

A NATIONAL FUSION PROGRAM FOR CANADA

SUMMARY

Vigorous international effort towards the goal of energy from the controlled fusion process has resulted in continued progress to the point where the emphasis in the International Fusion Program is shifting from research to engineering and technology.

Canada is the only important industrialized nation which does not have a serious fusion program. With the rapid advances being made in the world towards the goal of fusion energy it is important that Canada develop a technological base from which well informed decisions regarding the role of fusion for Canadian needs can be made. Furthermore, it is essential that Canadian industry be put in a position to supply at least some of this country's requirement for fusion hardware in the future and if possible to compete for the supply of some specialized sub-systems and auxiliary equipment on a worldwide basis. This is a long term process which cannot be completed overnight. Although immediate opportunities for international collaboration exist today, once energy "breakeven" has been demonstrated (1982), a nation which does not have a credible fusion program will likely be excluded.

The immediate goal for Canada must be to establish a national program of technological and scientific capability and industrial preparedness which would permit Canada to gain access to and be in a position to use the vastly increasing international pool of knowledge and technology on fusion energy.

Achievement of the above goal will require: the federal government to take the lead in funding and initiating the program, a coordinated effort by federal and provincial governments, the utilities and Canadian industry, concentration on a few selected areas in order to achieve and maintain international credibility by contributing to the world pool of knowledge, intensive international collaboration and a strategy to ensure adequate and properly trained manpower.

Recommendations for a minimal National Fusion Program for Canada to achieve the above goals include:

1. Development of a National Capability consisting of concentrated centres in
  - a) inertial confinement - a national laser fusion facility with emphasis on CO<sub>2</sub> lasers established around the NRC laser capability,
  - b) magnetic confinement - a Tokamak technology fusion facility at IREQ (Hydro-Quebec), Varennes and operated as a national facility, and
  - c) selected technologies - specialization in one or two selected engineering technologies associated with fusion power systems.