New reactor open for business

Richard Macey

AS THE debate over the use of nuclear power heats up, the Prime Minister, John Howard, will today declare open one of the country's biggest and most controversial science projects, the new $400 million nuclear research reactor at Lucas Heights.

Named OPAL, an acronym describing how its atomic core is shielded by an open pool of water 13 metres deep. It replaces Australia's first nuclear reactor, shut down in January after 48 years.

Powered by six kilograms of uranium-235, OPAL generates 20 megawatts of energy - twice that produced by the seven kilograms of fuel in the old reactor, but hundreds of times less than the output of typical nuclear power plants.

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While the old reactor used concrete and lead to contain its radioactivity, OPAL is shielded by a steel mesh 40 metres long and 30 metres wide, nicknamed the chip basket, or hairnet, designed to stop aircraft flown by suicide terrorists.

The Australian Nuclear Science and Technology Organisation, which runs Lucas Heights, already produces 70 per cent of the radiopharmaceuticals used in Australia, enough to treat 500,000 patients a year. It says the new reactor could boost production four times.

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The new reactor, described as a factory for making neutrons, fundamental atomic particles, will also be used for advanced materials technology, geology and cell biology science, and even gene therapy and obesity research.

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With names such as Wombat, Echidna, Platypus and Quokka, nine research instruments will eventually use particles made in the reactor.

Andrew Studer, an instrument scientist, is among a team that has been trialling Wombat this week, conducting experiments to unravel the nature of the Earth's interior.

Wombat and Echidna have both been designed to reveal subtle but vital variations in the atomic structure of materials by bombarding them with neutrons and watching the way the particles bounce off.

German scientists have been using extreme pressures and temperatures to make artificial bits of mantle, which Wombat has analysed. So far, Dr Studer said, Wombat's performance "looks fabulous".

Scientists also hope to use the new reactor for research into everything from the structure of blood cells to aircraft parts.