

# Association of Professional Engineers

of the

Province of Manitoba

## Certificate of Engineering Achievement

presented to

**MANITOBA HYDRO**

for the development of

### **THE HYDRO ELECTRIC RESERVOIR MANAGEMENT EVALUATION SYSTEM (HERMES)**

*The Certificate of Engineering Achievement is awarded to Manitoba Hydro for the development of the Hydro Electric Reservoir Management Evaluation System (HERMES).*

*HERMES is a computerized engineering decision support system used for reservoir and energy management at Manitoba Hydro. HERMES is used by the Reservoir Management Engineer in planning the operations of Manitoba Hydro's system of reservoirs, generating stations, and interconnections with other utilities. The objective is to maximize the benefits and minimize the costs of operating the power system while ensuring that a reliable supply of electrical energy is available to Manitoba customers.*

*Manitoba Hydro developed HERMES in order to be able to routinely and quickly carry out the complex engineering analyses required to prepare up-to-date operating plans that reflect the impact of changing circumstances as they affect the efficient and economic generation of electricity. Gradual but also sometimes sudden changes occur in electricity demand, water supply, in the extraprovincial markets, and in the generating and transmission capability of the system. These changes require Manitoba Hydro to respond promptly by varying the amount of water that is released from the system of reservoirs and the amount of electricity that is generated at the generating stations.*

*HERMES is an integrated computer environment providing the tools for monitoring and forecasting provincial energy demands, water supplies, the hydraulic performance of the river systems and prices for the purchase and sale of energy to neighbouring utilities. In the HERMES database the forecasts and the data describing the hydraulic, electrical and maintenance systems are kept in several thousand files. This information includes reservoir sizes, powerhouse and spillway discharge characteristics, the number and size of generating units, maintenance schedules, and interconnection ratings. Other information includes export and import contracts, exchange and interest rate forecasts, environmental and regulatory limits, as well as specific operating criteria related to the electrical and hydraulic operation of the system.*

*Only with the facilities provided by HERMES is the Reservoir Management Engineer able to manage the data in the database. A computer program retrieves all the necessary data about the present and forecasted state of the power system and creates a single mathematical formulation which encompasses all aspects of the operating problem. This feature is one of the major achievements of HERMES. The problem is solved using Linear Programming thereby ensuring an optimal schedule. This schedule is reviewed and evaluated before being implemented.*

*HERMES was developed at Manitoba Hydro to meet the challenges faced by the utility in operating an ever more complex system in an increasingly complex society. The benefits from HERMES are measured in terms of increased revenues and reduced generation costs because of increased capability to analyze and respond quickly to changing power system conditions. The capabilities of HERMES are continually being enhanced as new demands and opportunities dictate. Manitoba Hydro's HERMES project ensures that Manitobans are receiving full benefit from their investment in the development of the Province's water resources and is a significant achievement for the utility.*

*Today HERMES is in the forefront of engineering decision support systems for the management of water resource systems.*

March 7, 1995