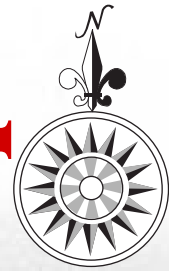


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India's CIRUS Reactor 1960

Canada and India

Re-igniting a 50 year old history as global nuclear partners

By Rick McLaughlin

The world's most powerful nuclear research reactor was, for a time, the NRX at Canada's Chalk River Laboratories which was built in 1947. The NRX (National Research X-perimental) vaulted Canada into the forefront of physics research when nuclear science and technology was in its infancy. In 1954, the world's first nuclear powered electricity generator began operation in the city of Obninsk, Russia. During that same year the Government of Canada and Atomic Energy of Canada Limited (AECL) assisted India in building a revolutionary research reactor called CIRUS (Canada India Research U.S.) that was based on the NRX reactor technology but used heavy water supplied by the United States. In 1963, India purchased a second reactor based on Canada's new CANDU technology and brought it online in Rajasthan in 1972. Today 13 of India's 17 nuclear reactors are based on technology introduced to them by Canada a half a century ago.

Canada's strong nuclear relationship with India, however, came to an abrupt end in 1974 when India tested its first

nuclear bomb built from the spent fuel (plutonium) of the CIRUS reactor. Driven by political support within the country for its nuclear weapons program, India chose to remain outside the 1970 Nuclear Non-Proliferation Treaty which would have required it to operate as a Non-Nuclear Weapons State. As a result, India was denied further nuclear technology by the entire western world for the next 35 years.

Today, India boasts a world class level of domestic nuclear expertise. Fueled by the isolation of the past three decades, its self-sufficiency extends from uranium

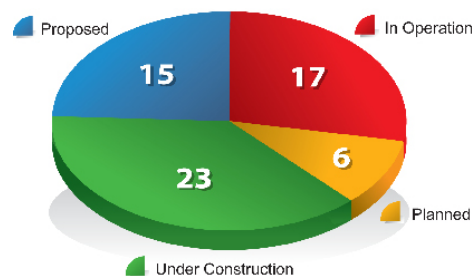
exploration and mining through to fuel fabrication, heavy water production, reactor design and construction, to reprocessing used fuel, and waste management. Despite these considerable resources, nuclear power still only makes up 3% of India's electrical needs and current capacity falls far short of the country's ever increasing demand for new energy resources.

India's Rising Demand

The U.S. government's Energy Information Administration projects that by 2030 China and India will be consuming nearly one third of the world's energy and tripling their current electricity consumption. India will need to spend approximately US\$120 – 150 billion on power infrastructure over the next 5 years in order to keep up with this requirement.

As part of its response to these demands, India now plans to double its nuclear generation capacity every 10 years for the next 40 years. On top of the country's 17 operating reactors, there are currently 6 more under construction, 23 planned and an additional 15 proposed.

India's Nuclear Power Reactors



One looming challenge will be fuel shortages as India's uranium resources are modest; hosting only 1% of the world's known recoverable uranium resources. Mining and processing of uranium is carried out by Uranium Corporation of India Ltd., a subsidiary of India's Department of Atomic Energy, and although they have committed hundreds of millions of dollars in recent years to the opening of new domestic mines, the country has admitted it will have to look abroad for the bulk of its long-term uranium needs.

India Re-Connects with the West

In October 2008, India signed a historic nuclear cooperation agreement with the United States that established a first step in India's future relationship with the rest of the world in civil nuclear energy. The "123 Agreement", once approved by the U.S. Congress, will allow India and the U.S. to enter into nuclear commerce (i.e. supply of nuclear reactors, transfer of technology, supply of nuclear fuel), transactions which up until now were prohibited by the U.S. Atomic Energy Act. The agreement will almost certainly unlock the global partnerships India requires to fulfill its energy plans.

On the heels of the U.S. agreement, Canada's International Trade Minister, Stockwell Day announced that the government-owned AECL had signed a memorandum of understanding with India for next-generation nuclear reactors. Further, Canada is poised to finalize a long awaited nuclear trade agreement with India, a pact that would open up the lucrative Indian market to Canadian nuclear exports for the first time in more than three decades. The Trade Minister estimated that nuclear technology and materials trade with India could total as much as CA\$150 billion over the next 20 years.

Given the historical role that Canada played in the initial stages of nuclear development in India, it seems a natural partner; a partner with the unique ability to provide a complete end-to-end service offering by way of advanced reactor technology, natural uranium and deep industry management and operational experience.



Indian Prime Minister Manmohan Singh meets with Canada's Stockwell Day

Lining Up to do Nuclear Business with India

As India heads into a new era of global nuclear trade, many energy companies are moving quickly to establish relationships, some already landing big deals.

One of the first was Westinghouse Electric Co. LLC, which announced a joint venture with India's Larsen & Toubro to build nuclear reactors at the conclusion of the United States' five-day trade mission to Mumbai in January.

France's Areva SA followed, striking a US\$12.3 billion deal to supply the Nuclear Power Corporation of India Ltd. with six reactors just two days after India said it would allow the International Atomic Energy Agency (IAEA) to inspect 14 of its reactors.

During 2009 India has been busy entertaining numerous delegations from France, Japan, Russia, and even Kazakhstan. The recent Canadian trade delegation led by Minister Day included representatives from AECL, Cameco Corp. (CCJ), and SNC-Lavalin. In light of the imminent nuclear co-operation agreement between Canada and India, the nuclear industry of Canada is anxious to acquaint themselves with their Indian counterparts.

Accessing India's Private Sector

India is also engaging its own utility companies in the country's nuclear growth strategy. The regulatory framework in India does not currently allow the private sector to invest in the development of nuclear power plants. The design, construction, commissioning and operation of all domestic thermal nuclear power plants is currently conducted by

the government owned Nuclear Power Corporation of India Ltd.

However, India's nuclear energy laws are poised for change and the government is increasingly moving towards adopting a public/private partnership model for its future nuclear power plants.

As a result, one of Canada's first business transactions may come from the mining sector. In May, Canadian uranium exploration company **Purepoint Uranium Group Inc.** travelled to Mumbai and Bangalore to discuss opportunities in Saskatchewan's prolific Athabasca Basin. "Investments in uranium exploration are not prohibited under the current rules" said Chris Frostad, Purepoint's President and CEO. "The energy companies we visited are eager to discuss early transactions in preparation for pending trade agreements and regulatory changes".

And as the government puts the final pieces in place, the utility companies in India are preparing themselves for investment in nuclear power generation including securing fuel sources. "These utility companies have been attracting experts from the government agencies for the past year" said Frostad. "The depth of experience and knowledge being assembled is huge".

A great deal has transpired since the early days of nuclear power and although different paths were taken, both Canada and India have emerged as two of the world's most respected experts in the field. As energy demands around the world grow and the barriers to nuclear trade fall, these two countries are discovering a valuable opportunity to re-kindle an old relationship. As they say "There is only one thing better than making a new friend and that is keeping an old one". ●