building the reactors; because the South Africans' own facilities will be on stream too late for the purposes of the project, it will be supplying them with the enriched uranium.

● In spite of mounting safety doubts and spiralling costs France reaffirmed its commitment to nuclear power by confirming in April that it is going ahead with its £500 millions Super-

phenix fast breeder reactor programme. Defending the decision, which followed earlier protests from concerned government scientists and nuclear power trades unionists, the Industry Minister, Michel d'Ornano, stressed the official view that "nuclear reactors currently present a remarkable record in the matter of safety". The French Government is aiming for an installed

nuclear capacity that will eventually meet almost all French generating demands, and if the 1,200 MW Superphenix prototype planned for the Rhone proves successful commercial breeder reactors could be under construction by 1990. Through the state-owned Electricité de France, France is a 51% partner in Superphenix with Italy and West Germany.

NUCLEAR TRADE: INDIA

An end or a beginning?

Canada recently decided to terminate nuclear cooperation with India. Our correspondent in Jullundur gives this assessment of the impact in the sub-continent.

ALTHOUGH Canada's decision was not entirely unexpected, it did come as something of a surprise because only in March this year, after nearly two years of strenuous negotiations between the two countries which had included three rounds of formal, two rounds of technical-level and several rounds of ministerial-level informal discussions, officials from the two sides initialled a detailed agreement in New Delhi which the two governments were expected to approve.

It was in this light that India responded. Speaking in the Lower House of Parliament, India's External Affairs Minister, Shri Y. B. Chavan, expressed disappointment and described the Canadian move as a "unilateral abrogation" of several provisions of the 1963 and later nuclear cooperation agreements between the two countries. He regretted that the Canadian Government had decided to "turn its back on the negotiated settlement and its contractual obligations". The Government of India, he said, was examining "the various implications" of the Canadian decision and would take "appropriate steps after this review has been completed". He made it clear, however, that there was "no ground for any suggestion that the Government of India is in any way responsible for ending Indo-Canadian nuclear cooperation".

Canada's Secretary of State for External Affairs, Mr Allan MacEachen, conveyed his government's decision to his Indian counterpart on May 18—exactly two years after India had carried out an underground nuclear explosion in the Rajasthan desert. This event is at the heart of the nuclear breach between the two otherwise very friendly countries: as Mr MacEachen put it, it was evident that Canada and India had taken profoundly different views of what should comprise peaceful applications of nuclear energy by non-

nuclear weapon states.

What effect will the Canadian decision have on India's atomic power programme? The worst that could happen would be more delays for projects that had already been delayed by an earlier Canadian ban on all nuclear shipments to India (of materials, equipment and so on) which was announced and enforced following India's explosion in 1974. The projects most affected by this ban were the second unit of the Rajasthan Atomic Power Project, RAPP-II (RAPP-I has been delivering power for quite some time now), the Madras Atomic Power Project (MAPP) and, to a lesser extent, the heavy water plant at Kota in Rajasthan, which is being built with knowhow developed at the Bhabha Atomic Research Centre (BARC) in Bombay.

For all of these projects India had placed orders with some Canadian manufacturers of special equipment, and sought alternative sources following the Canadian Government's ban. For example, critical components like reactor vessels and end-shields for MAPP reactors—originally on order from Canadian firms—have since been designed in India and are being built indigenously. The reactor vessel for MAPP-I has in fact already been delivered. Aside from a small number of specialised items which the country found it uneconomical to produce locally, most of the equipment and materials (including uranium fuel assemblies) for 200 to 250 MW CANDU reactors are being produced indigenously. RAPP-II, which after earlier delays will now be ready for commissioning in early 1977, may not possibly be able to go on steam as scheduled for want of enough heavy water. However, some heavy water is already being produced in the country at Nangal in Punjab (14 tons a year); a plant at Baroda in Gujarat (67 tons a year) was recently commissioned and is expected to start production shortly; and two more heavy water plants (Talcher, 62 tons a year, and Tuticorin, 71 tons a year) are expected to be commissioned by 1977. Thus, apart from the delays caused by the ban, any additional delays could only be

marginal as far as projects already under way are concerned.

The feeling in India is that Canada may suffer a loss of credibility by its action, and eyes are now being turned towards the US, where the government is under some pressure to default on its contractual obligation to supply India with enriched uranium for her Tarapur Atomic Power Station (TAPS), built by an American company on a turnkey basis. Shri Chavan has warned developing countries against attempts by developed countries to make participation in the technological revolution difficult: "... the Canadian thing", he told the Upper House, "is a warning in this direction", a warning to all developing countries and not only to India. India, he said, did not believe in making nuclear weapons, but it would not want to give up its right to develop nuclear energy for peaceful purposes.

The Canadian decision may yet help India move faster and with greater determination towards self-reliance and self-sufficiency in the nuclear field. Work has reportedly been going on at BARC on enrichment of uranium, for instance, and at TAPS on experiments aimed at finding ways to use plutonium in place of enriched uranium in the TAPS reactors. How much progress is being made is not known, however. Canada's action meanwhile raises questions about safeguards. When the agreement was signed between India and Canada in 1963 for setting up RAPP-I, Canada wanted India to agree to inspection by the International Atomic Energy Agency (IAEA), but India did not agree. An understanding was reached whereby Canada could inspect India's RAPP reactors and India could in turn inspect Canada's Douglas Point reactors, but when Canada later supplied heavy water for commissioning RAPP-I, it insisted that India sign a trilateral agreement involving the IAEA which put RAPP-I under joint safeguards. India is now presumably free to refuse any inspection of RAPP-I by Canada or by the IAEA, and free to use plutonium generated in the RAPP reactors any way she chooses. India has, after all, been using her own uranium in her reactors, including RAPP-I; only TAPS uses enriched uranium supplied by the USA under a contract. □