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THE DIFFERENCE BETWEEN THE POND TYPE RESEARCH REACTOR IN TERMS OF UTILIZATION

The research reactor is widely used for many purposes such as education and training, neutron activation analysis, radioisotope production, conversion effects, neutron radiography, material structure studies, neutron capture therapy [1]. Generally, the fission heat from fuel assembly is not used in a research reactor while electrical energy is produced in a commercial nuclear power plant using the fission heat of nuclear fuel.

Numerous research reactors (RR) are designed as pond- type reactors. The paper is substantially demonstrated with RR of pool type and the difference between them in terms of design and construction.

Utilization

Irradiation site configuration

To achieve the goal of irradiation and the production of radioactive isotopes that will necessarily evolve over the life of the reactor, the reactor must provide irradiation sites with a great diversity in terms of neutron fluxes and spectra. In this respect, the most flexible design is Open core e. g. By SILOE and OSIRIS.

In an open basic down flow, there is actually no limitation in terms of geometry as long as the basic configuration remains within the validity domain of the safety analysis. In addition, the flow performance at the irradiation sites is very good compared to the reactor energy density as the irradiation can be close to the fuel and there is no neutron-absorbing reactor mass structure between the fuel and the irradiation sites.

In an open upward flow, the base box presents slight limitations because the geometry usually remains rectangular. The normal pitch of the core is very suitable with respect to the irradiation site.

In open-heart designs, the irradiation site within the core can benefit from central cooling and primary circuit activity monitoring (and a cap failure detection system) and requires no dedicated cooling system, nor any monitoring of coolant activity.

For high performance reactors, due to the increase in pressure in the core, the core vessel geometry is more restrictive. For the highest initial pressure, the only suitable option in terms of the shape of the primary bowl appears to be revolution geometry. The shape of the pressure vessel imposes engineering constraints on the irradiation sites.

Access to irradiators

Open core designs are most preferred with regard to accessing the internal irradiation sites at any time, once the bypass when handling the internal device has been taken into account in the safety analysis.

To reach the irradiation sites within the core within the tank reactors in the pond, the reactor vessel cap causes the reactor to wait for the reactor to be turned off to reach the irradiation in the core or there is a thimble in the cap and a dedicated cooling system.

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THE DIFFERENCE BETWEEN THE POND TYPE RESEARCH REACTOR IN TERMS OF OPERATION

The research reactor is widely used for many purposes such as education and training, neutron activation analysis, radioisotope production, conversion effects, neutron radiography, material structure studies, neutron capture therapy [1]. Generally, the fission heat from fuel assembly is not used in a research reactor while electrical energy is produced in a commercial nuclear power plant using the fission heat of nuclear fuel. Numerous research reactors (RR) are designed as pond- type reactors. The paper is substantially demonstrated with RR of pool type and the difference between them in terms of design and construction.

Refuelling process

Open- heart designs, since they bear lower handling-in before reaching the energy assemblies that will be handled during primary outages, will be more applicable. Analysis of assignments learned from being reactors shows that the design effect is generally of the alternate order of magnitude on outage