SUBMISSION TO THE STANDING COMMITTEE ON INDUSTRY AND RESOURCES

INQUIRY INTO RESOURCES EXPLORATION IMPEDIMENTS

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Standing Committee on Industry and Resources
House of Representatives
Parliament House
CANBERRA ACT 2600

The inquiry into ***Resources Exploration Impediments*** is relevant to two key research divisions within CSIRO being Petroleum Resources and Exploration and Mining. CSIRO's submission is therefore focussed on these two key research areas and provided as **Part 1** and **Part 2** respectively.

Petroleum Resources
Australia's future wellbeing is critically dependent on a secure, sustainable and internationally competitive energy industry. With our current dependence on liquid hydrocarbons, combined with limited reserves, it is clearly in the national interest to encourage increased exploration and production. The main impediments to exploration relate to perceptions about Australia's petroleum prospectivity and the availability of appropriate technologies relevant to specific Australian exploration and production problems. Both of these impediments have an R&D dimension and CSIRO seeks to continue its research in these fields in partnership with other research providers, particularly Geoscience Australia.

Exploration and Mining
Australia has developed a vibrant, world-leading mining industry on the basis of technological advancement. If Australia is to maintain its role in an increasingly global business then it must do so by maintaining its technological edge. This technological edge has spawned a mining services industry worth nearly $2 bn in exports. Ensuring a vibrant exploration sector is the first part of a process to maintain Australia's largest industry.

We would be very pleased to address your committee and to answer any questions you may have.

Yours sincerely

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Part 1 - Petroleum Resources

The CSIRO Division of Petroleum Resources is the largest R&D supplier to the petroleum industry in Australia. There are two fundamental issues relevant to petroleum exploration impediments that we believe should be addressed:

- improved assessment of Australia's petroleum endowment, and
- development of new technologies directed at Australia's specific exploration and production problems.

High quality assessment of Australia's petroleum reserves, particularly with respect to liquids, underpins both the attractiveness of Australia as an exploration target for the global industry, as well as decisions about future national energy policy. CSIRO believes that petroleum resource assessment is a critical issue that deserves more attention.

There are several potentially fertile areas of technology development where research can make a significant difference to Australia's perceived petroleum prospectivity and exploration success rates. These include:

- enhanced oil recovery,
- metocean research, and
- low cost exploration technologies.

The future of innovative exploration in Australia depends on local competence and continuing support for Australian - based technology providers as well as continuing public provision of quality controlled geoscientific data.

Key Issues

The topics of key concern to the CSIRO Division of Petroleum Resources are:

1. An assessment of Australia's resource endowment and the rates at which it is being drawn down;

2. The structure of the industry and role of small companies in resource exploration in Australia;

3. Public provision of geoscientific data.

Key Issue 1: An assessment of Australia's resource endowment and the rates at which it is being drawn down

Concerns are focused on:

Technology for Undiscovered Resources
EOR technology and federal promotion
Risk aversion
Near-field technologies
Low-cost exploration/appraisal drilling

1a. Technology for Undiscovered Resources

Geoscience Australia need to be resourced at the level to which they can carry out an effective assessment of Australia's undiscovered resources.

The assessment by Australia of Australian hydrocarbon resource endowment has fallen technically behind other countries. In fact the latest document from Geoscience Australia (Petrie, E. & others. 2001. *Oil and Gas Resources of Australia 2000*. Canberra: Geoscience Australia.) concerning Australia's resource endowment relies entirely on United States (USGS) estimates of our undiscovered resources, and only covers four offshore basins (Bonaparte, Browse, Carnarvon and Gippsland). We refer to "Assessments of Australia's undiscovered hydrocarbon resources for the four major offshore producing basins (USGS 2000)"

We recommend and support the development of appropriate technology for realistic risk assessment for undiscovered resources in all Australian Basins, both deep water offshore (uncovered to date), immature (from an exploration point of view) onshore, and new offshore areas such as the Otway and GAB. The published appraisal of undiscovered hydrocarbon resources in Australia based on a USGS appraisal of four offshore basins presents an unduly pessimistic view of Australian resource potential. We recommend that a detailed study be prepared specifically on the issue of liquid hydrocarbon supply and the technology used for assessment.

1b. Enhanced Oil Recovery(EOR) technology and federal promotion

Linked to the issue of liquid hydrocarbon reserves is the possibility of improving the recovery efficiency for existing and new fields. This is an area where government can contribute in areas of both legislation and technical support (stick and carrot). Accepting a lower than necessary recovery from existing fields negatively impacts liquids sufficiency. The reasons why industry accepts lower recovery rates is often a function of investment returns on the research/development and infrastructure needed to squeeze an extra 5-10% out of the reservoir. By offering penalties for early relinquishment of producing fields, tax incentives to invest in EOR technology and implementation, and federal support of research into EOR technology appropriate for and tailored to Australian fields then plateau production from many fields may be prolonged.

Government may also consider offering production licences out to tender with a new tax regime once a field comes off plateau – to stimulate the involvement of specialists in EOR.

The use of CO2 in miscible flood for some fields also helps in CO2 reduction, and Commonwealth support for companies willing to invest in this type of EOR would be of benefit to several parties.

1c. Risk aversion

Companies operating in Australia are relatively risk-averse. The success rate for drilling in Australia is around 1:3 to 1:4 on average which suggests that industry is only prepared to invest in relative safe bets. This is detrimental to exploration for hydrocarbons. The worldwide level of risk is around 1:10. The reasons for the risk-aversion are probably related to small local markets, harsh tax regime, high drilling costs, high infrastructure costs. Statistics on well numbers and drilling depths also show that the average drilling target depth has not changed significantly in 25 years, suggesting that play concepts are relatively static in Australia. New (deeper) play concepts can only be tested by drilling and if it is too expensive to drill then they are not tested. An injection of new blood – small companies – higher risk profile and new concepts are desperately needed in Australia. The level of technological support, and the legal, taxation and investment climate needs to be adjusted to stimulate such an environment. A few deeper-water wells have been drilled in recent years, but considering Australia's island nature, and the size of the economic zone, these numbers have been insignificant to date. Technological and infrastructure support for deep marine exploration is a matter of urgency. Any Commonwealth money used for metocean support would aid deep water exploration.

1d. Near-field technologies

Exploration around existing oil and gas fields that are approaching plateau and have excess capacity is very cost-effective and to Australia's advantage in terms of prolonging supply. Federal investment in technology specifically related to near-field exploration would assist such exploration. Increased tax benefits against production for near-field exploration would also help stimulate this activity. Specific technologies that could be supported include OBC seismic, multilateral exploration drilling, subsea EM etc.

1e. Low-cost exploration/appraisal drilling

Commonwealth investment in developing and proving low-cost safe technologies for exploration drilling onshore and offshore would benefit both Australian exploration and provide a potential export market. There are many areas of the world where an Australian designed rig could be used cost-effectively. Slim-hole technology, automation, continuous coring, light-weight, sea-bed rigs, composites/epoxy casing, high-tech pressure control, advanced muds are all technologies where Australia could both gain an international competitive advantage as well as stimulate exploration in relatively poorly-explored areas. Low-cost/environmentally friendly seismic technology for 3D land seismic is badly needed for onshore Australian basins. This is an area where research dollars could pay significant dividends. Norway adapted marine seismic streamer technology for glacier use – can a similar approach be used for sand deserts ?

Key Issue 2: The structure of the industry and role of small companies in resource exploration in Australia

Concerns are focused on:

Technical/research/development support for small operators
Dominance by multinationals

2a. Technical/research/development support for small operators

Tax and technology support mechanisms need to be improved to provide support for small local operators in the oil industry. The tendency of the large multinational operators to rely on and fund overseas research and development is depriving the local small operator of access to local competence. Strategic alliances between small companies and technology providers need to be encouraged through schemes such as START, CRCs etc... We suggest the initiation of an **Exploration Start** program to complement the existing **R&D Start** program to provide Commonwealth support for technology provision for smaller Australian operators.

2b. Dominance by multinationals

Because multinationals aim to maximise profits internationally, they may often have exploration and production priorities that differ from those of the Commonwealth.

No multinationals have research facilities in Australia, and the smaller Australian independents do not have the resources to fund significant long-term research. If Australia is to maintain momentum in deriving innovative solutions to the long-term supply of liquid hydrocarbons within Australia, then we must ensure that local technological training and research continues.

> The future of innovative exploration in Australia must rest with local competence and support for local companies. Government support for Australian–based technology providers continues to be necessary.

Key Issue 3: Public provision of geoscientific data

Concerns are focused on:

Consistency in open access and pricing policy
All publicly funded (and partially publicly funded) data should be publicly available at cost of media duplication.
100% Company funded raw data available after 2 years
Need for all federal/state agencies to be treated as internal customers not competitors/external clients
Quality control is essential (processing audit trail for submitted numerical data)

The current provisions for public access to raw exploration data are basically satisfactory. We would like to emphasise the need to maintain these provisions, and ensure that appropriate funding is made available to Geoscience Australia to maximise public benefit from such data.

3a. Consistency in open access and pricing policy
We would like to emphasise the need for continuing consistency in access to archival data, and the continuing need to make such data freely available to the scientific and exploration community in Australia and overseas. Open access after a maximum of 2 years is essential to enable effective research and testing of concepts – and to provide a platform for further research.

3b. All publicly funded data should be publicly available at cost of media duplication
Raw data from publicly funded (and partially publicly funded research) should be available to the public after a maximum confidentiality period of two years.

3c. 100% Company or partially funded raw data available after 2 years
Raw exploration data which have been paid for by industry should be held confidential for a period of two years, whereafter they should be made available to the public.

3d. Need for all federal/state agencies to be treated as internal customers not competitors/external clients
We need to maintain inter-agency collaboration rather than competition. The goal is to ensure that the whole of government is working together to ensure the energy sufficiency of Australia rather than scoring short-term points by claiming external earnings from charging other Commonwealth agencies for data.

3e. Quality control is essential (processing audit trail for submitted numerical data)
Geoscience Australia does a commendable job within its allocated resources of ensuring that data submitted for archive and public access is of a satisfactory standard. We would like to emphasise the need for formal quality control of such data. We recommend that additional funds be made available to Geoscience Australia or put out to tender for a geoscientific quality control program for archive submissions. CSIRO can assist in drawing up guidelines for wireline, core, seismic and potential field data quality control.

Part 2 – Exploration and Mining

As a leading science agency involved with the development of exploration technologies we would be pleased to brief the Committee on the tools and techniques currently available for exploration and to suggest likely future directions. This is a particularly appropriate time because the success of future mineral exploration in Australia will depend on technological advances.

We would like to raise two key issues of relevance to this inquiry and would welcome the opportunity to expand on these.

1. A survey of countries involved with mining development (see attached media release), shows that Australia is very competitive across the range of issues considered most important by minerals companies.

   This is valuable because it provides comparisons with twenty other countries. This shows Australia, Canada and USA as being particularly low in investment risk categories. It also shows areas where we need to be vigilant so we retain our competitive advantage.

   Obviously these are important issues for any minerals organisations considering investment. However these are not the only factors to be considered when evaluating the attractiveness of a country for exploration activities. For example baseline geological information is important.

2. There is a need to raise Australia's technological capabilities. Now that the easy mineral discoveries have been made, our technological capabilities will have to be raised to a new level if Australia is to continue to enjoy its position as a major player in global mineral resources.

   To establish the next generation of baseline geological information will require new technologies because of the distinctive geology of Australia. We are currently developing a suite of skills under the umbrella of our Glass Earth project. This sophisticated understanding is needed to make the next generation of major discoveries. If this capability is developed it will also ensure that Australia continues to build an industry which is growing even faster than mineral resources, and that is *knowledge* about the exploration and development of resources.

TIMEBOMB TICKS FOR LIVING STANDARDS
By Neil Phillips *

During the next five to ten years Australians may suffer a significant fall in living standards – and it will be of our own making. Amid the uncertainty caused by the war on terrorism and tremors in the global economy, it is easy to lose sight of the fundamentals that make Australia a good place to live.

One of these is the need for a steady, reliable stream of export income from minerals and energy. And the source of concern is an alarming slump in investment in mineral exploration and research during the last five years.

This year the minerals and energy sector will inject $55 billion into the nation's fiscal arteries, generating, by one calculation, about 2.5 million jobs up- and downstream. Another way to look at it is that mineral income will comfortably service the interest bill on Australia's $330 billion external debt.

That income, so long taken for granted, is no longer secure. Exploration for new mineral sources is about 40 per cent below where it was in 1997. At the same time our investment in new mineral knowledge, which keeps us world competitive, is down by a half.

It has been a few years since Australia last discovered a giant mineral deposit:. Even if we found one tomorrow, it would take 10-20 years before it was fully on-stream.

Our relative prosperity today is sustained by discoveries made before a good many of us were born. If we expect that to continue, and to sustain the ageing population we are fast becoming, then we need to make major new discoveries and to extract and process minerals far more efficiently and cleanly.

This isn't just an argument for more mineral investment. It's a plea for us to think intelligently about our future as a people.

The reductions in exploration and research, inevitably, mean there will be less mineral wealth and fewer jobs five years, ten years and more from today. Such issues may lie far beyond the political horizons of the 3-year election cycle – but that doesn't mean they can be allowed to fall off the nation's radar.

There is another, critical issue embedded in this. Today, Australia's fastest growing mineral export is knowledge. About 130 small to medium companies which grew and developed to service the Australian mining industry are now exporting that knowledge to the world at the rate of $1.7 billion a year. They are selling technology, services, advice, equipment, and environmental knowhow – all the intellectual products that make our mining industry world class.

This new knowledge-based export industry has come from nowhere in just ten years. Its stellar growth rates put industries like wine, cotton, gold and even aluminium in the shade. It's a perfect example of a traditional industry, mining, spawning a range of new-economy industries. The income and jobs these industries produce are particularly valuable because many of them are based in regional areas.

Australia is considered at the forefront of international mining research and practice. One of the reasons is because mining research in Australia is closely allied with industry and thus tempered by the practicality of on-site operation. The industries serving mining tend to share this combination of innovative science and practical experience.

Back in the mid-1990s, we were investing around half a billion dollars a year in new mineral knowhow. Today, it's barely a quarter of a billion. We have halved the very thing that gave us our competitive edge, as well as reducing the potential of a dynamic new export industry.

Australia became a world leader in minerals because it had the best knowhow, as well as mighty resources of coal, iron, gold and bauxite. In the process we put a lot of other players out of the game. Those players are never coming back, because when they lost their mining industries, they also lost their knowledge base, their talent, the R&D edge that had previously conferred supremacy.

The same can happen to us too, if we stop investing in new knowledge. We can lose our commodity exports, our value added industries exports *and* our knowledge exports.

Mineral exploration will always go in cycles. At the moment it is low, worldwide, because companies are engaged in a takeover frenzy and there is still a softness in demand for some metals. But it will pick up again, sooner or later.

The issue for the Queensland Government and the Federal Government is that we must not permit Australia to drop behind in the knowledge game. There is a very strong case to be made for the nation investing in mineral R&D, even increasing our research effort at times when exploration slumps. It is important too, that we retain our talent instead of suffering a brain drain.

Take, for example, the science of gold deposit formation. In Australia, we rely on experiments conducted by a New Zealand scientist in a Swiss research laboratory to determine how soluble gold is at high temperatures.

Only this way can we ensure Australia is still sharp, competitive and ready to go when the turnaround in exploration eventuates. Only this way can we underwrite our ability to service our debt, maintain our living standards, restore our landscape and keep millions of Australians productively employed into the future.

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World Investment Risk Survey 2002											
Investment Risk Categories	Sovereign Risk	Land Access	Green Tape	Land Claims	Red Tape	Social Risk	Infrastructure	Civil Unrest	Natural Disasters	Labor Relations	Weighted Totals
Ranking/Country	Risk weighting 0 = least important, 5 = most important										
1. Australia	1	3	3	3	2	1	1	0	1	2	11.1
2. Canada	1	2.5	3.5	3	2	1	2	0	1	2	11.6
3. USA	1	3	4	2	3	2	1	1	1	2	12.9
4. Chile	2	2	2	2	2	2	2	2	2	2	13.2
5. South Africa	3	2	2	2	3	3	2	3	1	2	15.7
6. Ghana	3	2	2	2	3	3	2	3	1	2	15.9
7. Tanzania	3	2	2	2	3	3	3	2	2	2	15.9
8. Brazil	3	3	2	2	3	2	3	2	2	2	16.1
9. Mexico	3	3	2	2	3	2	3	2	2	3	16.1
10. Malaysia	3	3	2	3	3	3	3	2	2	2	17.4
11. Vietnam	4	3	2	2	4	2	3	2	2	2	17.6
12. Argentina	3	3	2	2	3	3	3	3	2	3	18.1
13. China	4	3	2	2	4	3	3	2	2	2	18.2
14. Peru	3	3	2	3	3	3	3	3	3	2.5	18.9
15. Philippines	3	3	2	3	3	3	3	3	3	3	19.2
16. Russia	4	3	2	2	4	3	3.5	3	2	3	19.9
17. India	3	4	2	3	4	3	3	3	3	3	20.5
18. Indonesia	4	3	2	3	3.5	3	3.5	4	3	3	21.6
19. PNG	4	3	3	4	3	4	4	4	3	3	23.5
20. Zimbabwe	5	4	2	5	3	5	4	5	2	3.5	26.7

Source: RESOURCESTOCKS – World investment risk survey 2002