20th Annual Conference of the Canadian Nuclear Society
Montreal, Quebec, Canada / May 30 - June 2, 1999

"Fusion Research's Demise in Canada – another Avro-Arrow?"

Richard A. Bolton PhD, FCNS

Abstract:

In 1997, the Canadian Government unilaterally ended the highly successful National Fusion Program that it had cost-shared with Hydro-Québec and Ontario Hydro. There were two research centres, the Centre canadien de fusion magnétique (CCFM) in Varennes, Québec and the Canadian Fusion Fuels Technology Project (CFFTP) in Mississauga Ontario. Both, though relatively young and of modest budgets, had already made their names on the world stage, whose overall size is about 2 – 3 billion dollars per annum.

This world program is continuing vigorously, in spite of the US decision to fund the very large National Ignition Facility for laser (inertial) fusion instead of contributing to the International Thermonuclear Experimental Reactor (ITER) of which they were one of the founding partners. Europe and Japan are still pursuing ITER vigorously, albeit with a somewhat reduced mandate and scale.

As a result of the termination of the National Fusion Program, Canada is now the only G-7 country without significant experimental research in fusion energy. In fact it now ranks below many smaller countries with much less developed technological capabilities. The research programs at CCFM and CFFTP have already been dismantled and the experimental installations of the CCFM are in the process of being crated before being shipped abroad, probably to be divided between both highly developed and developing countries.

Because of the concentration of scientists involved this cancellation almost wipes out a whole branch of science, i.e. that of experimental plasma physics, by government fiat! This field was already grossly under-represented in Canada before disaster struck the 30 odd PhD's at the CCFM.

The decision to terminate this program will have several strategic consequences. This new technology will come into being without Canada's input, and without Canada's manufacturers being part of the development process. Not only will the technology be imported for use here, but most of the supporting technology will also be imported. Canada will then be in the position of begging for technological transfer inward instead of the current situation in the fission industry where the transfer is outward!

Although the immediate effect of this cancellation is not nearly so dramatic as the cancellation of the Avro-Arrow, the long-term implications are of the same order, and a large strategic component of Canada's economy will be supplied by others.

The cancellation of this program, although motivated by a desire to reduce government expenditures, also resulted from structural imperfections in the Canadian funding of science, particularly large experimental facilities. In the event, when a reasonable defense of the program was required, those who were formally required to supply it had no real interest in keeping the program alive, and in fact viewed it as a competitor for resources and a potential threat. There was also considerable political by-play at the time, which had a strong effect on the final result.

This talk will provide further details on the background to the very retrograde decision to cancel Canada's National Fusion Program and examine more closely the social and technological implication.