THE ROYAL
AUSTRALIAN CHEMICAL INSTITUTE Inc

ABN 69 030 287 244

Ms Shelley McInnes
Inquiry Secretary
House of Representatives Standing Committee on
Science and Innovation
R1 Suite 116
Parliament House
Canberra 2600
ACT

30 August 2002

Re Inquiry into Business Commitment to R&D in Australia

Dear Ms McInnes

Introduction

The Royal Australian Chemical Institute Inc (RACI) is the professional organisation of chemists in Australia, with a current membership of about 8000 chemists working variously in education (universities, TAFE, schools), research (universities, CSIRO), industry and government.

Together with mathematics and physics, chemistry is an enabling science ie those sciences upon the principles and practices of which science and technology is founded.

As the principal science of all materials discovery and development, energy (gas, fuels), water supply, (safe processed) food, medicines, minerals etc, chemistry and chemists provide much of the backbone for today's society and well-being. In overview, chemists synthesis and/or purify materials supplied to the community.

At this time of writing there are many Government instigated inquiries and reviews. The following "Actions" recently completed, about to be completed or underway at the time of this submission include:

> Chemical and Plastics Action Agenda March 2001 – Department of Industry, Science and Resources
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> Pharmaceutical Action Agenda (in preparation) – Department of Industry
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> The Chance to Change - Chief Scientists Statement Aug 2000
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> Backing Australia's Ability - Government Innovation Report 2001

Higher Education at the Crossroads - Department of Education April 2002

Developing National Research Priorities – Department of Education May 2002

Review of Australia's Skilled Labour Migration and Temporary Entry Programs - Parliamentary Inquiry (current)

Business Commitment to R&D in Australia - Parliamentary Inquiry (current)

The RACI views these various inquiries and their outcomes as interlinked and trusts that the data and conclusions can be integrated into a cohesive total for chemistry (and science) in Australia. It trusts that the various recommendations translate into more resources and funding, both from the public and private sectors, for the necessary infrastructure to provide R&D for the growth and well-being of Australian society.

Changing Nature of Industrial Chemistry - Product Types and Services

The continuing supply of materials (chemicals and their blends) to the community is fundamental to its well-being. Such materials; foods, medicines and medical devices, energy and fuels, polymers, metals, communication equipment etc rely on scientific/engineering R&D and manufacture/quality assurance for their instigation and continuance of supply to the community. This process is taken entirely for granted until there is a lack of supply or mishap.

There are a variety of product types and services involving the chemistry industry. Much research is focused on new chemical entities but most commercial products (materials) are blends involving intimate powder mixing and treatment, suspensions, emulsions and solutions or treated polymers etc. Developed new products are likely to be new formulations of existing molecules. Evaluation of appropriate packaging and shelf life require expertises in their own rights.

There is a perceptible change of "industrial chemistry", perhaps now more appropriately termed as "chemistry in commerce". In Australia there is a diminution of production of large scale "heavy duty" chemicals with a replacement towards high-tech and life sciences with a larger R&D component.

Nevertheless it is obvious that Australia must become more self sufficient with its chemical industry in the broadest sense. With financial incentives, the private sector can contribute to the necessary R&D to achieve this. Such incentives can include grants and tax deuctions.

By definition R&D is a higher risk undertaking than manufacture of existing technologies, therefore the risks and benefits must be financially feasible.

Action Agendas

Two relevant Action Agendas, Chemicals and Plastics and Pharmaceuticals Industry have been conducted in recent times. Results of the former have been publishes and of the latter are imminent. A reading of the websites gives valuable information regarding the existing and projected interaction of government/academica/industry. These are to be found www.isr.gov.au/agendas/sectors/chemicals/index.html and www.isr.gov.au/agendas/Sectors/Pharmaceuticals/index.html respectively

The vision of the Chemicals and Plastics Action Agenda is:

To be a sustainable, dynamic and innovative industry underpinning Australia's Industrial growth capturing significant domestic and export markets.

The objectives of all chemical organisations surely remain the same as outlined in the Chemicals and Plastics Action Agenda ie

- The importance of the industry being recognised by the community as a critical element of Australia's economy and contributing to Australians' quality of life maximising industry growth

- revised and streamlined regulatory system

- expanding and strengthening industry linkages

- increasing the level of industry R&D

- development of a highly skilled and flexible workforce

Encouragement for the first time placement of graduate and higher degree chemists into industry with salary subsidies and/or tax incentives for employers

Industry Expectations of Collaborations

While it is recognised that the R&D agenda setting and its implementation are likely to be performed by the Department of Science and academic sector , the economic realities of this sector dictate more and more collaboration with industry, ie as a result of both the shift towards more R&D and reduced government funding to Academica, more industrial/academic alliances are being formed.

By definition, industrial organisations must aim to be profitable ie make a return above any money invested. As with any investment, collaborations with academica have a risk/benefit basis. Academica now has to differentiate fundamental research and "commercial application" research. Both source and "top-up" funding from Industry will be heavily biased towards the latter.

With notable exceptions, industry is increasingly sourcing its R&D to outside organisations, other specialist industrial and academic organisations which have existing infrastructure and expertise. This usually has synergies of scientific personnel and endeavours, cost advantages and the expectation that results generated are seen to be assessed and reviewed objectively.

In general terms industry will collaborate with and fund academic Institutions for one of two reasons; to utilise specialist equipment and/or expertise for a short fix or to out-source a significant long term and probably expensive project, involving full time usage of staff. Only this latter need is feasible for longer term research projects.

Ownership and terms disclosure of intellectual property (if indeed disclosure is permitted) has to be resolved to mutual satisfaction in all instances before commencement of the project. By funding the research, a sponsor believes it owns the i.p. or at least has the option of first right of refusal. Ownership of "spin-off" science and technologies should also be negotiated.

In essence, Industry is most likely to require confidentiality, especially when patenting issues are involved. Lack of disclosure/ publishing is a significant problem for many (younger) academics whose career paths are directly related to publication and may also be problematic when graduate students complete a thesis for a higher degree. Conversely, early, wrongly timed disclosure can kill a project and guarantee industry distrust of academic collaborations.

Scientific milestones and their payments, imposing an external discipline are also considerations.

Industry remains focussed on the science for commercial purposes and is usually reluctant to fund scientifically interesting but commercially irrelevant byways. This precept is not consistent with the academic research culture and accommodations have to be made by both parties.

Nevertheless such factors are becoming increasingly recognised by the Research Institutions and moves are made to accommodate them for mutual satisfaction.

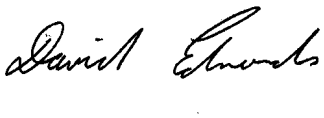
For longer term and larger projects industry has more likely utilised academica at the research stage of a project. It must be realised that a project is likely to require a development and upscaling stage, requiring different expertises but nevertheless the maintenance of close communications with the original researchers. Researchers must be cognisant of the different requirements of large scale industrial processes and research scale laboratory practices.

Industry expects a saleable product as an outcome; therefore it is unlikely to invest in fundamental research. That is not to say that many saleable products have emanated from such fundamental research, only that the risk factor for industry to invest in such is likely to be perceived as too high.

This last point seems to me to be the crux of future research based scientific collaborations. Government has an important role to underwrite by grants, tax incentives, higher risk/ greater return projects in the realisation that not all such projects will achieve commercialisation in their originally conception or indeed, at all. In the main, (Australian) Industry and investors will baulk at high (commercial) risk projects without such suitable (financial) incentives.

I trust that this overview contributes for this very worthwhile enterprise in the identification of Australia's R&D needs.

Yours sincerely



David Edmonds
President Elect
RACI