The OPAL Research Reactor

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The OPAL research reactor is the only operating nuclear reactor in Australia. It was designed and constructed to operate as a multipurpose research reactor for the production of radioisotopes, silicon transmutation doping, neutron activation analysis and the production of neutron beams for research. It operates at a power of 20 MW produced in a compact high leakage core. All the irradiation and beam facilities are outside the core in a large heavy water reflector designed to optimise the neutron flux and number of facilities.

There are a total of 17 water cooled facilities capable of accommodating up to 5 targets each for irradiation of bulk materials. These are currently used to produce fission product $Tc99^m$ and I131 for medical applications and Ir192 for medical and industrial applications. There are a total of 57 pneumatically actuated target positions for the irradiation of smaller samples including the production of Cr51 and Sm153 for medical applications.

Instrumental neutron activation analysis and delayed neutron activation analysis are also available for the elemental analysis of samples post irradiation. There are three thermal beam tubes, two of which end in the reactor beam hall and the third in a neutron guide hall. They serve a total of 6 instruments for neutron scattering analysis. In addition there is a cold neutron source that provides two cold neutron beams. These cold neutrons are transported to 5 instruments located along neutron guides, with a further two instruments in the process of being commissioned or constructed.

The reactor has a design life of 40 years and the flexibility to adapt the application of existing facilities and even add one or two new ones. It has the capacity to meet Australia's need for radioisotope production and research applications into the future and is already a significant international contributor.