



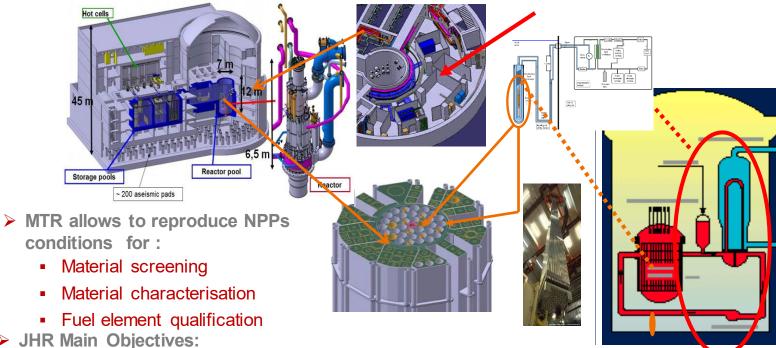
Contents

- Briefly about JHR
- JHR Consortium
- Status of the test equipment construction
- International co-operation and actions



JHR Project





> JHR Main Objectives:

1] R&D in support to nuclear Industry (F&M studies under normal, incidental and accidental situations)

- 2] Radio-isotopes supply for medical application
- 3] A key tool to support expertise

Current fleet of test reactors is ageing!

JHR: experimental capacity & performances at 100 MW power level (*) (*) Maximum Power- Second Operating conditions:70 MW

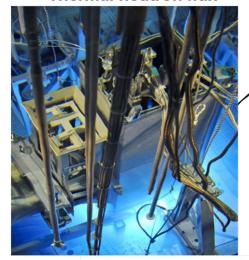


Thermal Neutrons flux In reflector

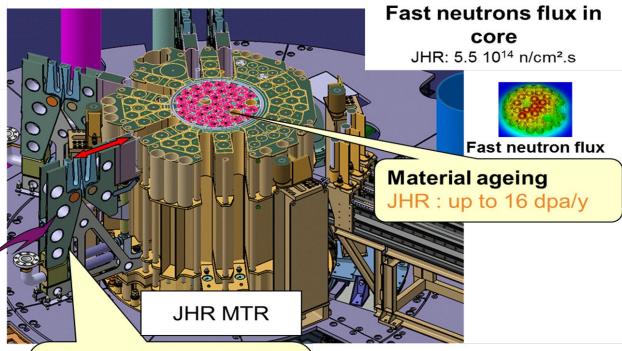
JHR: 5.5 10¹⁴ n/cm².s and 6 displacement systems



Thermal neutron flux



OSIRIS MTR



Displacement systems in JHR to:

- Adjust the fissile power
- Study transients

In JHR:

- Highly Instrumented Experiments
- On-line fission Gas analysis
- 20 simultaneous experiments

JHR International Consortium today: 15 partners





JHR consortium gathers organizations which take part financially and get permanent access to JHR experimental capacities (1 representative / organization)

JHR International Consortium:

Research centers & Industrial companies



operation



























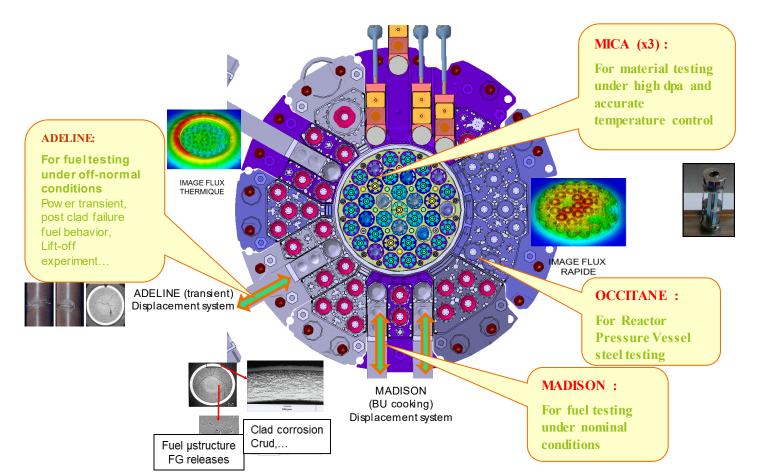
In several cases, the organization (member of the JHR consortium) is itself the representative of a national domestic consortium which gathers organizations among industry, R&D organizations, TSO, or Safety Authority... See next slide

CEA is mandated by the Governing Board to enlarge to consortium before start-up of

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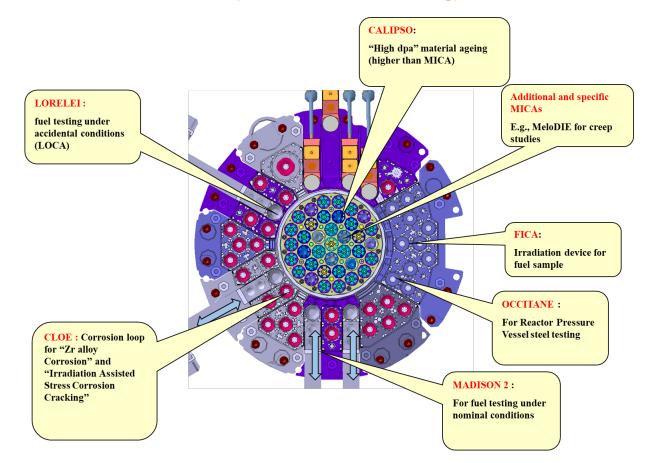
First fleet of experimental devices under development (dedicated to LWR testing)





Second fleet of experimental devices under development (dedicated to LWR testing)





Construction status

- First criticality in 2030's.
- Comprehensive re-organisation couple of years ago due to increased budget and delayed construction.
- By the end of 2023, the design needs to be frozen, reassessment of overall schedule and estimate of completion cost.
- Comprehensive JHR review by French state in 2023



Project progress





Pool Conveyor



Lift (on conveyor)



Underwater door frame (EPU)



May 2021

Hot cell floor (ECR)



Project progress





Gamma penetration EPI



June 2021



Coralie CoreTest loop

Conveyor in factory test



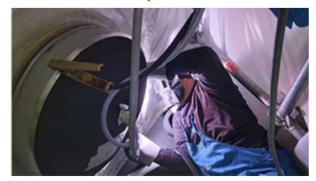
PROJECT PROGRESS



December 2021

Installation of the fatigue strength test bench

First weld on a fitting component



RSS penetration



for experimental devices underwater piping



PROJECT PROGRESS



Factory acceptance test for the RMD handling system



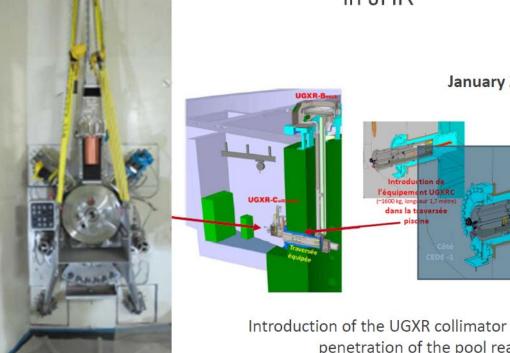
RMD handling system



PROJECT PROGRESS



Introduction of the first experimental equipment in JHR



January 2022

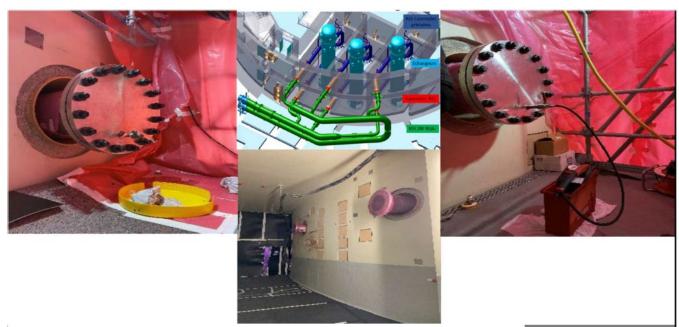
Introduction of the UGXR collimator in the Gamma penetration of the pool reactor



OTD Milestone 2 End of erection of the six RSS penetrations February 2022



RSS penetrations





Preparing JHR International Community

JHR Jules Horowitz Reactor

- The yearly seminar
- The Secondee Program
- JHR School
- The 3 Working Groups and the preparation of future joint programs
- The ICERR designation by the IAEA





JULES HOROWITZ MTR OPERATION PLAN 2040

1st fleet of devices

WP1 – Strategic Research Agenda for the first four years – "ROADMAP-4" -**CEA**

2nd fleet of devices

WP2 – Strategic Research Agenda for the following 11 years "ROADMAP-15" - CVR -JH0P2040

WP5 – CSA Management - **VTT**

Coordinated Support Action Grant Agreement 899360

www.jhop2040-h2020.eu

WP4 – Communication & Data and knowledge

management – **SCK-CEN**

JHR-ESN

WP3 – Financial and Programme model for Euratom -JRC



Communication outside the

project



Jules Horowitz Operation Plan 2040 – JHOP2040



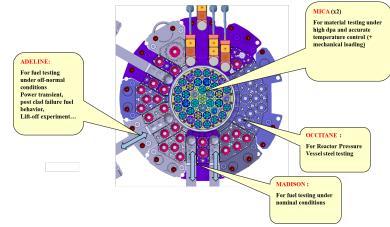
First 4-years irradiation period

- Latest information provided by the JHR consortium concerning the devices, irradiation locations, PIE facilities and transport capabilities has been created and updated – PUBLIC
- Final Synthesis Report First 4Yrs PUBLIC

	#	Topic	Type of materials	Reactor system of interest												
Family				PWR	BWR	WWER	SFR	LFR	ADS	HTR	SMR	CANDU	Fusion	Spent fuel storage (SP)	JHR exp. device	GLOBAL PROGRAM RANKING:
RPV	1	Embrittlement: effect of neutron dose	MnMoNi (e.g. SA-533, Grade B, Class 1 SA-508, Class 2, 16MND5), MnMo (e.g. SA-302, Grade B), CTMOV (e.g. 15Kh2MFA	х	х	x	х	х	x	x	х				OCCITANE	3
	2	Embrittlement: effect of neutron flux		х	х	х	x	х	x	x	х				OCCITANE	3
	3	Embrittlement: Effect of neutron spectrum		х	x	х	х	х	x	x	х				OCCITANE	2.5

This work has been finalized.

Fuel test device (first fleet)	T0 (mid N-1)	Year N (T0+1)	Year N+1	Year N+2	Year N+3	Year N+4	
ADELINE		Tests for validation of the performance	Qualification of the experimental domain/non regression	Qualification of the experimental domain/non regression	Experimental programs : 2 tests dedicated to JHR Consortium (with the hypothesis of a total number of up to 6)	Experimental programs : 2 tests dedicated to JHR Consortium (with the hypothesis of a total number of up to 6)	
		1 test ("ADE1" test) open to the validation of specific performance directely linked to Euratom needs	1 test ("ADE2" test) open to Euratom participation on some specific points when qualifying the experimental domain or checking the non-regression	1 test ("ADE3" test) open to Euratom participation on some specific points when qualifying the experimental domain or checking the non-regression	1 test ("ADE4" test) more specifically oriented on Euratom topics of interests	1 test ("ADE5" test) more specifically oriented on Euratom topics of interests	
MADISON		Tests for validation of the performance	Qualification of the experimental domain/ non regression			Experimental programs: With the hypothesis of a total number of 6 experimental irradiation cycles per year	
		2 cycles open to Euratom participation "MAD1"test	2 cycles open to Euratom participation "MAD2" test	2 cycles open to Euratom objectives "MAD3" test	2 cycles open to Euratom objectives "MAD4" test	2 cycles open to Euratom objectives "MAD5" test	



Jules Horowitz Operation Plan 2040 – JHOP2040

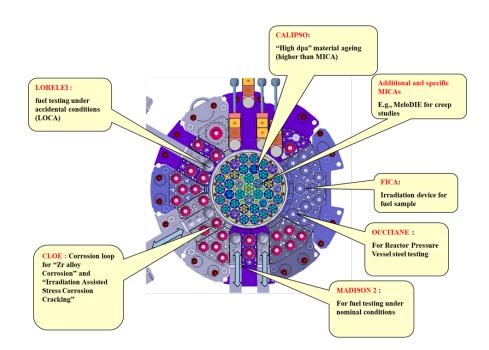


Long-term roadmap (after first irradiation period)

- Exposures with intermediate discharges, irradiations under variable conditions, irradiations in association with loading or corrosion
- Testing of nuclear fuels in design basis accident / design extensions conditions and innovative testing of nuclear fuels
- Testing of sensors and other novel equipment coming from the M&F needs

→Synthesis report on the plans for the material and fuel studies and technology development in the long term in May 2022.

This work is in progress.





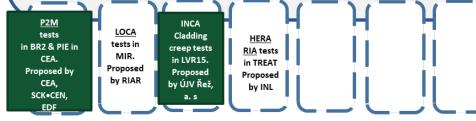
NEA FIDES new Framework

FIDES* : Framework for IrraDiation
ExperimentS



The FIDES Framework

- To consolidate needs and resources from the community
- To address Cross-cutting Activities: Education, Evaluated data basis
- To implement Joint Experimental Programmes (JEEPs) in available facilities



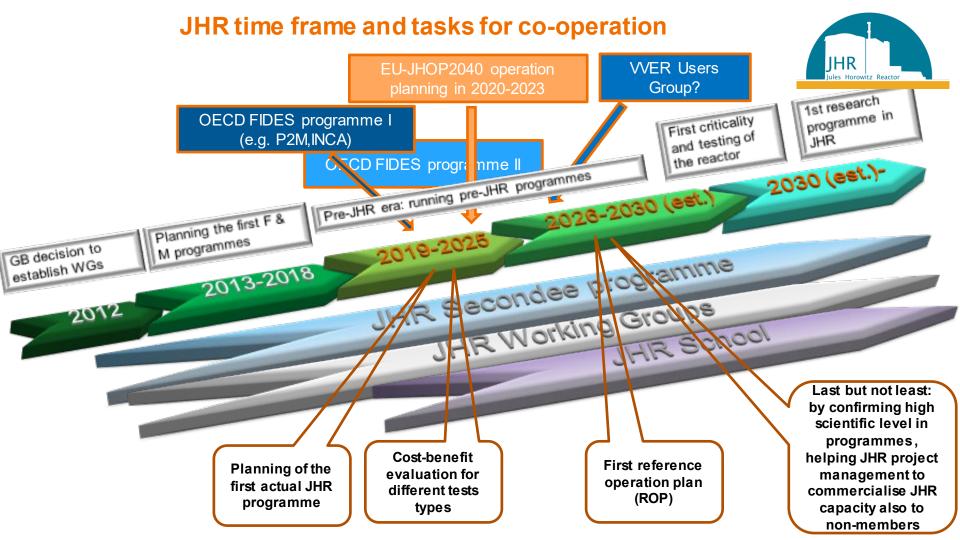
*Fides (Latin: Fides) was the goddess of trust and bona fides (good faith)

The JHR consortium members are particularly involved in two projects:

- P2M (Power to Melt and Manoeuvrability) project that sets out to perform slow power transients to reach partial fuel melting, and
- INCA project that focuses on in-pile creep studies of ATF (Accident Tolerant Fuel) claddings.

Experiments feasible for JHR

www.oecd-nea.org/jcms/pl 15313/framework-for-irradiation-experiments-fides





Thank you for your attention



Petri.Kinnunen@vtt.fi