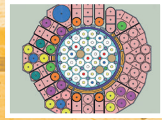






THE JULES HOROWITZ REACTOR

The Jules Horowitz Reactor (RJH) research project, led by the Division of nuclear energy (CEA-DNE), is now rising to meet an essential scientific and technological challenge: the testing of the behavior of materials and fuels under irradiation, in support of both existing and future nuclear reactors.

The JHR is an experimental reactor. Unlike a power reactor, it is not designed to produce electricity, but to provide scientific data on the behavior of nuclear materials and fuels when they are exposed to very high stress (high neutron flux).

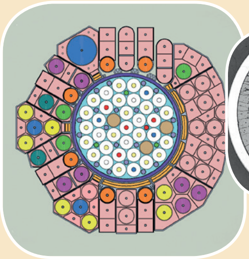
The players in the nuclear industry must be able to ensure the security, competitiveness and operating life of existing reactors and to develop new generations of more efficient and reliable reactors. It is therefore essential to test and qualify the structural materials and the fuels that are to be used in the reactor cores.

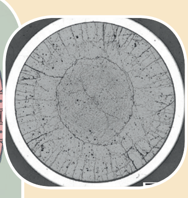
Initiated in 2007 at the Cadarache site, the construction of the JHR has led to the creation of an average 100 to 300 direct jobs and 300 to 1,000 indirect jobs in the different stages of its building. The operation of the reactor, expected by the end of the decade, will require about 150 people over a period of 50 years.
The installation of the reactor containment dome in December 2013, was a major step in building the JHR.

→ View of the construction site at CEA Cadarache research centre (2015)

The JHR project is led by an international consortium, including the CEA, owner and future operator of the nuclear facility, its french industrial partners EDF and Areva, the European Commission and research or industrial organizations of the following countries: Belgium, the Czech Republic, Finland, Great Britain, India, Israel and Sweden. Japan also participates in the project as an associate partner.

THE MAJOR CHALLENGES OF RESEARCH AND PRODUCTION FOR AN INTERNATIONAL EXPERIMENTAL REACTOR AT THE FOREFRONT OF SAFETY





→ Irradiated fuel

→ Sectional view of the JHR reactor. The core, of around 60 cm in diameter and height

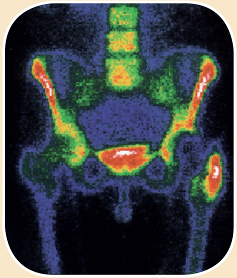
A high performance research tool

The JHR will damage the component samples that researchers and industrialists wish to test, using an intense neutron flux. In the experimental devices, these samples may also be submitted to extreme pressures and temperatures. These components will thereby undergo an accelerated aging process and will be pushed beyond the limits set for their nominal use in order to qualify them for industrial use. It will also be possible to achieve incident and accident conditions.

The JHR will be equipped with adapted infrastructures (storage pools, hot cells) to condition samples in lead transfer casks (special containers) for their analysis in post-irradiation examination laboratories such as the LECA-STAR in Cadarache. It will also have the means to conduct in-situ analyses just like a fission product laboratory or non-destructive examination cells for samples.

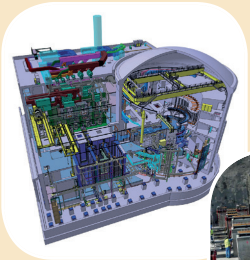
A supplier of radioisotopes for nuclear medicine

The JHR will also be used for nuclear medicine needs. It will supply hospitals with short-lived radioisotopes used in medical imaging for diagnostic purposes. These radionuclides such as technetium-99m, have a limited lifespan of a few hours and must therefore be produced continuously. The JHR will provide 25% of the European Union's needs on an annual average and could even supply up to 50% of the needs on a temporary basis, if necessary.



→ Bone scan of pelvis

Reenforced Safety Standards



→ 3D view of the nuclear unit

→ Aseismic pads

The JHR is being built in conformance with the highest standards of safety required by the French Nuclear Safety Authority (ASN). As such, it will have:

- Increased resistance to withstand an earthquake measuring 9 on the MSK scale
- Several separate diesel power generators to ensure continuous electrical supply in case of an emergency
- A decay heat removal system in air
- A second control room in case of emergency

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