

IRRADIATION EXPERIMENTS OF STRUCTURAL STEELS IN LVR-15 IN CZECH REPUBLIC

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ANNOTATION

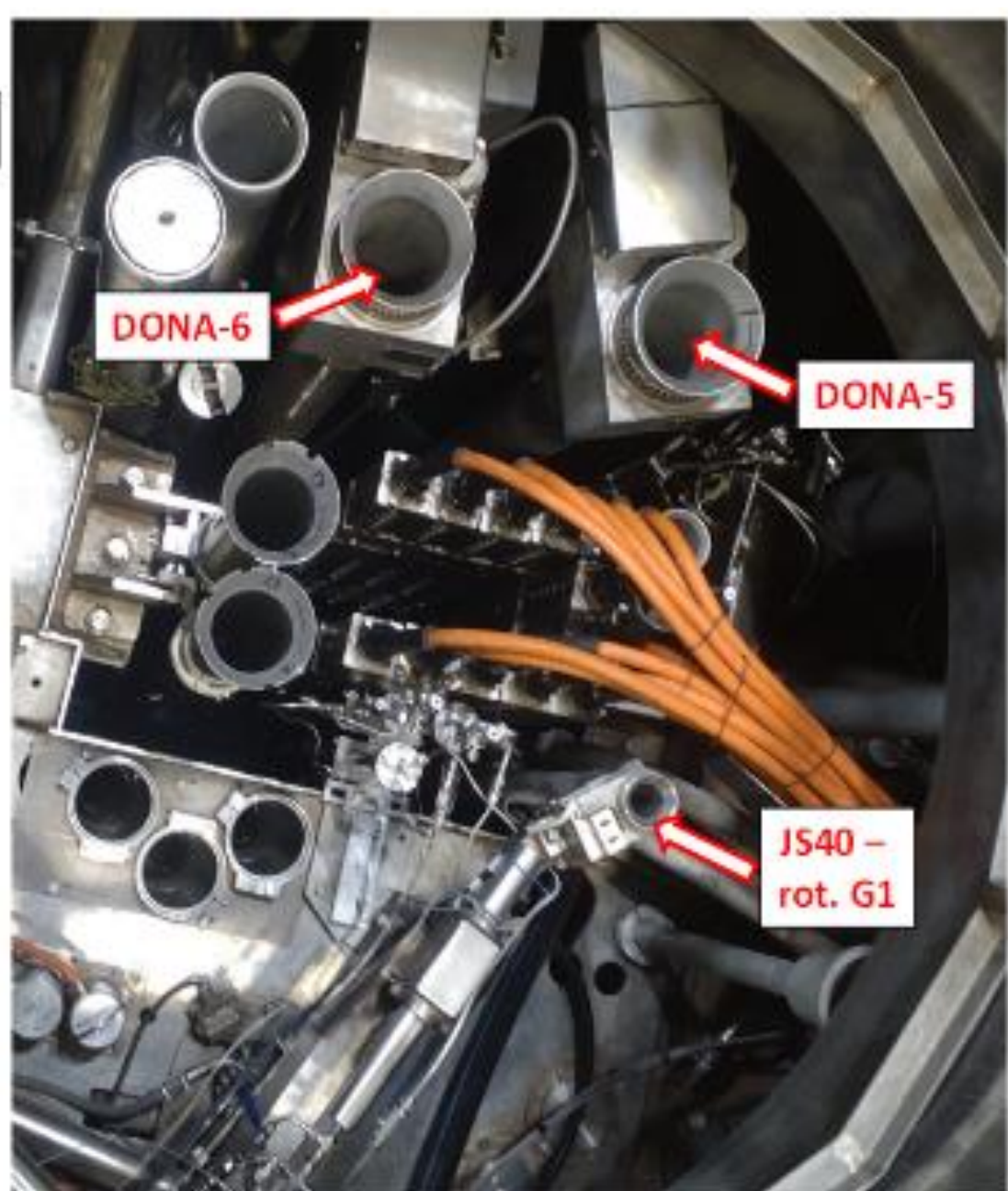
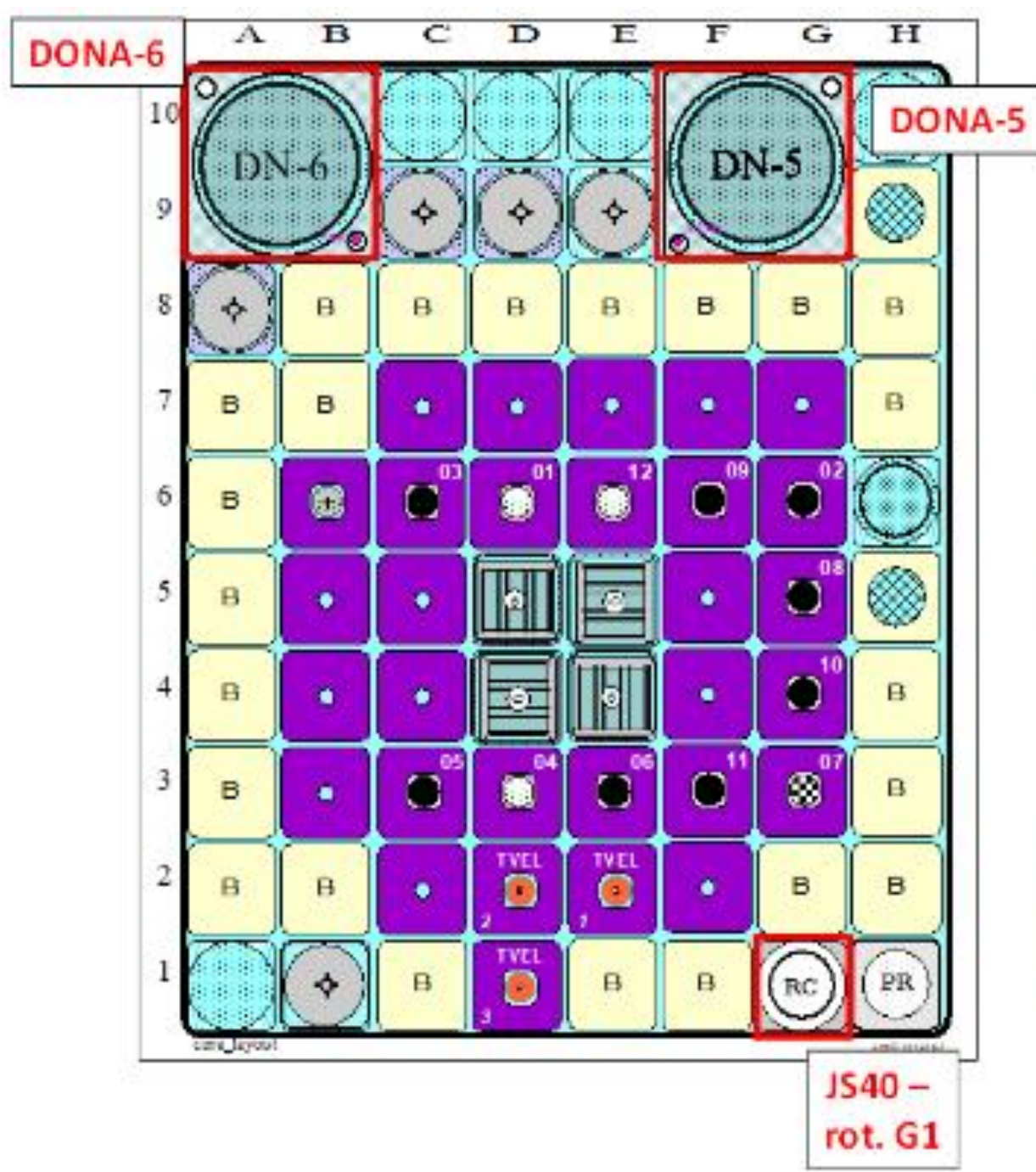
- Irradiation experiments on structural steels in the LVR-15 reactor examine the effect of neutron radiation on the degradation of mechanical properties of materials used in nuclear energy. These experiments simulate real operating conditions of individual components, and therefore various types of irradiation probes are used to achieve the required parameters (temperature, neutron flux, fluence).

Irradiation experiments

- The goal is to obtain data for component evaluation and prediction based on experimental results, particularly from mechanical property tests of irradiated samples.
- Irradiation experiments for the purpose of supplementing the surveillance program are conducted in the LVR-15 research reactor, primarily using three types of devices, which are listed here.

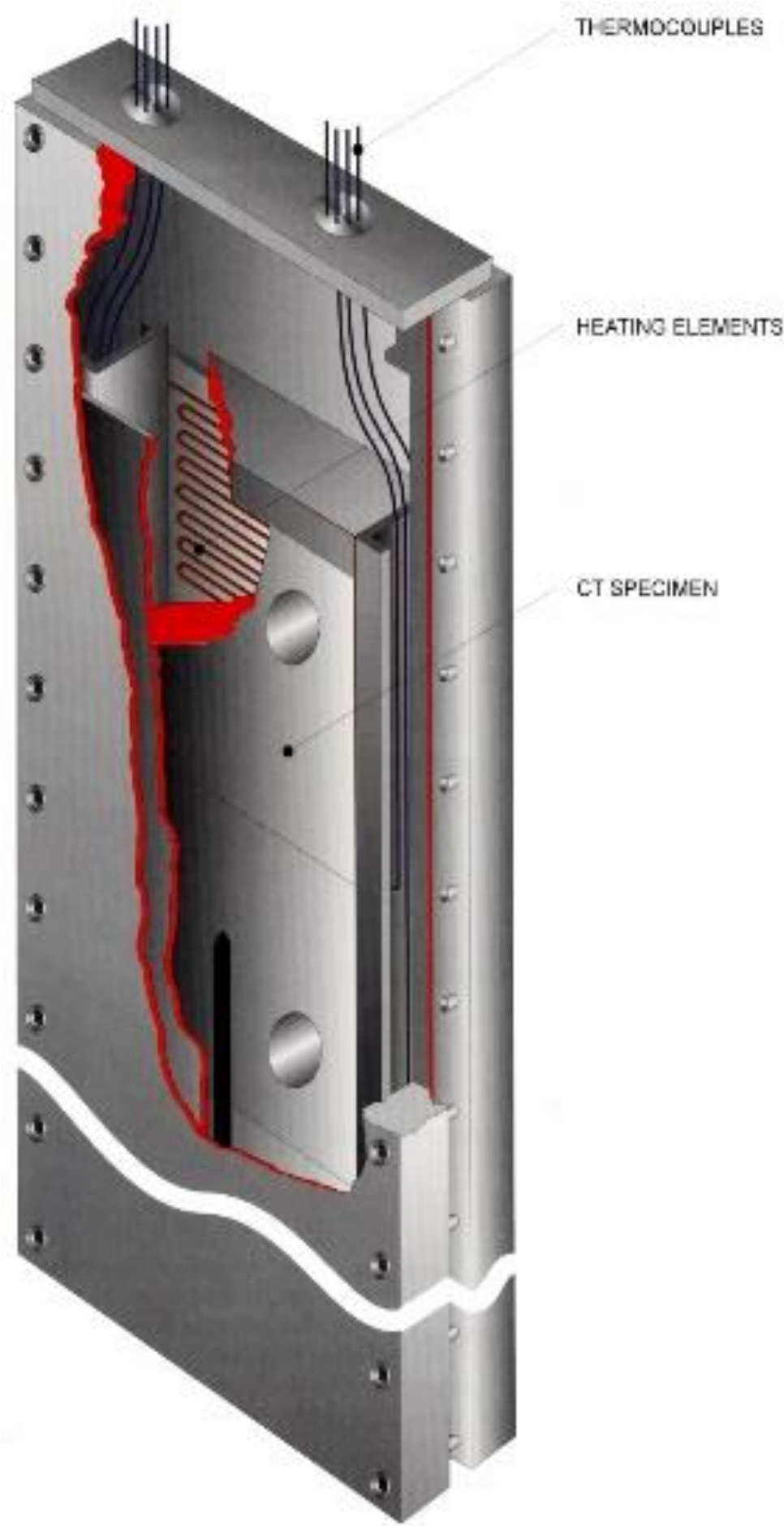
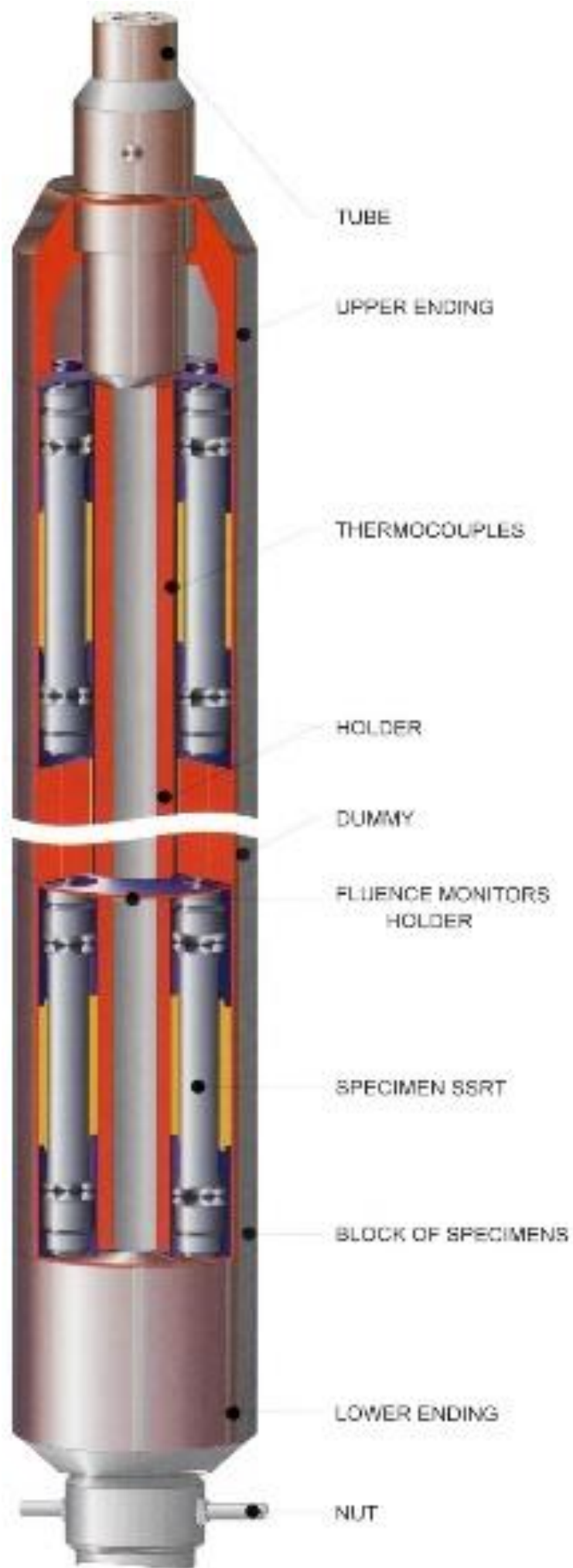
Research reactor LVR-15 in Rez

- Light-water, open-pool type reactor with an operational thermal power of up to 10 MW (fuel type IRT-4M enriched to 19.75% ²³⁵U). The moderator and coolant is demineralized water with an average temperature of 45°C.
- The active zone is formed by a separator in an 8 × 10 grid, into which fuel assemblies or irradiation channels are inserted.
- The operator of the research reactor is the company Research Centre Rez.



Probe CHOUCA

- Single-cell probe with heating sections.
- Temperature range: from 200 to 350°C.
- Active temperature measurement using thermocouples.
- Inert gases: He or mixture He+Ar, the ratio can be adjusted during irradiation.
- The irradiation time is usually an even number of campaigns.

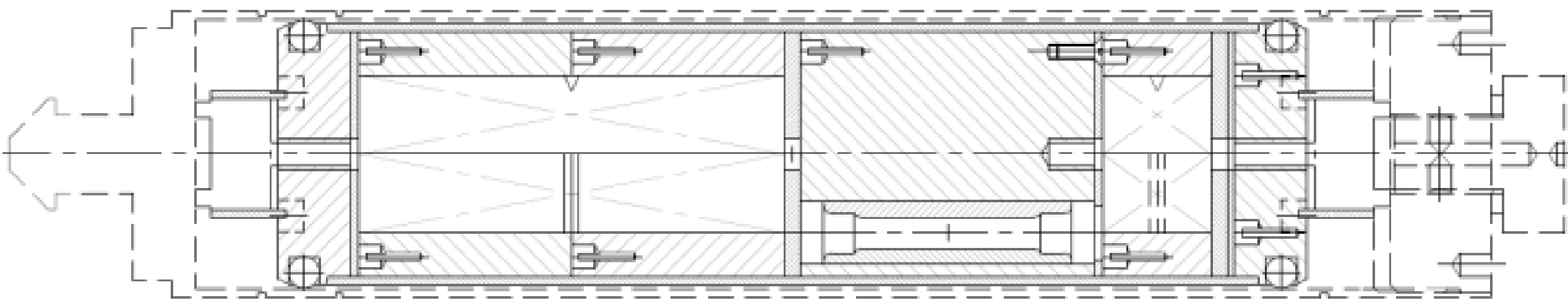


Flat probe

- Four or six-cell probe with heating sections.
- Temperature range: from 200 to 300°C.
- Active temperature measurement using thermocouples.
- Inert gases: He or mixture He+Ar, the ratio can be adjusted during irradiation.
- The irradiation time is usually an even number of campaigns.

Low temperature irradiation

- Designed for the vertical rotary channels.
- Temperature range from 60 to 220°C.
- Passive measurement - melting temperature indicators.
- Inert gas – He filled and sealed before irradiation.
- Irradiation time can range from several minutes to several weeks.



CONCLUSION

- The results of irradiation experiments in the LVR-15 reactor in Rez provide key insights for ensuring the safety and efficiency of nuclear facilities. The data obtained are essential for evaluating and predicting the behavior of materials under operational conditions, contributing to the long-term reliability and life extension of nuclear power plants.