NERDDC WORKSHOP ON POWER SOURCES FOR ELECTRIC VEHICLES

Australia, like all developed countries, is exploring alternative systems to meet its long-term transport needs. Indigenous as well as total world petroleum resources are limited and substitute transport fuels must be identified and developed. Vehicles based on electricity provide an option which is attractive in the Australian context because local electrical power is produced mainly from large indigenous coal deposits. Furthermore, most urban transport requirements are within the scope offered by electric vehicles.

Battery-operated electric vehicles are being developed in Australia under sponsorship by the National Energy Research, Development and Demonstration Council (NERDDC). Widespread introduction of these, or any electric vehicle, into the market place depends to a large extent on the availability of suitable power sources. NERDDC is concurrently supporting traction battery research designed to satisfy this need.

In order to consider world developments in relation to Australian needs, a *Workshop on Power Sources for Electric Vehicles* was sponsored by NERDDC in late 1980. The organising committee consisted of Dr R. Woods (Chairman), Dr E. J. Frazer and Dr D. A. J. Rand of the CSIRO Division of Mineral Chemistry, Mr C. J. Bain of the Australian Lead Development Association, and Dr D. B. Matthews of the Flinders University of South Australia.

The Workshop was successful in bringing together overseas and Australian research workers and technologists with interests in the field of power sources for electric vehicles. The large group of overseas scientists who attended the Workshop was drawn from Government laboratories, universities, and industrial and battery companies, and included many whose work is important in determining the direction that the development of power sources is taking throughout the world. Australian participants also represented a wide range of interests and came from the battery industry, organizations using traction batteries on a large scale, the metals industry, the Australian Lead Development Association, university research groups and Government laboratories. Representatives of NERDDC Technical Standing Committee No. 7, which assesses Australian battery projects, also attended the meeting.

This issue of the Journal presents the addresses delivered at the Workshop by the keynote speakers. In order to engender fresh and open dis-

cussion, it was decided not to record the proceedings of the Workshop in full. However, we believe that it is important to publish the general conclusions that emerged from this meeting.

(1) There is considerable world effort in traction battery research and development, particularly in the U.S.A., and there is substantial government funding of this work.

(2) Each candidate EV battery has both advantages and shortcomings. At the present time, it is not possible to identify one particular battery as ideal or to disregard any of the systems presently being investigated.

(3) The lead–acid battery will be the power source for electric vehicles and electric hybrids for some time to come. However, improvements in performance, particularly with respect to cycle life, are necessary if this system is to satisfy private vehicle requirements, even for short-trip service.

(4) Nickel–iron is the battery nearest to commercialization after lead–acid.

(5) Nickel–zinc appears to be the most attractive near-term candidate provided cycle life can be improved significantly. The life problems associated with the zinc electrode are proving more difficult to overcome than was originally anticipated.

(6) Zinc–halogen batteries have attractive features but they present severe engineering problems in electric vehicle applications.

(7) Slurry and mechanically-rechargeable batteries based on metal–air systems present interesting possibilities since they avoid range restrictions and use relatively cheap active materials. However, their development is inhibited by the lack of an established infrastructure for distribution and recycling of materials.

(8) High-temperature batteries face severe materials problems which must be solved before these systems can compete in the EV battery market.

(9) Recent improvements in the technology of fuel cells have improved the prospects of these systems for traction applications.

(10) In the commercial production of EV batteries, strict quality control is essential if the performance of battery packs is to match that of the individual units tested under laboratory conditions.

R. Woods
D. A. J. Rand
E. J. Frazer
Port Melbourne, 1981