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19th July, 2002

**The Secretary,**
**House of Representatives,**
**Standing Committee on Industry and Resources,**
**Parliament House,**
**CANBERRA ACT 2600**

**Subject:** Inquiry into Resources Exploration Impediments

Dear Sir,

I wish to make a submission on the above named inquiry especially addressing the following points from your terms of reference:

- Australia's resource endowment and the rates at which it is being drawn down
- Impediments to accessing capital, particularly by small companies
- Public provision of geoscientific data.

In addition I would like to make a point on geoscience education and R&D and the potential future impediments that may arise as a consequence of the present situation.

**SUMMARY**

- Australia is only partially explored in terms of its resources. While clearly these resources are finite I do not believe the nation is in any immediate danger of shortages in any of the critical commodities, energy, iron, aluminium, copper, to name a few. The issue is "at what rate should we be exploring for additional resources ?". If we have hundreds of years of supply of, say, iron ore, why invest in finding more that may not be monetised for decades ?

- Over the last 40 years small companies have been through numerous cycles of "feast and famine" in terms of supply of capital. These cycles are driven by many factors, some manageable, but mostly beyond the control of industry or Governments. The single most influential factor that is largely controllable by the industry itself is an economically successful and sustainable record of results. The record is clear for the successful "start-ups", they are either in production and profitable, or have been acquired/merged/integrated with a larger profitable concern. However, what happened to the countless small companies that raised capital, carried out an exploration program, and then "faded" away. There does not appear to be a consolidated account of all the capital raisings carried through to both the successful and unsuccessful exploration programs to see if, on a portfolio basis, the capital has been profitably invested. I would suspect that the result of such a study would indicate a positive outcome. Such information would greatly aid the credibility of those seeking new funds.

- One of the legacies of the failed exploration programs is the vast data and knowledge bases. While the record of the economic outcomes of the programs is not known, it is a credit to the foresight of Federal and State administrators of the 1940's and 1950's that systems were put in place to collect and store samples, field data and reports. A possible reason for the failure to quantify the economic outcome of all exploration

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activity is that a large part of the value generated is, in fact, the knowledge base that now exists. To value that national asset would be an extremely difficult task. It is therefore vital to the national interest that geoscientific data is preserved in an organised and accessible fashion. The single most important service of State and Federal agencies in this area (e.g. PIRSA, WADME, Geoscience Australia) is to be the repository of this part of the national archive. The single most effective way to promote further exploration activity is to make this data available to all interested parties including academia and industry. Any further work on this data is value adding to the national interest.

- Exploration is a knowledge-based function. Without competent people exploration efficiency will fall off, capital will be withdrawn, and the national interest suffers. The level of Federal and State funding to tertiary science education in general and geoscience education in particular, is woefully inadequate. Almost all the tertiary institutions need to have a thorough review of their geoscience programs, many need to be eliminated and the surviving programs significantly strengthened. Likewise in the research area, there is too much dispersion of effort, more focus is required and an overall increase in funding put in place. Incentives to industry to make larger contributions to education and research would also be appropriate.

My consideration of the issues raised highlights a theme, namely that the overarching impediment to exploration is a lack of **knowledge**. Conversely, improvements in individual, company, State and Federal authority, and ultimately, national knowledge will enhance all other initiatives.

I have 33 years of active, primarily international, experience in the Upstream (Exploration and Production) oil and gas business. The first 27 years of my career were with Conoco Inc. a large, US, integrated oil and gas company. I have lived and worked on all continents having begun in the field in Papua New Guinea, held technical positions in Indonesia, the USA and UK, led exploration teams in Egypt and Chad, was a subsidiary President in Ecuador, and held technical and strategic managerial positions in headquarters in Houston, Texas. I returned to Australia in 1996 and was General Manager Exploration with Santos Ltd. for approximately 4 years. Since mid-2000 I have been an independent consultant and non-executive company director. I have a B.Sc. (Hons) degree in Economic Geology from the University of Adelaide.

I have attached a more detailed explanation of my views. I would be pleased to answer any questions on my submission, or if invited, to appear before the Committee.

Yours sincerely,

**Michael Frost**
**Managing Director**

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# SUBMISSION TO STANDING COMMITTEE ON INDUSTRY AND RESOURCES

## Inquiry into Resources Exploration Impediments

The points chosen on which to focus highlight a theme that clearly identifies exploration as a **knowledge** driven enterprise. In this context knowledge goes beyond the data, the raw unprocessed "facts". It goes beyond the information level where the data has taken on an interpreted meaning or an additional level of understanding. Knowledge refers to the higher-level understanding that comes about from the combination of data and information coupled with experience. In the ideal case it is recorded in a manner that is understood by those who follow us.

It takes the sum of our **knowledge** to understand the extent of the national resource endowment in all its complexities. Access to and allocation of, exploration capital requires advanced **knowledge** of the risk and uncertainty surrounding the project. The archive of national geoscientific data is the foundation stone for national **knowledge** of our resources. And education and research is fundamental to improved **knowledge** of the national endowment

### 1. RESOURCE ENDOWMENT

**1.1 Depth** - Australia is a vast continent both in terms of its land mass and surrounding territorial waters. I was recently surprised to discover that in the mining sector in many parts of Australia sub-surface imaging techniques have only investigated to depths of around 100 metres below the surface. My professional experience is largely confined to the oil and gas area where, by necessity, sub-surface images to depths of around 5000 – 6000 metres are routinely obtained. Many sedimentary basins in Australia are not thoroughly explored to these depths and so the full extent of the national hydrocarbon resource is not yet understood. It would appear, therefore, that the oil and gas industry is further advanced than the mining industry in terms of their "depth of investigation", however, with time and advances in technology the mining industry will be able to "see" to deeper depths, increase their **knowledge** of the subsurface and discover new resources. Given their greater overburden these new deposits will need to be richer than existing mines to be economically viable. However there is no reason to believe, given the complexity of the earth's crust and the distribution of near surface deposits already found that these deeper resources are not there.

**1.2 Area** – The other dimension is, of course, access to specific areas to explore. The obvious impediments here are Native Title and environmental concerns (e.g. the Great Barrier Reef region). It is my view that eventually solutions will have to found to accessing

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these areas, assessing the resource potential through sensible exploration programs, and with indications of success, the development and exploitation of the resources contained. Despite their best efforts, the resources industry has not been able to demonstrate to the broader community the culturally and environmentally responsible manner in which they are able to operate. In the late '80's I was responsible for some large oil discoveries in the Amazon rainforest in Ecuador. There were strong objections to development from the international community on both environmental and cultural grounds. (The area was home to a small group of Indians who had had little contact with the outside world.) The Government was anxious to see the project progress, royalties would be funding national development, schools, hospitals, etc., and the oil companies could see a profitable venture for their shareholders. Both parties recognised that it was inevitable that the project should go forward, all stakeholders were considered and practical solutions derived. It is still producing the reserves in a manner that meets economic, cultural and environmental criteria. It is no more realistic to expect that society will accept degradation in living standards than it is to expect that they will tolerate the resources industry causing environmental or cultural damage. The technology and business processes are there (or soon will be) to see solutions to these apparently conflicting drivers.

**1.3 Price** – A constraint on exploration and development of resources is the outlook for the expected price to be obtained. The resources industry was largely "globalised" well before the term was accepted in common usage. Artificial and/or regulated prices for these global commodities will not be sustainable in both the medium and long terms. A case in point are Australian natural gas prices, there is strong political pressure to see prices to the consumer come down, however, producers are struggling to meet shareholder expectations in return on capital. Whether the next major tranche of gas for SE Australia comes from the NW Shelf, the Timor Sea, the Timor Gap, or Papua New Guinea it will have to be recognised that the distances are vast, capital costs huge and consequently prices will be higher. The driver for Shell and Woodside to consider offshore LNG is that they can get a better return by selling LNG to the northern hemisphere than to domestic customers in SE Australia.

**1.4 Rate of Extraction** – There can be no doubt that Australia's resources are finite. With the exception of liquid hydrocarbons (specifically crude oil) all strategically important resources would seem to be well provided for in the medium to long term (10 – 50 years). The nation could do some more work to improve **knowledge** of the extent of strategically important resources especially the condition of the "tail", i.e. those deposits that are currently expected to be the last to be produced. It is most likely that it is these deposits that are characterised by the greatest uncertainty and therefore hold the greatest potential to have an upside scenario in terms of size or economic parameters. It is my view that it would be a waste of current resources (both real and financial) to adopt policies of constraining production or building stockpiles. This view is driven by the observation that Australia does not seem to be facing any obvious near to medium term (2 – 10 years) threat. We may be surprised, but what that surprise is, when and where it might come from and what form it might take cannot be predicted. Therefore, unless we adopt an all-encompassing "fortress Australia" policy that would bankrupt the country both financially and socially, it is preferable to take our chances. It is my view that economically driven technology solutions will continue to provide the improvements in living standards that we all seek. If these solutions involve moving away from the use of a particular resource I have every confidence in Australian ingenuity and entrepreneurship delivering results.

## 2. ACCESS TO CAPITAL

**2.1 Availability** – It is generally accepted that, in the resources industry, capital can be found for the "right" projects. The difficulty lies in differentiating the "right" projects rather than access to capital. Ideally, an investor would like to rank and compare a series of projects, analysed on a consistent basis, to see where the funds might generate the best return. It is the technical **knowledge** applied to the analysis that supplies the information that best describes the risk-reward relationship for each of the projects. Capital is then allocated in a manner that spreads risk and anticipates the highest return. Integral to this process, derived from portfolio theory, is a constraint on capital. Only when the amount of money available is limited will the process drive sound decision-making. The international oil and gas industry saw huge value destruction in the early 1980's through undisciplined exploration brought about by seemingly unlimited capital.

**2.2 Tax Regime** – A responsibility of State and Federal authorities is to set a reasonable tax and royalty regime that does not deter exploration. Given the global nature of the resources industry capital will go where the best return is achievable. Before any adjustments to tax and royalty regimes are made a careful analysis of comparable systems on a worldwide basis should be made to ensure that the Australian environment stays competitive.

**2.3 Competition** – Just as there is competition for exploration capital from other countries, so there is competition from other industries. Comparisons used by investors in capital allocation decisions generally come down to the assessment of risk. Investors are always looking for "high risk" opportunities and it is the industry that can best assess the risk, i.e. reliably predict the outcome that will attract the investment. Note that the assessment of risk is a **knowledge**-based competency. The resources industry could help itself by tracking and reporting on its performance so that investors can develop a level of confidence in the prediction of exploration program outcomes.

## 3. GEOSCIENTIFIC DATA

**3.1 Access** – The existence and condition of State and Federal data stores is a tribute to previous administrations. In my experience, whether sample stores, paper files of reports and analyses or more recent digital records, Australian standards are world class. Of the major oil and gas producing countries probably only Norway has a better national archive. Invariably the staffs assigned to manage these facilities are professional, dedicated, and extremely knowledgeable of all the material in their custody.

**3.2 Commercialisation** – Given the state of these facilities and the professionalism with which they are managed it might seem an ideal opportunity to seek to commercialise them. However, it needs to be kept in mind that some of the companies seeking this data originally paid for its acquisition and incurred costs in delivering it to the authorities. Access to the

fundamental data comes in the early stages of the project when uncertainty is at its highest and risk money therefore at a premium. Generally authorities are keen to give some incentive to companies to explore, especially in frontier areas, so easy access to the basic data is a low cost (to the authorities) solution. And given that a level of competition generally drives the best outcome the more players with the data in the game, the better the result. Some charges to deter those who might seek to collect data unnecessarily, and to cover basic operating costs would seem appropriate, however, attempts to recover real costs would be detrimental to increasing the **knowledge** base, and hence value, to the nation.

**3.3 Standards** – An extremely important role for Federal and State authorities is to work with industry to establish standards in the collection and storage of data. This function has become even more important as data is collected digitally. Where possible international standards should be adopted. The importance of standards goes beyond the fundamental data, in areas like bio-stratigraphy and geochemistry it is important that analytical standards are established and adhered to so that reliable and comparable data bases can be built across the nation. Geoscience Australia in Canberra has recently played an outstanding role in this area.

## 4. GEOSCIENCE EDUCATION AND RESEARCH

**4.1 Students** – Reports of declining interest in science at the Tertiary level are alarming for the nation. All the political and business platitudes like “knowledge nation”, “work smarter”, etc. will mean nothing if our best and brightest are not following career paths including the fundamental sciences of physics, chemistry, and mathematics. More work needs to be done at the high school level to demonstrate to students that knowledge of, and a career in, the sciences is just as rewarding as business, accounting, and information technology. The geoscience professional bodies (e.g. PESA) and industry groups (e.g. APPEA) have provided speakers and information kits to schools however this is obviously not enough. A significant impediment to recruitment of geoscience students is their fear of the boom and bust cycles the industry has seen. Given the global nature of the industry my advice to potential students has always been that if the industry slows down in Australia chances are that things are picking up elsewhere, e.g. UK, Canada, etc. The faculty staff that I know at several Universities are knowledgeable, enthusiastic, and in many cases, world class in their field.

**4.2 Research** – The Australian Petroleum Cooperative Research Centre carries out some outstanding work in key fields of petroleum geoscience, however it is my view that the work lacks focus, has not been prioritised in the national interest and does not seek out to the full extent opportunities for international cooperation. The area needs more funding, a responsibility that should be shared by the Federal government and industry. Industry support to research has not been good, however the organisations carrying out the research have not helped themselves by seeking guidance from industry in a manner that more closely aligns the technology needs of industy with the research outputs.