

Nuclear Latency (NL) Dataset
Country Coding Sheets

ITALY

COW COUNTRY CODE: 325

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

1. Eurex SFRE (MTR) at Saluggia in Vercelli
2. Eurex SFRE (Oxide) at Saluggia in Vercelli
3. Eurex SFRE (PU Nitrate Line) Saluggia in Vercelli
4. ITREC at Trisaia

Note: Italy had a gas centrifuge research program and reportedly developed a successful centrifuge in 1974.¹ We were unable to find definitive evidence, however, indicating that Italy used centrifuges to enrich uranium.

Detailed Facility-Specific Information and Sources

1. Eurex SFRE (MTR) at Saluggia in Vercelli

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

Spent fuel reprocessing.

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

Pilot.

- 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 construction of the facility began in 1964 and ended in 1968. The facility started cold runs in May 1970, which is used as the operational date. The facility was operational from 1970 until 1983 and was used for treating and conditioning waste until 1990.²

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

No.

¹ Kemp, R. Scott. 2014. "The Nonproliferation Emperor Has No Clothes." *International Security* 38, no. 4: 45.

² Acton, Gili and Risoluti, and World Nuclear state reprocessing ended in 1983.

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

Yes, Italy signed a comprehensive safeguards agreement with the IAEA in 1977.

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

Yes, Italy ratified the Euratom treaty in 1958, which provided regional safeguards.

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

No.

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

No.

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

No. Euratom financial assistance does not necessarily imply foreign aid based on our definition.

- j. *Sources:*

Acton, James M. 2009. "Nuclear Power, Disarmament, and Technological Restraint." *Survival*. 51(4): 112-113.

http://carnegieendowment.org/files/acton_survival_aug20091.pdf. Accessed 06/25/2015.

Calleir, G, S. Cao, M. Fiorelli. 1971. "Italian Progress Report on Reprocessing of Irradiated Fuel." Fourth United Nations International Conference on the Peaceful Uses of Atomic Energy. Geneva, Switzerland 6-16 September 1971.

European Union. 2007. "Analysis of Environmental, Economic and Social Issues Linked to Decommissioning of Nuclear Installations." European Commission: Directorate General Energy and Transport.

Gili, M, and Troiani, F. 2003. "Direct Dismantling of Reprocessing Plant Cells the Euxex Plant Experience." WM'03 Conference. February 23-27.

<http://www.wmsym.org/archives/2003/pdfs/440.pdf>. Accessed 06/25/2015.

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

Kroenig, Matthew. 2010. *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons*. Ithaca, NY: Cornell University Press.

Merlini, Cesare. 1988. "A Concise History of Nuclear Italy." *The International Spectator*. 23(3): 141.

Organization for Economic Cooperation and Development. 2011. "Radioactive Waste Management Programmes in OECD/ NEA Member Countries: Italy." http://www.oecd-nea.org/rwm/profiles/Italy_profile_web.pdf. Accessed 06/25/2015.

Sogin. "Eurex Plant- Saluggia." <http://www.sogin.it/en/about-us/environmental-remediation-of-nuclear-sites/where-we-are/eurex-plant---saluggia---vercelli.html>. Accessed 06/25/2015.

World Nuclear Association. 2014. "Italy." <http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Italy/>. Accessed 06/25/2015.

2. Eurex SFRE (Oxide) at Saluggia in Vercelli

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

Spent fuel reprocessing.

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

Pilot.

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

Construction of the facility probably began 1976.³ The facility operated from 1980 to 1990.

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

No.

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

Yes.

³ The 1976 date is from the Commission of the European Communities (1991) report that discusses the last 15 years of extraction. Additionally, 1976 fits with the five-year nuclear plans that Italy issued throughout the period.

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

Yes, Italy ratified the Euratom treaty in 1958, which provided regional safeguards.

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

No, the facility was for the civilian nuclear program.

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

No.

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

No, evidence of foreign assistance is not found.

j. *Sources:*

Acton, James M. 2009. "Nuclear Power, Disarmament, and Technological Restraint." *Survival*. 51(4): 112-113.

http://carnegieendowment.org/files/acton_survival_aug20091.pdf. Accessed 06/25/2015.

Calleir, G, S. Cao, M. Fiorelli. 1971. "Italian Progress Report on Reprocessing of Irradiated Fuel." Fourth United Nations International Conference on the Peaceful Uses of Atomic Energy. Geneva, Switzerland 6-16 September 1971.

Gili, M, and Troiani, F. 2003. "Direct Dismantling of Reprocessing Plant Cells the Eurex Plant Experience." WM'03 Conference. February 23-27.

<http://www.wmsym.org/archives/2003/pdfs/440.pdf>. Accessed 06/25/2015.

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

Merlini, Cesare. 1988. "A Concise History of Nuclear Italy." *The International Spectator*. 23(3): 141.

Organization for Economic Cooperation and Development. 2011. "Radioactive Waste Management Programmes in OECD/ NEA Member Countries: Italy."

http://www.oecd-nea.org/rwm/profiles/Italy_profile_web.pdf. Accessed 06/25/2015.

Sogin. "Eurex Plant- Saluggia." <http://www.sogin.it/en/about-us/environmental-remediation-of-nuclear-sites/where-we-are/eurex-plant---saluggia---vercelli.html>. Accessed 06/25/2015.

World Nuclear Association. 2014. "Italy." <http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Italy/>. Accessed 06/25/2015.

3. Eurex SFRE (PU Nitrate Line) Saluggia in Vercelli

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

Spent fuel reprocessing.

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

Pilot.

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

Construction of the facility probably began around 1981.⁴ The facility operated from 1988⁵-1990.⁶ The facility is decommissioned.

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

No.

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

Yes.

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

Yes, Italy ratified the Euratom treaty in 1958, which provided regional safeguards.

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

⁴ The 1981 date is from the Commission of the European Communities (1991) and fits the five-year nuclear plans that Italy issued throughout the period. In the report the opening comments discuss the evolution of extraction at the facility.

⁵ The initial operational date is from INFCIS.

⁶ The 1990 date is based on when Italy decided to end the country's nuclear power program (World Nuclear Organization).

No.

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

No.

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

No evidence of foreign assistance found.

j. Sources:

Acton, James M. 2009. "Nuclear Power, Disarmament, and Technological Restraint." *Survival*. 51(4): 112-113.
http://carnegieendowment.org/files/acton_survival_aug20091.pdf. Accessed 06/25/2015.

Calleir, G, S. Cao, M. Fiorelli. 1971. "Italian Progress Report on Reprocessing of Irradiated Fuel." Fourth United Nations International Conference on the Peaceful Uses of Atomic Energy. Geneva, Switzerland 6-16 September 1971.

Casari, M., L. Cecille, and L. Pietrelli. 1991. "New Separation Chemistry Techniques For Radioactive Waste and Other Specific Applications." Commission of the European Communities.

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Merlini, Cesare. 1988. "A Concise History of Nuclear Italy." *The International Spectator*. 23(3): 141.

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Schaper, Annette. "A Treaty on the Cutoff of Fissile Material for Nuclear Weapons: What to Cover? How to Verify?" PRIF-Report.

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World Nuclear Association. 2014. "Italy." <http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Italy/>. Accessed 06/25/2015.

4. ITREC at Trisaia

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

Spent fuel reprocessing.

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

Pilot.

- 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 facility started construction in 1962 and was completed in 1966. The facility operated from 1966⁷ to 1980.

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

No.

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

Yes.

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

Yes, Italy ratified the Euratom treaty in 1958, which provided regional safeguards.

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

⁷ The NFCIS database has the facility starting to operate in 1975 and end in 1988. The NFCIS end of operation date is used. The 1966 date is from the Zentner et al. report, which states that a thorium reprocessing facility was constructed in 1966 at Taranto. ITREC facility is coded as the Taranto facility as no additional sources used the Taranto location. Additionally, geographically the two locations are neighboring provinces in southern Italy. Zentner et al. (2005) state that collaboration with US on thorium reprocessing ended in 1974. Additional details about thorium reprocessing can be found in Rhan et al. (1984) and Candelieri (1985).

No.

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

No, the facility was owned by Italy.

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

Yes, the ITREC program was jointly carried out with the USAEC. In 1960 Italy and the US began designing the reprocessing plant. Spent fuel from the US Elk-River reactor was reprocessed at the facility. The joint effort ended in 1974 according to Candelieri (1985). Additionally, Italian thorium research received support from Euratom countries.

j. Sources:

Candelieri, T. 1985. "Operating Experience in First Campaign for Reprocessing of Uranium-Thorium Elk-River Fuel Elements." in *Proceedings of a Technical Committee Meeting on Utilization of Thorium-Based Nuclear Fuel*. International Atomic Energy Agency. Vienna, Austria: December 2-4, 1985.
http://www.iaea.org/OurWork/ST/NE/inisnkm/nkm/aws/fnss/fulltext/0412_9.pdf

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

MacLachlan, Ann. 2003. "Government Decision to Site Deep Repository Astonishes Italy." *Nuclear Fuel*. 44(47): 1.

Rahn, Adamantiades, Kenton, and Braun. 1984. "A Guide to Nuclear Power Technology." New York City: EPRI, John Wiley & Sons.

World Nuclear Association. 2014. "Italy." <http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Italy/>. Accessed 06/25/2015.

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