

Nuclear love affair loses its charm

Declan Butler

The strong showing of environmentalists in last month's elections in France has marked a turning point in the history of its nuclear power programme, and raised doubts over the future of French reprocessing.

Lionel Jospin, France's Socialist Prime Minister, has thrown into question the overall strategy of the world's foremost nuclear power programme with his confirmation last week that the government intends to "abandon" Superphénix, the only commercial-scale fast-breeder nuclear reactor.

Also at stake is the future of the world's largest reprocessing plant for nuclear fuel, at La Hague on France's northern coast.

Superphénix was built in the 1970s by NERSA, a consortium of French, German and Italian utilities, at Creys-Malville near Lyons. But the 1,250-MW reactor, whose total cost is put at FFfr60 billion (US\$10.3 billion), has been plagued by technical prob-

lems. It has operated for a total of only a few months since it was opened in 1986.

Jospin's announcement of its closure, made during his maiden speech to the National Assembly last week, represents a major victory for the 'green' movement. Dominique Voynet, the leader of the Green party, Les Verts, and environment minister in the new government, had demanded the closure as part of a pre-election pact with the Socialist party. Les Verts entered the assembly for the first time after the general election earlier this month, when it won eight seats.

Voynet's ministry will be strengthened by the fact that it succeeded in fighting off a last-minute bid to save the reactor by the

nuclear lobby and the Socialist party's Communist allies, who were supported by reactor staff and local politicians. The decision is a serious defeat for those who have until now steered the country's nuclear power programme, free of any significant public scrutiny.

France produces 77 per cent of its electricity from nuclear power, and few expect the country to follow Germany and other countries in phasing out nuclear power. But the shift in the balance of forces between the nuclear lobby and environmentalists suggests that greater public scrutiny is inevitable.

Jospin said that, although France's nuclear industry is important, it should not be "exempt from democratic rules" and that greater independent control is needed.

Following the decision to close Superphénix, many observers in Paris are now questioning the fate of the La Hague plant. Reprocessing plants were originally built to provide plutonium for weapons, and later for a planned park of fast-breeder reactors

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Voynet: invoked pre-election pact.

CELIK ERKUL, GAMMA

Japan set to face a lonely future in fast-breeder research

[TOKYO] The Japanese government is determined to press on with the development of fast-breeder reactors, despite France's decision to close Superphénix and calls for the "dissolution" of the organization that operates Japan's Monju fast-breeder (pictured right) following a series of accidents.

At its meeting last Friday (20 June), the Atomic Energy Commission reaffirmed Japan's policy of developing a nuclear fuel cycle that will use plutonium in conventional and fast-breeder reactors. The policy had been put in doubt following a series of accidents at facilities operated by the Power Reactor and Nuclear Fuel Corporation (PNC), including a sodium leak at Monju in 1995 and an explosion at a low-level waste facility last March (see *Nature* 386, 746; 1997).

Some feel that the French decision, announced the day before the commission's meeting, could isolate Japan from other industrialized nations in its nuclear power strategy. But the head of the commission, Riichiro Chikaoka, who also heads the government's Science and Technology Agency (STA), which oversees PNC, declared that "the importance of our nuclear fuel cycle project has not changed [as a result of the French policy]."

The commission's decision came only a few days after the head of a committee set

up by the agency to look into reform of the PNC suggested that a revamped corporation should concentrate on research and development of fast-breeder reactors and nuclear waste disposal. Hiroyuki Yoshikawa, head of the committee and former president of Tokyo University, says that a reformed PNC should concentrate on "pragmatic" research and development. Certain activities should be privatized, transferred to other

organizations or terminated, such as uranium surveys overseas and development of the advanced thermal reactor Fugen.

Yoshikawa's draft proposals, which will be finalized next month, are considerably less severe than suggestions by some politicians that PNC should be "dissolved".

A parallel PNC reform committee of the ruling Liberal Democratic party, headed by Hidenao Nakagawa, a former director-general of the STA, is likely to recommend that PNC should be dissolved. But even this committee is expected to propose the continued development of fast-breeder reactors, according to Kaname Ikeda, director-general of STA's nuclear safety bureau.

The STA's budget for Monju will decrease next fiscal year to about ¥10 billion (US\$88 million) from the current ¥13 to ¥14 billion, says Ikeda. But this is because the facility is "sleeping" following the sodium leak.

But France is the leader in fast breeder technology, and the closure of Superphénix is bound to at least cause a rethink in Japan, the only other country with a substantial fast-breeder programme, says Gerhard Heusener, who heads nuclear safety at the Karlsruhe Nuclear Research Centre, and led German participation in French efforts to explore using fast breeders as plutonium incinerators.

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that would burn plutonium and breed further plutonium fuel.

The plutonium cycle has dominated French nuclear thinking since the 1970s, when it was predicted that uranium would become scarce and that plutonium would become the fuel of choice.

Twenty years later, uranium prices are lower than ever, and plutonium from reprocessed spent fuel and dismantled weapons is generating a large and unwanted stockpile. But reprocessing plants continue to be built and operated, with the La Hague plant producing 15 tonnes of plutonium a year.

The conversion of Superphénix in 1994 from a power plant to a research reactor aimed at incinerating plutonium may have ended the French dream of developing power-generating breeders. But it still gave the plutonium cycle a second lease of life, by keeping open the unlikely option of developing a park of incinerators, and the associated reprocessing plants that would be needed. Although such research may continue at a reduced level, any plans for industrial-scale fast breeders in the near future have now disappeared.

Controversy over the La Hague plant has also been fuelled recently by a study linking it to increased rates of leukaemia in the region, and claims that levels of radioactivity in discharges from the plant were greater than officially stated (see right).

Incineration remains a "valid research angle", however, claims Gerhard Heusener, who heads nuclear safety at the Karlsruhe Nuclear Research Centre in Germany, and leads the small German participation — about DM 5 million (US\$2.9 million) annually — in the French incineration research programme CAPRA.

But he admits that it is "hard to imagine" using fast neutron reactors to burn plutonium on an industrial scale in the near future, given that this would require building one plutonium furnace for every five pressurized-water reactors.

Debate is likely to grow over the coming weeks with the expected completion of a report commissioned by the government on the recycling of plutonium. "The end of the breeder programme puts into question the rest of the [plutonium] system", argues Mylce Schneider, director of WISE, a Paris-based energy consultancy.

Les Verts has called for a halt to new reprocessing contracts, pointing out that reprocessing is by far the most polluting part of the nuclear fuel cycle. Observers in Paris predict a long, hard battle over the future of the La Hague plant, adding that the outcome is difficult to predict. The plant has been a key component in the management of France's spent fuel and its shutdown would provoke a complete rethink of the French nuclear fuel cycle. □

Cogema's 'arrogance' adds to La Hague's problems

[PARIS] Continuing controversy about the level of radioactivity in discharges from the reprocessing plant at La Hague took a political turn last week when France's environment and health ministers rallied to the support of the environmentalist group Greenpeace.

This followed an incident in which divers from Cogema, the company that operates the plant, were alleged to have removed underwater monitoring equipment that had been installed by Greenpeace.

Greenpeace immediately filed charges against 'X', a standard legal procedure in France, for "theft by an organized gang". Cogema admitted having "confiscated a foreign body". Dominique Voynet, the environment minister, criticized the removal of the equipment, saying "it is not unusual for an independent organization such as Greenpeace to exercise its role of vigilance by carrying out measurements of the discharges".

In a blistering leading article, the newspaper *Le Monde* described Cogema's action as "pitiful". Drawing a comparison with the bombing by the French secret services of the Greenpeace ship *Rainbow Warrior* in Auckland harbour in 1985, the newspaper argued that the latest incident betrayed the persistence of an obsolete "arrogant" belief within the nuclear industry that nuclear activities are none of the public's business.

The pipe that discharges waste from the La Hague plant into the English Channel has become the flashpoint of a lengthy battle between Greenpeace and Cogema. The latest measurements by Greenpeace show that levels of radioactivity in sediments in the vicinity of the pipe exceed European norms.

Officials at the health ministry expressed disbelief that official monitoring could have missed what Greenpeace detected. The government body responsible for carrying out spot checks on Cogema's monitoring, the Office de Protection contre les Rayonnements Ionisants (OPRI), limply explained that it had restricted measurements to the beaches, and had ignored the area around the end of the pipe.

The revelations follow a controversy earlier this year, when exceptionally low tides exposed the mouth of the pipe on a beach open to the public. Measurements made then by CRIIRAD, a respected private nuclear monitoring group, at the request of Greenpeace showed levels of 300 microsieverts per hour at the mouth of the pipe. "A person remaining in the vicinity of the pipe for four hours would have received a dose of radioactivity exceeding the annual maximum dose", says Bruno Chareyron, a CRIIRAD official.

CRIIRAD has protested about the scale of

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Channel vision: La Hague's waste discharges have become a focus of attention.

the authorized outputs, claiming that these amount to a figure greater than the discharges of all the world's nuclear reactors taken together. The plant is authorized to release annually 37,000TBq of tritium alone.

CRIIRAD complains that the methods used to determine acceptable levels are available only to Cogema and the government, but not to the public. Chareyron points out that Cogema gathers data on only 4r radionuclides, whereas the UK authorities responsible for monitoring discharges from the Sellafield reprocessing plant look at 14.

CRIIRAD has also found the highly toxic radionuclide iodine-129 in moss within a 7-km radius of the plant, suggesting that the plant was also producing air pollution. Cogema and OPRI had not detected this, Chareyron claims.

Public concern about such claims has been heightened by preliminary research results suggesting that rates of childhood leukaemia in the region are higher than expected.

Following the success of Les Verts in last month's general election, the political tide in France now seems to be turning in favour of environmental organizations. Voynet said last week that she intends to demand an independent study of the levels of radioactivity being dumped from the plant into the channel, as well as a public inquiry into the levels of authorized outputs. And Bernard Kouchner, the junior minister for health, instructed OPRI to carry out a detailed radiological survey of the area around the pipe.

A critical test of the new government's position will come this autumn, when 15 European countries are scheduled to sign the Convention for the Prevention of Marine Pollution, which includes the ultimate goal of reducing radioactive emissions from reprocessing plants to close to zero.

D.B.