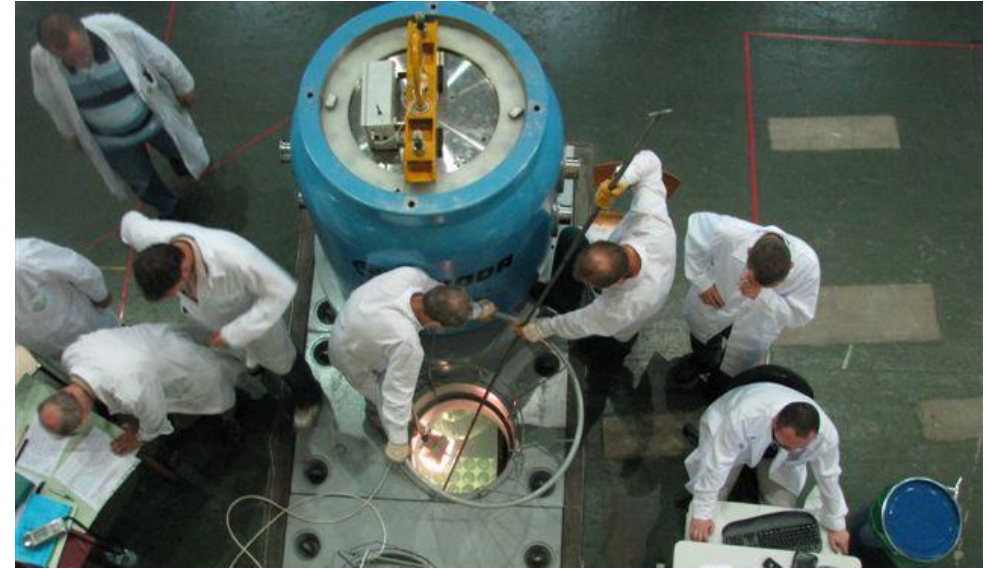
. SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES



Hungary: Sea transport (Slovenian port Koper)



SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES



Poland: Casks preparation and SNF loading



SUPPORT OF SNF SHIPMENT FROM OTHER COUNTRIES



Ukraine: Preparation for SNF loading



PLANNED SHIPMENT OF SNF FROM OTHER COUNTRIES

- Planned shipments – rest of HEU fuel
 - Hungary (2013)
 - Czech Republic (2014)
 - Ukraine (2014)



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New Build – Temelin site



- Supplier qualification (Areva, Skoda, Wesi) - done
- Tender announcement October 2011
- Contract January 2013
- First concrete 2017 expected



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JHR project



JHR
a new high
performance
testing reactor

- ❑ 100 MW research reactor in Cadarache – France
- ❑ Mission – irradiation experiments and tests
- ❑ Hot chambers provided by NRI Rež
- ❑ Commissioning 2014 / 2015

JHR project

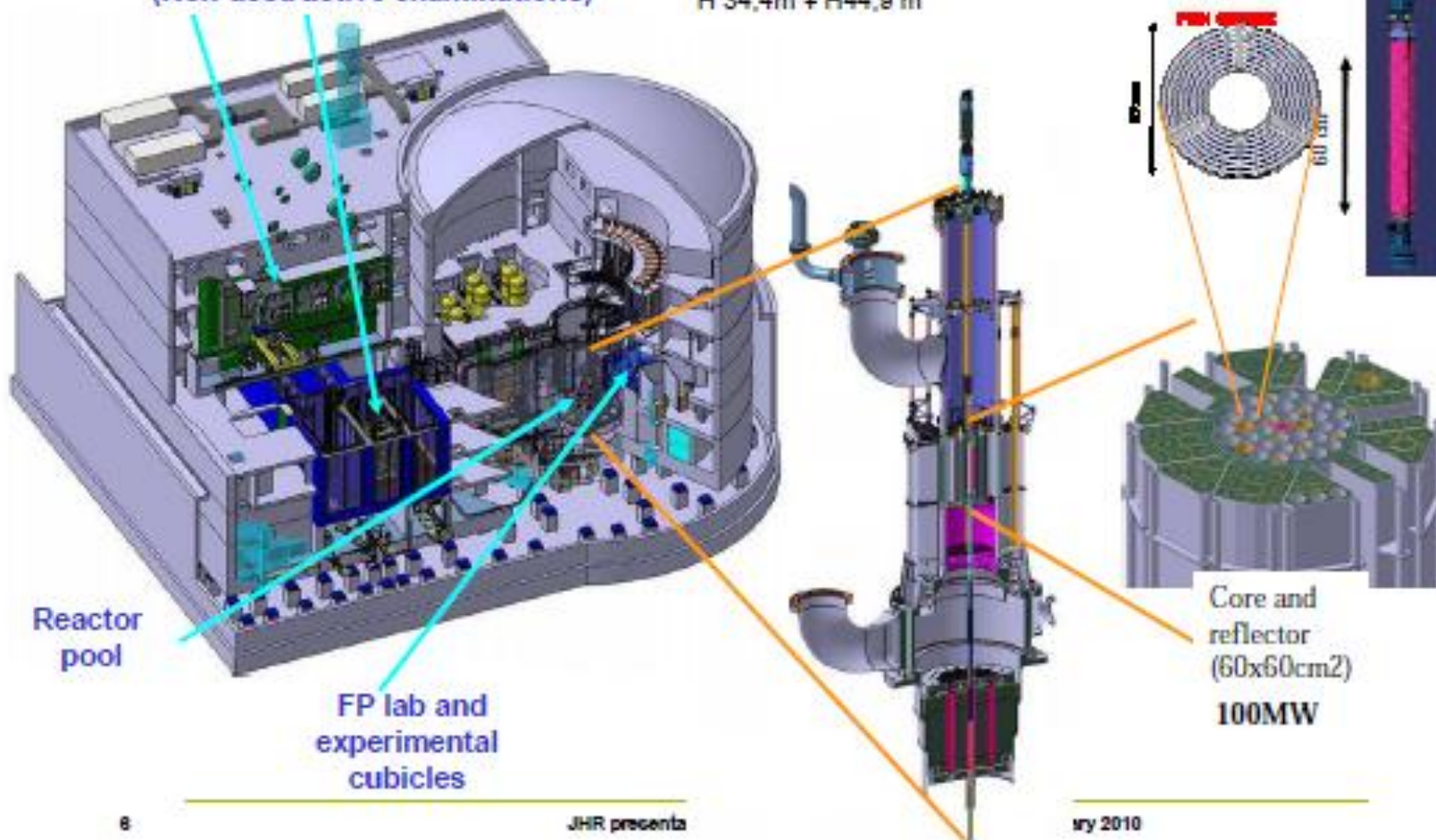


JHR power 100MW, start 2014



Hot cells and storage pools
(Non destructive examinations)

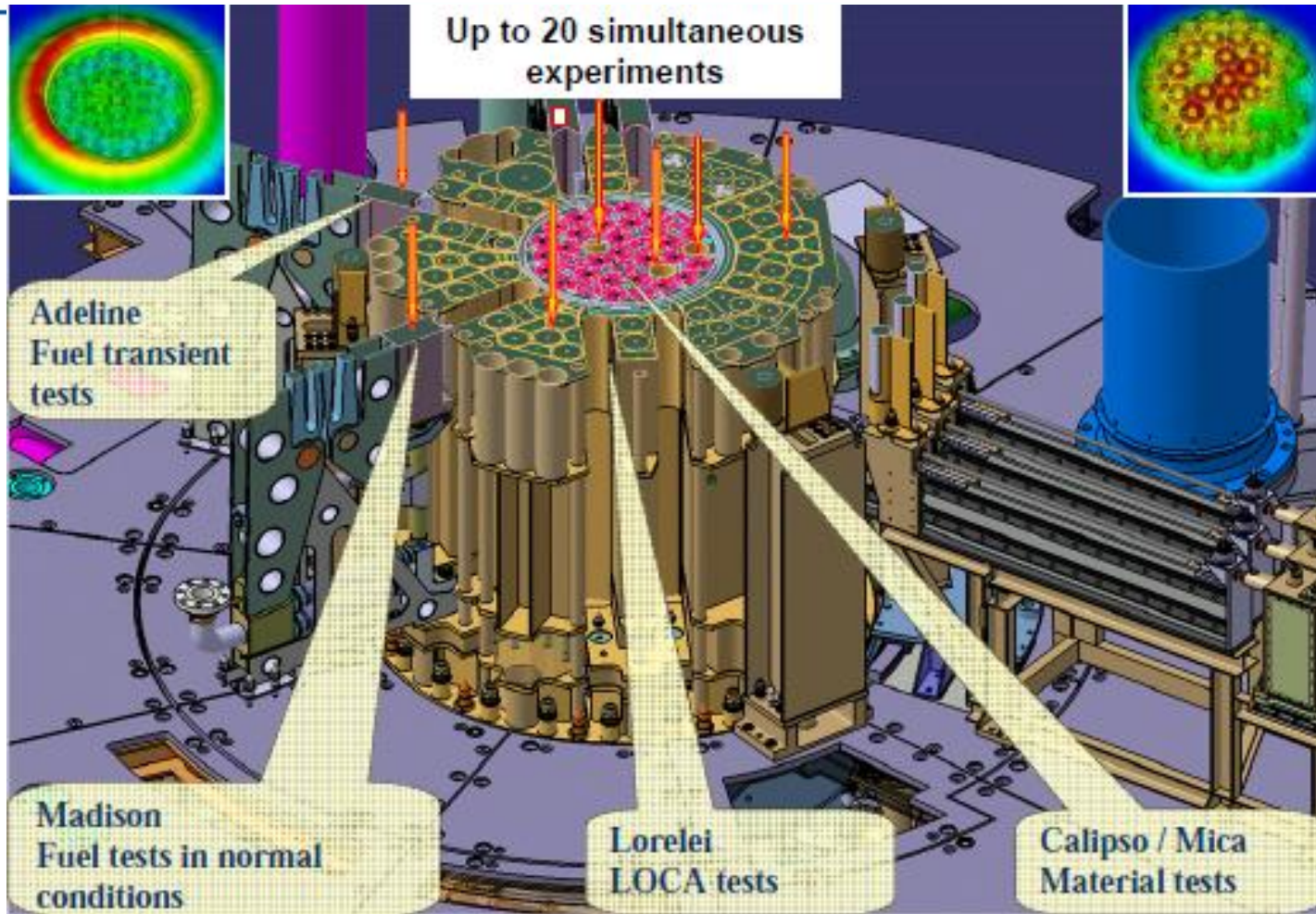
51,12m x 46,75m + Φ 38.6m
H 34,4m + H44,9 m





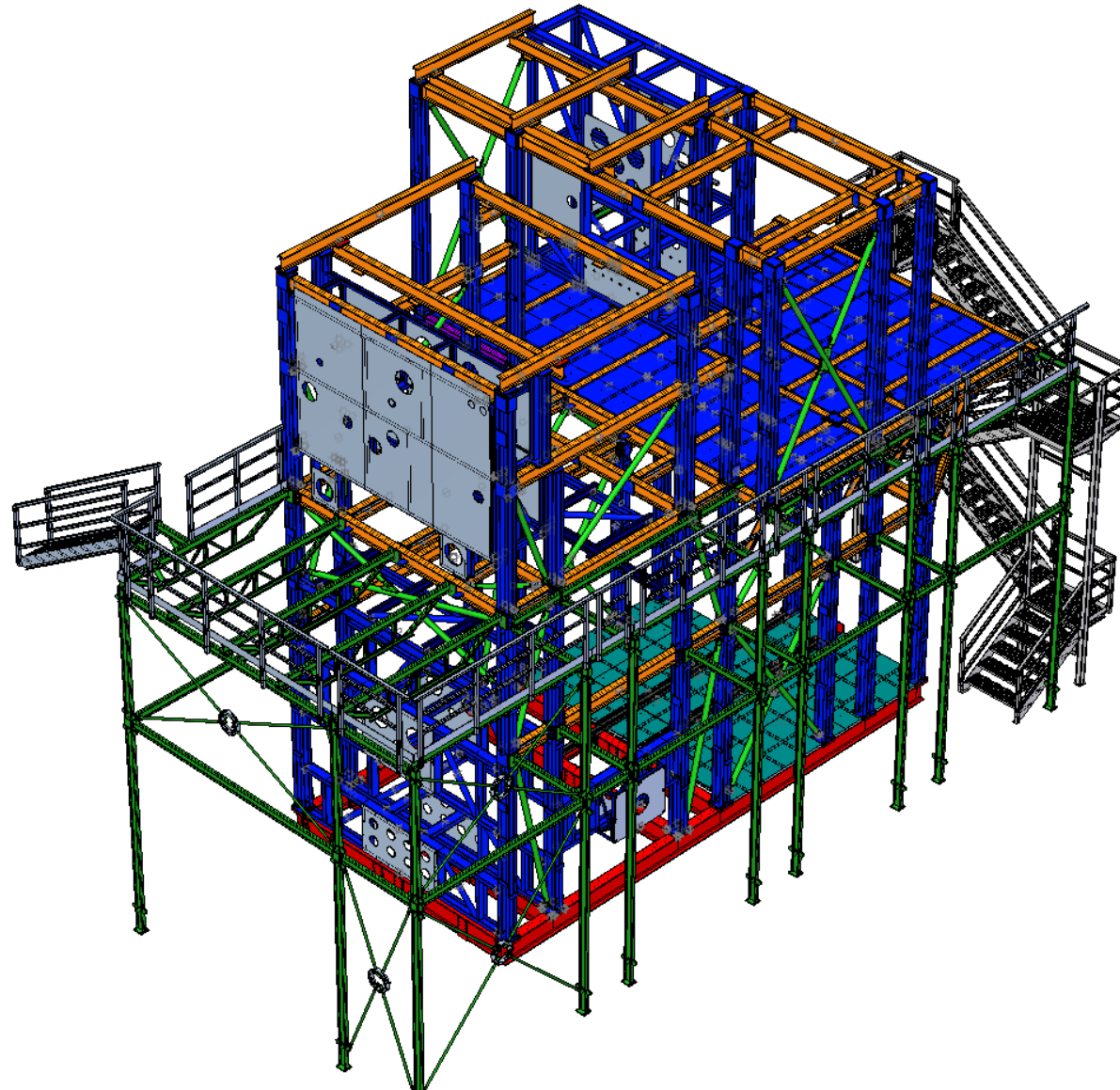
NRI - hot chambers construction and provider

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Hot chambers mock up in Rez





Conclusion

- NRI Introduction - long term cooperation with TVEL and other Russian organization
- Research facility ready for cooperation

- Situation in the Czech Rep
- Global Threat Reduction
- Fuel for existing NPP
- New build
- Jules Horowitz reactor project

Thank you for your kind attention