

Nuclear Latency (NL) Dataset
Country Coding Sheets

AUSTRALIA
COW COUNTRY CODE: 900

List of Country's Enrichment and Reprocessing (ENR) Facilities

1. Lucas Heights
2. Silex Laser Enrichment Facility at Lucas Heights Science and Technology Complex

Detailed Facility-Specific Information and Sources

1. Lucas Heights

- a. ENR type (diffusion, centrifuge, EMIS, chemical and ion exchange, aerodynamic isotope separation, reprocessing).*

Enrichment, centrifuge.

- b. Facility size (laboratory, pilot, commercial).*

Laboratory.

- c. Is the facility under construction or in operation? If under construction, list the construction years. If in operation, list the years of operation.*

The centrifuge program was initiated in 1965 or 1966. This date is used as the initial construction of the experimental facility.¹ The facility operated from 1972² to 1983.³ A report in the *Sydney Morning Herald* confirms, "a small quantity of uranium has been enriched at Lucas Heights" ("It's Wait and See at Lucas Heights," June 1, 1977).

- d. Was the facility developed covertly? If so, identify years that facility was covert.*

There may have been some secrecy surrounding the uranium enrichment program. Yet, the centrifuge plant at Lucas Heights was publicly revealed in the 1967-68 annual report of the Australian atomic energy commission.

- e. Was the facility placed under IAEA safeguards? If so, identify the years that the facility was safeguarded.*

¹ 1972 is the proposed start date for enrichment experimentation at the facility according to Pryor.

² Ibid.

³ The 1983 date is from Laughter's 2009 World Uranium Enrichment Programs update. Pryor lists 1986 as the ending date for the centrifuge facility.

Australia ratified the NPT in 1973, and entered into a comprehensive safeguards agreement with the IAEA in July 1974. When the plant was shut down in 1983, Australia initially denied the IAEA access, citing the need to protect proprietary technology. Sampling was allowed to occur in 1993, however. At that time, the building had been thoroughly cleaned, decontaminated, and repeatedly repainted.

- f. *Was the facility placed under regional safeguards? If so, identify the years that the facility was under regional safeguards.*

No while the Treaty of Rarotonga (South Pacific Nuclear-Free Zone) entered into force in 1986, there was no independent safeguards regime associated with that treaty. The treaty requires that states do not pursue nuclear weapons, but not necessarily ENR. Compliance is ascertained through IAEA safeguards on all civilian facilities.

- g. *Did the facility have a military purpose?*

This was intended primarily as a civilian project. However, the construction and operation of this plant coincided with an Australian effort to develop nuclear weapons. To be sure, several Australian officials – including Philip Baxter, the head of the atomic energy commission – valued centrifuge technology in part for its military utility. Taking all of the available evidence under consideration, it seems inaccurate to call this plant part of a concerted nuclear weapons program, but it may not have been entirely civilian either.

- h. *Was the facility multinational? If so, identify the other countries that were involved.*

No, the facility is a predominately Australian research facility.

- i. *Was the facility built with foreign assistance? If so, list the supplier(s) and what they provided.*

No evidence of foreign assistance was found.

- j. *Sources*

"Australian Nuclear Weapons: The Story So Far," APSNet Policy Forum, July 17, 2006, <http://nautilus.org/apsnet/0623a-broinowski-html/>

Kemp, Scott R. 2014. "The Nonproliferation Emperor Had No Clothes: The Gas Centrifuge, Supply Side Controls, and the Future of Nuclear Proliferation." *International Security*. 38(4): 39-78.

Laughter, M.D. 2009. "Profile of World Uranium Enrichment Programs—2009." Oak Ridge National Laboratory

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Pryor, A. W. 1997. "Personal Memories of Two Advanced Uranium Enrichment Projects at Lucas Heights in the Years 1972-1980." *The Australian & New Zealand Physicist*. 33(3-4): 53-58.

"Uranium Enrichment," Friends of the Earth Australia. <http://www.foe.org.au/anti-nuclear/issues/oz/en>.

Zentner, M.D., G.L. Coles, and R.J. Talbert. 2005. "Nuclear Proliferation Technology Trends Analysis." Pacific Northwest National Laboratory. Report 14480.

2. Silex Laser Enrichment Facility at Lucas Heights Science and Technology Complex

a. *ENR type (diffusion, centrifuge, EMIS, chemical and ion exchange, aerodynamic isotope separation, reprocessing).*

Laser (SILEX).

b. *Facility size (laboratory, pilot, commercial).*

Laboratory.⁴

c. *Is the facility under construction or in operation? If under construction, list the construction years. If in operation, list the years of operation.*

The program started development in 1982. This is used as the start date for the construction of the facility. The facility started operating in 1992⁵ and completed operations in August 2007.⁶

d. *Was the facility developed covertly? If so, identify years that facility was covert.*

No, the facility was part of a commercial effort to develop a viable laser enrichment process.

e. *Was the facility placed under IAEA safeguards? If so, identify the years that the facility was safeguarded.*

Australia entered into a comprehensive safeguards agreement with the IAEA in July 1974. The country reaffirmed its obligation to place SILEX-related activities under safeguards in a 1999 agreement with the United States.

⁴ Zentner et al. refer to this as a pilot module.

⁵ The 1992 date is from the IAEA INFCIS database. The first successful test of the technology was in 1994 (Zentner et al. 2005, 63)

⁶ August 2007 is the date Silex Systems announced the successful transfer of the project to the Wilmington, North Carolina facility, thus ending the enrichment program in Australia (Laughter 2009, 32).

- f. Was the facility placed under regional safeguards? If so, identify the years that the facility was under regional safeguards.*

No while the Treaty of Rarotonga (South Pacific Nuclear-Free Zone) entered into force in 1986, there was no independent safeguards regime associated with that treaty. The treaty requires that states do not pursue nuclear weapons, but not necessarily ENR. Compliance is ascertained through IAEA safeguards on all civilian facilities.

- g. Did the facility have a military purpose?*

No, the enrichment facility was commercially owned and operated.

- h. Was the facility multinational? If so, identify the other countries that were involved.*

The original development of technology was not multinational. A 1999 agreement between the United States and Australia paved the way for technology transfer to the United States. The US firm United States Enrichment Corporation (USEC) signed an agreement in 1996 to cover the cost of development. The Japanese based firm Hitachi formed a joint venture with GE in 2007 to manage and develop the technology.

- i. Was the facility built with foreign assistance? If so, list the supplier(s) and what they provided.*

Foreign assistance was provided after the “Agreement For Cooperation Between Australia and the United States of America Concerning Technology for the Separation of Isotopes of Uranium by Laser Excitation” was signed in 1999. The treaty states, “The Parties shall cooperate in research on and development and utilization of SILEX technology... sensitive nuclear technology and Restricted Data related to SILEX technology may be transferred for peaceful purposes.” This includes “Research on and development, design, construction, operation, maintenance, and use of sensitive nuclear facilities for SILEX technology.”

- j. Sources*

International Atomic Energy Agency. “Integrated Nuclear Fuel Cycle Information Systems.” <https://infcis.iaea.org>. Accessed 06/08/2015.

Laughter, M.D. 2009. “Profile of World Uranium Enrichment Programs—2009.” Oak Ridge National Laboratory

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- . “Agreement For Cooperation Between Australia and the United States of America Concerning Technology for the Separation of Isotopes of Uranium by Laser Excitation.” <http://www.princeton.edu/~rskemp/SILEX-treaty.pdf>. Accessed 06/08/2015.