

HEU-Fueled Facilities in France

Updated March 2013



Location	Reactor	Characteristics	Status
Cadarache	Eole	Tank in pool, critical assembly - Up to 93% HEU in the past, now MOX	Start-up 1965, operational
Cadarache	Harmonie	Tank in pool	Operational 1965-1996. Fuel may still be in Cadarache
Cadarache	Jules Horowitz	Tank in pool, research reactor at least 100 MW thermal, to use LEU	Under construction; will replace Osiris. Set to startup in 2014 with 27% enriched fuel and convert to 19.75% enriched fuel when that fuel is available.
Cadarache	Masurca	Critical assembly, fast 3 MW, plutonium, and uranium, natural or enriched to 25%	Startup 1966, operational
Cadarache	Minerve	Pool, critical assembly 100 kWt; 90-93% HEU now MOX	Startup 1959, moved to Cadarache from Fontenay in 1977; operational and can be converted with currently available LEU fuel. While the Global Threat Reduction Initiative and France have engaged in discussions regarding HEU reactor conversion, no formal feasibility study examining Minerve has been undertaken.
Cadarache	Scarabée (INB 24)	Pool, test reactor 100 MW thermal; HEU fuel	Startup 1982, shut down 1996. All HEU fuel sent to La Hague.
Grenoble, Institute Max Von Laue-Paul Langevin (ILL)	Réacteur à Haut Flux (RHF)	Heavy water research reactor 58.3 MWt; up to 93% HEU	Startup 1971, currently not a candidate for conversion due to lack of fuel, but signed MoU with DOE for conversion "when fuel available."
Grenoble	Siloé	Pool reactor with open core 35MWt; 93% HEU until 1996	Startup 1963, shut down 1997. All HEU fuel sent to La Hague
Grenoble	Siloette	Critical model of Siloé	Operational 1964-1985 (?)
Grenoble	Mélusine	Pool reactor with open core 1 MW thermal, raised to 8 MW thermal in 1971; up to 93% HEU	Operational 1958-1988. All HEU fuel sent to La Hague
Marcoule	Phénix	Fast breeder reactor 563MWt; used HEU, used MOX from 1995 until shutdown	Startup 1973; shut down in 2009; its dismantlement began end of 2011 and is due to be completed in 2026.
Saclay	Isis	Critical assembly, mock-up of Osiris.	Startup 1966, converted to LEU
Saclay	Orphée	Pool research reactor 14 MW; up to 93% HEU	Startup 1980. Currently not a candidate for conversion due to lack of fuel, but signed MoU with DOE for conversion "when fuel available."
Saclay	Osiris	Pool reactor 70 MW	Startup 1966, converted from HEU to LEU fuel in 1995-96. Carries out tests of the high- density UMo fuel that is under development for research reactors and produces isotopes for industry and medicine, periodically with use of HEU targets. It is due to transition to LEU targets as processors convert.
Saclay	Ulysse	Argonaut training reactor 100kW; 20-90 HEU	Startup 1961, shut down in February 2007 without conversion.
Strasbourg University	Strasbourg-Cronembourg	Argonaut training reactor 0.1 MWt; 93% HEU	Operational 1966-1997, fuel removed 2000, dismantled 2008.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



This material is produced independently for NTI by the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies and does not necessarily reflect the opinions of and has not been independently verified by NTI or its directors, officers, employees, or agents. Copyright © 2012 by MIIS.