

The Progress of Kijang Research Reactor Project

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1. Introduction

Kijang Research Reactor (KJRR), a 15 MWth isotope production reactor is under construction at Kijang-gun, Busan, Korea. The first concrete was poured in April, 2023 and the concrete for basement 2 floor of reactor building was poured as of August, 2024. The reactor operating license has been submitted to NSSC (Nuclear Safety and Security Commission) in October, 2023. The target for initial reactor criticality is April of 2027.

2. Facility Description

The KJRR facility will be producing Mo-99, I-125, I-131, and Ir-192 and irradiating Si ingot for neutron transmutation doping (NTD). There are 5 major buildings in KJRR facility; reactor building(RB), fission moly production building(FMPB), utility building(UB), radioisotope production building(RIPB), and radioactive waste treatment building(RWTB). RB, FMPB, and UB have safety class 3 and seismic class 1.



Fig. 1. Plan view of KJRR facility. 154 kV GIS & transformer, electric building, and DG building in north of UB. Cooling tower, demineralized water system, and natural evaporation building in west of RB.

There are 22 fuel assemblies in the reactor core, each of which has 21 U-Mo fuel plates. The U-Mo fuel will be loaded in the reactor for the first time as a driver fuel. This high uranium density LEU fuel will be favorable to the research reactor who wants to replace HEU with LEU maintaining high performance. There are 6 holes for fission moly production in the core box. The fission

moly target has 8 UAlx plates. The on-power loading is possible for the fission moly target.

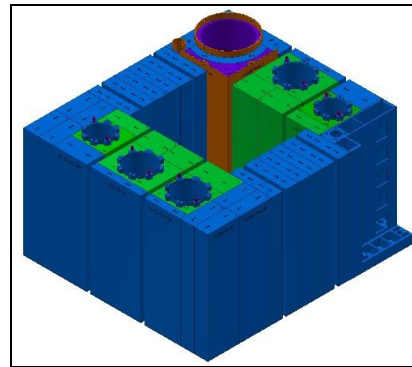


Fig. 3. Reflector region outside of core box. There are 5 NTD holes (three holes for 8 inch Si ingot and two holes for 6 inch Si ingot) and a fast neutron irradiation hole.

3. Licensing and Construction Progress

Since the construction permit approved in May, 2019, the operation license documents has been prepared. The construction company has been contracted in April 2022.

2.1 Licensing Status

The document suitability review for operation license documents has been completed and will be proposed to the NSSC Committee in September 2024 and the main evaluation by KINS will be followed.

The reactor operation procedures will be prepared and be used for the reactor operator (RO) and supervisor reactor operator (SRO) permit examination.

The permission to the GMP (Good Manufacturing Practices) for radiopharmaceuticals will be applied as well as the radioisotope (RI) production permission. There will be a RI production inspection by KINS when the RI is produced for the first time after the RI production permit is approved. The commercial RI production should be started within a year after the RI production permit.

2.2 Construction Progress

RB, FMPB, and UB are sharing the wall and the basement floors of these buildings will be completed

within this year 2024. The construction of RIPB and RWTB basement floors will be started in the beginning of 2025.

The pool liner installation at the basement floor 1 and 2 of the RB will be completed in September 2024. The electric building will be completed at the end of 2024 and the installation of HVAC and fire protection system will be followed. The initial electricity will be powered in 2025.

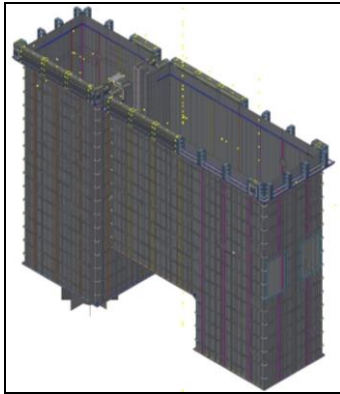


Fig. 2. Reactor pool, service pool, and spent fuel storage pool. The depth of pool water is 12 m.

The stage 1 of pre-operational inspection is for foundation excavation, back filling, rebar installation, pool liner plate installation, etc., which started in March, 2023. The stage 2 of pre-operational inspection has been requested in September 2023, which is for the installation of reactor structure, control rod driving mechanism, reactor cooling system, I&C system, etc.

3. Conclusions

The construction completion group (CCG) will be organized within the construction company in September 2024 and their first task will be the initial electric power energizing. The turn-over and construction acceptance test will be started at the end of 2025 and mainly performed in 2026.

REFERENCES

- [1] KJRR Final Safety Analysis Report, KAERI (2023)