France, as part of the Cultural Exchange Agreement and specifically with the Centre National de la Recherche Scientifique; the Conselho Nacional de Pesquisas de Brazil; and the Czechoslovak Academy of Sciences (Czechoslovakia). Under these programs arrangements are made to send Canadian scientists on short- and long-term visits to each of the above countries and to receive scientists from those countries for similar visits in Canada.

In co-operation with the Canadian International Development Agency, NRC has initiated a program of CIDA - NRC Research Associateships for scientists from developing countries. Awards under this program provide an opportunity for promising scientists to spend annually in Canada up to three months during a three-year period. During these visits the scientists will be associated with Canadian scientists who will guide and assist them with their research programs. Candidates under this program must be eligible for assistance under one of the programs of the Canadian International Development Agency.

In addition, NRC supports Canadian membership in organizations such as the International Council of Scientific Unions, helps to finance scientific congresses in Canada, and aids Canada's participation in world scientific meetings.

9.2.2 Atomic Energy of Canada Limited

At the present time an appreciable proportion of the world's estimated total fossil-fuel resources has been consumed by a comparatively small segment of the world's population. This rate of consumption is increasing, the increase reflecting not only population growth but also increasing per capita energy demands. The active exploitation of energy available from nuclear fission provides the only known, practicable means of reconciling the world's energy demand (present and projected) with available resources.

Canada's atomic energy program has maintained a significant position in the world's nuclear power community comparable with the major nuclear powers. Atomic Energy of Canada Limited has, in the development of the heavy-water-moderated power reactor concept, provided a nuclear power system whose simplicity of design and flexibility of fuelling requirements offer the prospect of abundant, low-cost electrical energy for the foreseeable future on a world-wide basis.

The unique position of Canadian CANDU (CANada-Deuterium-Uranium) power reactors in the world's nuclear power systems is the Canadian use of heavy water (deuterium oxide) as a moderator for slowing, or "moderating", the neutrons from nuclear fission to maintain the fission chain reaction. The high neutron economy obtained by using this moderator and employing neutron-transparent core materials (zirconium alloys) means that natural uranium may be used as fuel. The use of natural uranium in the CANDU system is incidental to the basic concept of neutron economy but its use at the moment has certain economical and political advantages and serves as a useful engineering design discipline. The user of a natural-uranium fuelled reactor system is not dependent on one of the very limited number of countries providing uranium enrichment services and is able, for a comparatively modest capital outlay, to establish a domestic fuel fabrication industry. This, together with the inherent simplicity of the technology of the CANDU reactor, makes it a particularly relevant system to those countries wishing to establish an indigenous nuclear industry.

The bulk of Canada's power reactor operating experience so far has come from three generating stations operating in Ontario. These – NPD (the Nuclear Power Demonstration station at Rolphton), Douglas Point and Pickering – all use reactors cooled by pressurized heavy water (PHW), and in view of the Pickering station's performance it may be said that the CANDU-PHW option has been proved commercially viable. In Quebec, the operational record of the 250-MW prototypical Gentilly reactor has given good grounds for the belief that the second member of the CANDU "family", using ordinary water as coolant, will be equally successful. The incentive for developing the boiling light-water-cooled (BLW) CANDU is economic. By eliminating the heavy-water coolant and the hardware associated with a secondary coolant circuit, substantial capital cost savings may be realized and construction time (a major cost factor) may be reduced.

Development of a third coolant option in the CANDU series, organic liquid, offers the potential of higher operating temperatures (in the region of 400°C) and much easier maintenance. At the Whiteshell Nuclear Research Establishment an organic-cooled experimental reactor (WR-1) has been operating reliably for several years. Compared to water-cooled CANDUs, reactors cooled with organic liquid (a mixture of light oils) can