



COMMONWEALTH OF AUSTRALIA

JOINT PARLIAMENTARY COMMITTEE

on

PUBLIC WORKS

**Reference: CSIRO National Centre for Petroleum and Mineral Resources Research,
Bentley, Western Australia**

BENTLEY

Wednesday, 26 August 1998

OFFICIAL HANSARD REPORT

CANBERRA

JOINT COMMITTEE ON PUBLIC WORKS

Members:

Mr Tuckey (Chair)

Senator Calvert
Senator Ferguson
Senator Murphy

Mr Richard Evans
Mr Forrest
Mr Ted Grace
Mr Hatton
Mr Hollis

WITNESSES

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CHRISTOU, Mr Peter Nicholas, Director, Christou Casella and Jee Architects Pty Ltd, 610 Murray Street, West Perth, Western Australia 6005	2
HAMILTON, Dr Patrick Joseph, Deputy Chief of Division, CSIRO Division of Petroleum Resources, Petroleum House, 3 Broadie Hall Drive, Technology Park, Bentley, Western Australia 6102	2
HARVEY, Dr Stephen, General Manager, Division of Exploration and Mining, CSIRO, Underwood Avenue, Floreat, Western Australia 6014	2
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JOINT COMMITTEE ON PUBLIC WORKS

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Western Australia*

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Wednesday, 26 August 1998

Present

Mr Tuckey (Chair)

Mr Richard Evans

Mr Hollis

Committee met at 1.32 p.m.

Mr Tuckey took the chair.

BOSCI, Mr Peter John, Business Manager, CSIRO Division of Petroleum Resources, Riverside Corporate Park, Delhi Road, North Ryde, New South Wales 2113

HAMILTON, Dr Patrick Joseph, Deputy Chief of Division, CSIRO Division of Petroleum Resources, Petroleum House, 3 Broadie Hall Drive, Technology Park, Bentley, Western Australia 6102

HARVEY, Dr Stephen, General Manager, Division of Exploration and Mining, CSIRO, Underwood Avenue, Floreat, Western Australia 6014

HOBBS, Dr Bruce Edward, Chief of Division, Division of Exploration and Mining, CSIRO, Underwood Avenue, Floreat, Western Australia 6014

MOODY, Mr Trevor Laurence, Assistant General Manager, CSIRO Corporate Property, PO Box 225, Dickson, Australian Capital Territory 2602

CHRISTOU, Mr Peter Nicholas, Director, Christou Casella and Jee Architects Pty Ltd, 610 Murray Street, West Perth, Western Australia 6005

CHAIR—I declare open this public hearing into the proposed CSIRO National Centre for Petroleum and Mineral Resources Research, Bentley, WA. This project was referred to the Public Works Committee for consideration and report to the parliament by the House of Representatives on 29 June 1998 at an estimated outturn cost of \$31.8 million. In accordance with subsection 17(3) of the Public Works Committee Act 1969:

- (3) In considering and reporting on a public work, the Committee shall have regard to:
- (a) the stated purpose of the work and its suitability for that purpose;
 - (b) the necessity for, or the advisability of, carrying out the work;
 - (c) the most effective use that can be made, in the carrying out of the work, of the moneys to be expended on the work;
 - (d) where the work purports to be of a revenue-producing character, the amount of revenue that it may reasonably be expected to produce, and
 - (e) the present prospective public value of the work.

This morning the committee was briefed by the CSIRO and inspected CSIRO facilities at Floreat Park, Nedlands and Bentley. The committee has received a submission from the CSIRO dated 9 May 1998. Do you wish to propose any amendments?

Mr Moody—Yes, Mr Chairman, there are two minor amendments to the statement of evidence. The first is on page 3, paragraph 13, first sentence. Delete ‘the creation of 170 jobs (now 90)’ and substitute ‘a population of 170 jobs (now 220)’. The second amendment is page 31, paragraph 132, first sentence. Delete ‘16’ and substitute ‘15’.

CHAIR—It is proposed that the submission and the paper entitled ‘CSIRO’s

involvement in Western Australia' be received, taken as read and incorporated in the transcript of evidence. Do the members of the committee have any objection? There being no objection, it is so ordered.

The document read as follows—

Mr HOLLIS—Dr Hobbs, members of the committee were very impressed with the research that has been going on and by what we saw not only this morning but also in Brisbane quite recently. In your view, is this the most appropriate site for this new facility?

Dr Hobbs—There are two aspects to that question. One is nationally where we are going to put it. We have decided upon Perth as the locality for this particular enterprise, mainly because it is the centre of activity for minerals exploration and mining in Australia, and it has by far the biggest concentration of petroleum exploration and development activities in Australia these days too. From that point of view, because our philosophy is to always be as close as possible to the action or to the customers, Perth is definitely the location for that activity. Having said that, we then sought a site within Perth. A location could have been Floreat where we already are but there really is very little room for expansion. The facilities here at Technology Park at Bentley and close collaboration and contact with a number of other high technology groups really swung the day and that is why we selected this area.

Mr HOLLIS—Are you happy with the design of the building? Do you think that it meets the requirements?

Dr Hobbs—Most definitely, yes.

Mr HOLLIS—Will it provide better working conditions than already exist?

Dr Hobbs—At the moment we have a group in quite crowded conditions at Nedlands. Perhaps the conditions are a little bit better at Floreat, and Petroleum is steadily moving people into a building here on Technology Park. We really do need to bring those three groups together and to provide facilities for expansion of Petroleum. This building does that quite well.

Mr HOLLIS—When you move the personnel out of Nedlands and Floreat what will happen to that accommodation then? Will you be left with a whole lot of additional accommodation?

Dr Hobbs—We lease the Nedlands accommodation from the University of WA. So that will just revert to them. The Floreat space will be occupied by groups already at Floreat who are anxious to expand and there may even be the opportunity to bring some outside tenants into that as well.

Mr HOLLIS—I suppose my next question should be to Mr Moody. Did the sloping site put any constraints or difficulties on the building?

Mr Moody—There are some constraints certainly imposed by the City of South Perth on our development on the site but the sloping site also created a bonus to some

extent. We are limited in relation to the maximum height of a building to an RL of 30.5 metres. That is determined at the highest point of the site. It has meant there is a limitation on building height at that highest point but our taller buildings, which are the process and technical bays, can be located in the lower portion of the site because of the sloping site. In reality, the Australian Height Datum (AHD) of 30.5 translates as seven metres above the highest point on the site and, being a sloping site, we can make use of that site to put tall buildings at the bottom and maintain the buildings within the council constraint at the upper end of the site, while linking them progressively down the site.

Mr HOLLIS—I take it, being a CSIRO building, all the energy audits have been done.

Mr Moody—Certainly. Obviously, as we do with all of our facilities, we are very mindful of energy conservation measures in our design. We have incorporated a large number of passive and active measures to ensure that appropriate energy conservation measures have been put in place. We have listed a number of those in the evidence in relation to passive measures: orientation of building, sun shading, insulation and so on. In the active areas, it is in the design for mechanical services and electrical services, to ensure that maximum energy efficiencies are incorporated. We have a building management system. We have looked at various measures with the airconditioning design to minimise energy usage and so on. We are quite happy to provide a separate list to this committee outlining the measures that we have put into this project.

Mr HOLLIS—Looking at the top drawing on the wall there, it seems to me there are a lot steps, or it is steep there? Is there access for people with disabilities?

Mr Moody—Certainly. Throughout the building we are mindful of providing access for both visitors and staff who are disabled as well as those who do not have disabilities. To achieve that, where you may see ‘steps’ we also provide ramps within the code requirements, parallel with those steps, so that any disabled person is not impeded in any way. They can come to the main entry as would somebody who is not disabled; similarly through the building, with lifts and ramps, to ensure that accessibility is maintained.

Mr HOLLIS—Does the local council have a tree preservation order?

Mr Moody—The local council does not have a policy on tree preservation but, in our discussions with the City of South Perth, it has asked that we preserve as many trees as practicable on the sites. With that measure in mind, where trees are being removed, our intention is to replace wherever practicable the removed trees, as our landscape philosophy has been to plant trees of a similar nature through the site.

Mr HOLLIS—That would be the landscape allocation, I see in the papers.

Mr Moody—Yes, predominantly.

Mr HOLLIS—I am not a scientist or anything like that but I am always impressed when I see photographs on screens and computer images and so forth. What are we looking at here? Are we looking at state of the art? Where will this research or this facility put us in the research field for this particular area? Are we up there with the leaders in the field? Are we state of the art or what? I meant the work that is going to go on in the building rather than the building itself.

Dr Hobbs—As we indicated to you this morning, the work that is done in this building is designed to have a very high impact on the industry that it addresses, and that need not be short term. It could be 10 years out, even. In fact, some of our best developments have taken at least 10 years to get themselves organised. But we strongly believe that you can only do that if you have state of the art, the best science and the best technology in the world, so we try to attract the best people that we can, and I think to a large extent this facility will help us do that, from overseas and within Australia, and put together the right kinds of teams to do that high impact work. But, yes, the answer is overwhelmingly that we will be state of the art, the best group in the world doing this kind of work.

Mr RICHARD EVANS—Let us expand upon that, then, please, Dr Hobbs. Just give us a bit of an overview of the petroleum and mineral resources research and possibly the industry in Australia and where this particular project fits into all that.

Dr Hobbs—Perhaps I could start off and talk about the minerals area and then hand over to Dr Hamilton for the petroleum area. Our particular division concentrates on minerals—metals, that is—and coal, and exploration and mining for those commodities. Our activities in coal are pretty well restricted to the Brisbane laboratories at QCAT, and these laboratories here will concentrate very largely on minerals exploration and mining. That is not to say that there is not a lot of synergy between the two. In fact, a lot of the developments in automated mining happen in the coal industry and ultimately get transferred into the metals area. But the work that will go on in this laboratory will concentrate around those two areas that have a really high impact on mineral exploration; that is, trying to understand why very large ore bodies like Broken Hill or Mount Isa or Chuquicamata in Chile or the Witwatersrand in South Africa are where they are and how one would then go about trying to find one of those deposits somewhere in Australia. So that is one aspect of the work.

A second aspect of the work, which again has a very high impact on the industry, is cutting the time to actually discover and outline where an ore body is, once you have decided that you are in the right patch of ground. That involves things like not only our very successful regolith geochemistry group but also a lot of airborne geophysics, and some of that airborne geophysics will start to be developed in this laboratory, whereas hitherto it has been largely confined to Sydney.

At the mining end of the spectrum, the areas seem to be developing more into environmental aspects of mining, again an area that has very high impact, and in novel ways of mining ore bodies. That, to some extent, is linked with the automation technologies that we are developing in Brisbane, but it does give us the opportunity now to develop a group that might, for instance, worry about far more efficient ways of cutting rock or drilling rock or developing technologies that do not involve a lot of people underground. For instance, caving technologies are very applicable to many Australian ore bodies, if one can get the beginnings of that technology going in the caving operation, and are very applicable to places like Olympic Dam or North Parkes or even Argyle, for that matter. They are the general area that we would be developing in the minerals exploration and mining area.

Dr Hamilton—One thing I would point out about the oil industry is that in the past it has had a very significant R&D capability of its own. However, in the last five years or so, as a consequence of the downsizing of those companies, many of those labs have been either totally shut down or drastically reduced by up to 90 per cent. So those oil companies now look to see where they might continue to—

Mr RICHARD EVANS—Can I just interrupt you for a moment. Why is that? Why have they closed down?

Dr Hamilton—At the last downturn in the oil price, it was a knee-jerk reaction, and it is a cycle the oil companies go through and they have been through this before. Present wisdom suggests that they are beginning to find it is most cost-effective to outsource a lot of their R&D and to go more into alliancing with a view to sharing, and keeping the competitive advantage for themselves where they apply it in their own secret areas. So there is now, I think, a very great opportunity to supply that R&D need. Some of our crucial research relationships are with companies such as Chevron that used to have major R&D labs. They are now looking to local service providers with whom they can work, who will support their affiliates in Australia—WAPET is a Chevron affiliate and their local operating companies, such as Chevron New Guinea—and as a consequence of our memorandum of understanding with Chevron, we now are a favoured service provider for a number of technologies to their operating companies.

We have research projects where we share in research costs and the benefits, and this involves staff exchanges, for example. So I think there is an enormous opportunity there. The particular areas that we are addressing are the areas of risk that can be addressed through technology. Environment is one where we are collaborating with Baroid, one of the major providers of drilling fluids, to produce a water based, environmentally safe drilling fluid. That has the potential to be of major benefit around the world if we can develop a product with them, with enormous returns. We are also looking at the other areas of risk other than the environment, which include optimal targeting of exploration targets. A feature of the oil industry is that it is, in general, very unsuccessful at finding oil. It puts a lot of dry holes down. They are expensive. In the North West

Shelf-Timor Sea region, they cost anywhere between \$5 million and \$20 million. One of the technologies we have recently developed looks at very minute shows of oil and analyses them. From data that the Australian Geological Survey produces, we now realise we could reduce the discovery rate in the Timor Sea, which has been about one in 25, to one in three, and there is a significant cost saving there.

Mr RICHARD EVANS—Generally, then, Dr Hobbs, where would you place our technology and our research facilities in a position worldwide? Are we leaders, leading edge, catching up? Whereabouts are we?

Dr Hobbs—I think, for the most part, being humble, leading edge.

Mr RICHARD EVANS—That is a good answer. Therefore this particular facility then becomes a major diamond in the whole tiara of CSIRO?

Dr Hobbs—Yes, I would say that is true.

Mr RICHARD EVANS—You are talking about costs and you are talking about getting people from around the world. Are you having any problems in recruiting people to come to Perth? How are you going to handle all of that? What about the people coming from Sydney and Melbourne, those great cities in the east?

Dr Hobbs—As far as the Division of Exploration Mining is concerned, most of the people who will occupy this building are already in Perth. We have had an active kind of removal process going on for the last five years or even longer, mainly moving people from Syndal in Melbourne, to Perth, and they are largely the people who are now accommodated at Nedlands, although there are some at Floreat. So that process is complete, as far as we are concerned, but we still are recruiting people fairly actively and most of those people are coming from overseas. We seem to have no problem at all in attracting people from Zurich to Perth. On the other hand, the petroleum group will expand by moving some people from Syndal and by again recruiting a lot of people from overseas.

Mr RICHARD EVANS—And the costs associated in doing that would be a separate line item?

CHAIR—Outside of this.

Mr RICHARD EVANS—Outside of these costs?

Dr Hobbs—They are outside of the capital costs of the building, yes.

Mr RICHARD EVANS—What about the relocation cost then from Nedlands to here? Is it incorporated in these costs or is it a separate line cost as well?

Dr Harvey—It is separate from the \$31 million.

Mr RICHARD EVANS—And what sort of money are we talking about?

Dr Harvey—The estimates of the total cost of relocating the staff from Nedlands and Floreat to the new centre. I will have to take that question on notice. We have calculated it but I have not got those figures with me.

Mr RICHARD EVANS—Are they recoverable? You were talking before about commercialising the property out at Nedlands.

Dr Hobbs—They would only be recovered if it ended up that the divisions paid for that. They would only be recovered by future external earnings, but it would be worth it to us for that to happen.

Mr RICHARD EVANS—What sort of disruption are we talking about to the site itself? CALM is over there. You are talking about relocating roads, et cetera. What sort of disruption to the sites is there?

Mr Moody—When you say disruption to the sites, I mentioned before we are mindful of conservation as much as possible in our activities. There are a number of pine trees on the site and our intention would be to preserve as far as practicable the number of existing pine trees on the site.

Mr RICHARD EVANS—But there are fire people over there, and CALM is nearby, so are there are going to be access road problems?

Mr Moody—The subdivision is going to be constructed by the state, which will relocate roads and so on through the area.

Mr RICHARD EVANS—Prior to construction starting?

Mr Moody—Prior to our construction. That work is due for completion, I believe, by the end of this year, but we are not planning any construction on this site until April, so there is a reasonable time span between completion of their component of the works that need to be carried out compared with ours. So, as far as road constructions go within the subdivision, that will be undertaken by the state. We will be constructing access roads to car parks, to our hardstand area, to service the process bay and so on from that road system. In looking at access to our site, and taking into consideration the roads that are being constructed, we have accounted for access to, for example, CALM facilities across the site. Consultation has taken place with CALM to ensure that safe access is maintained to their site, and that has been incorporated in the works that are being carried out by the state. In a similar way, the Bushfires Board, which are our neighbours, are currently adjacent to the proposed site. Their access will not be affected in any way by our

contracting activities.

Mr RICHARD EVANS—Who will be the project manager?

Mr Moody—CSIRO delivers its project through a traditional lump sum contract, so we will be seeking competitive tenders from the industry in Western Australia. Until we have designed and documented the building, we do not know who that will be, but it will be a competent contractor.

Mr RICHARD EVANS—Is there a commitment to local content?

Mr Moody—Local content? West Australian content?

Mr RICHARD EVANS—The head contract could be West Australian but what about the lower contracts? Is there a commitment to ensuring that the subcontractors are in fact local?

Mr Moody—Certainly our commitment is to ensure the main contract will be a Western Australian contract, or at least a firm that is operating in Western Australia, whatever that might mean. I would anticipate, with the work being carried out in Perth, it would not be very attractive for subcontractors from other states to contract works on this site, and therefore local subcontractors would be used for all of the trades work on the project, unless there is something of a specialist nature.

Mr RICHARD EVANS—That would be material supply too, would it?

Mr Moody—Material supply could come from anywhere, to be honest. We have not at this stage determined what the finishes in the building will be. Some materials may come from interstate but, if there are local suppliers, obviously it is more economical to use local materials. In that regard we are looking for quality of finishes, quality of materials and so on that will be compatible with the life of the building. We are obviously looking for a quality product.

Mr RICHARD EVANS—You mentioned that the tree replanting program would be of a similar nature. Does that mean you are going to be putting natives in? The trees that are there at the moment are native, aren't they?

Mr Moody—We will be planting some pine trees similar to the pine trees that will be removed as part of the construction work. As far as the balance of landscaping goes, our approach would be to use native plantings as much as possible. Mr Christou might want to expand upon that.

Mr Christou—Our intention in the overall design has certainly been to enhance what is already there, and what is already there is a number of pine trees, and there is not

a lot left. What we are trying to do is to add to that particular area and then also develop it further by grassing and low shrubs, et cetera, but in keeping with that overall planning of the site.

Mr RICHARD EVANS—One last question: in estimating these costs, you probably went to a formula of estimation and got a bottom line total. How much flexibility is there in this particular price? For instance, if the committee said, ‘Okay, we’ll approve this project for \$25 million,’ would you be able to produce it?

Mr Moody—In reducing the estimate to \$25 million we obviously would not be able to construct the extent of facilities that are required. We are constructing a building complex of 14,700 square metres and we would need the \$31.8 million to achieve our requirements of 14,700 square metres. The estimate has developed from need rather than the estimate having determined what the area requirements can be to fit in with that, so any reduction would reduce the area of the building. As a result, it would reduce the extent of research activities which can be carried out in this complex, so a reduction from \$31.8 million to \$25 million would be quite catastrophic from a design viewpoint.

Mr RICHARD EVANS—Do we know what the final figure is going to be for the total project in regard to all the staffing requirements?

Mr Moody—We did outline the funding to the committee this morning. The funding of the overall project, which goes beyond the \$31.8 million, includes an amount for relocation of staff. My recollection is that that figure is \$5 million. I might add that that money is being provided by the state to CSIRO to assist in the relocation.

CHAIR—Mr Christou, I note what appears to be quite a unique facility on the model, and I raised a question about it this morning. You have your major buildings or multistorey buildings, not the process phase, facing in on each other with a sort of raised roof above them. If I am correct, you then have some verandahs, if I can call them that—balconies—extending out into the space covered by that raised roof section. What is the access to those particular balconies? In fact, I note from the drawing over there that they are only on one side. Are they limited to the existing offices?

When we were looking at the extensions in Queensland, a point was made about points of interaction where scientists and others can get together, possibly in the cafeteria but in other places, to have a bit of a chat and maybe invent the next penicillin or something of that nature, through the interaction of their intellect. What can you tell us about that and what advantages do you see in that particular concept? It is fairly unique. I am not critical of it, I might add, but I would like to have something on the record about it.

Mr Christou—Do you mean by ‘balconies’ or ‘verandahs’ the internal—

CHAIR—I note in the photographs you have a little person standing outside. As I said, I am interested, for the record as much as anything else, to have some comment made about that.

Mr Christou—The entire building has been designed on an interactive dynamic basis, whereby there are things happening on every level, horizontally, vertically, et cetera. What we were trying to do was create an interactive quality throughout the different departments—whether they be laboratories, research facilities, public facilities in terms of where the canteen was or where the library was—so that when you were walking through that central gallery space you were conscious of the workings of the building and you were conscious of people coming backwards and forwards on different levels. That interactive quality was very much a strong quality in the designing and input from CSIRO to us as well.

CHAIR—What is the purpose of the balconies on the left of the building as I face it? Are they like a corridor or just something that a person occupying a particular part of the facility can walk out onto?

Mr Christou—They are basically corridors that happen to be balconies, if you like.

CHAIR—Good. That clarifies that particular point.

Mr RICHARD EVANS—Are you catering for smokers at all outside, with a smokers' pit or something, where they can put their cigarette butts and things like that?

Mr Christou—It is a fairly extensive site and the building has an interaction with the outside world as well, so lots of people can go to different spaces externally to have a cigarette, if they need to.

CHAIR—Your auditorium indicates that the principal part of it is a suspended facility. Was that for architectural reasons or was that the least expensive way to construct it? I get the impression it just sort of hangs out there on its own. Was that to achieve something?

Mr Christou—It is part of the CSIRO ethos of dynamism and interactive quality, of trying to attract attention, and bringing the community within their fold as well. I suppose the functionality of the auditorium and its dynamic quality of thrusting out from the ground was again synonymous with geological formations, et cetera, but making no compromise at all with the functionality of it. The building or the auditorium itself had to work in terms of its functionality, the number of people that were using it and the sight lines from the raked seating. I suppose the fact that it is actually shooting out of the ground is in keeping with the stepping of the seating inside the auditorium as well.

CHAIR—In a cost context, how did that work out? Did having to suspend it in that fashion add significantly to the cost?

Mr Christou—It would certainly be more expensive than having a building on-ground and building it as a barn, I suppose. There are variations from a simple barn-like structure to something like what we are talking about here, which is a dynamic cantilevered element, so you are looking at a structural system that is cantilevered and you are paying some cost penalty as a result of it.

CHAIR—I have raised this morning—again, I am interested in this for the record—the diagram of the development and the adjoining PITC Technology Park western precinct. It has been indicated to us this morning that it is anticipated some of those sites will be taken up by private enterprise organisations seeking to have joint programs under CRCs and things of that nature with the CSIRO. Can you give us some information as to how they would be able to communicate with the activities within this development, particularly I would think for the sharing of data and things of that nature, where that was appropriate, and/or were you to install a substantial mainframe computer or something of that nature?

Dr Hobbs—I have since this morning inquired about the facilities here on Technology Park. They do have a fibre-optic system which is capable of 650 megabytes per second. Although a lot of the boxes are not in place to enable that to happen, that is the potential and we would aim for the same kind of bandwidth connections on the other side of the road in this particular precinct as well, or better. By then perhaps one could get better than 650, but we would aim for the highest bandwidth possible across that particular group of lots that are there.

CHAIR—My final question just happens to relate to an earlier question. Have there been any estimates made, or planning, that would be for the public record as to any new type of equipment that might be housed in this building that will contribute to your research efforts? We looked at some very substantial equipment today, some of which was admittedly getting reasonably old. Most of that technology is old the day you buy it. Are you able to tell us what sort of capital cost is anticipated in equipping this building with scientific equipment?

Dr Hobbs—At least as far as the Division of Exploration and Mining is concerned, we are still trying to develop strategies around precisely where we will go with the mining end of the spectrum. Advanced cutting technology or drilling technology is certainly one of our aims. That is because there are fairly successful companies here in Perth which are world leaders in these kinds of technologies. Our aim is to interact a lot more with those companies than we have in the past. That will probably involve us in developing some kind of experimental drilling facility, but we have not explored that much past there at the moment. We do have development work going on in Brisbane at the moment with diamond composite cutting tools that we hope will result in at least an order of magnitude

of faster cutting velocities than are available at the moment.

That is, if you like, the flavour of what might happen but the precise details have not been worked out. There is money available to develop new experimental facilities and it is quite possible that we could, in conjunction with Petroleum and in particular with Curtin University, develop a different kind of isotope measurement facility. There are a lot of new technologies coming onto the market at the moment. We are still actively exploring those but the aim would be to put in a very advanced mass spectrometry system as soon as we can work our way through all that.

CHAIR—So it is reasonable for us to assume that, once you have got a roof over your head, there would be some fairly substantial investment from CSIRO in scientific equipment suitable to complement the buildings.

Dr Hobbs—Most definitely. The petroleum division is one of the few divisions in CSIRO that has got the guernsey to expand rapidly over the next two years. The aim there is to double in size and, with that, there will be a whole lot of new equipment and technologies as well. The experience, again from the new facilities in Brisbane, is that once those facilities are in place a whole lot of new projects come that one did not dream were going to be there before and they involve often quite substantial capital expenditures on new equipment.

Mr RICHARD EVANS—The \$5 million, Mr Moody, was that including fit-out? That is the relocation cost that you are speaking of.

Mr Moody—No. It depends what you define as fit-out.

Mr RICHARD EVANS—I mean desks and chairs and things like that.

Mr Moody—All the laboratory benches, fixed equipment and so on, will be part of the project cost of \$31.8 million. Loose furniture, chairs, filing cabinets, photocopying machines, et cetera, which normally go with any building are over and above the \$31.8 million. The indicative figures we have at this stage are roughly about \$1 million for loose items of furniture, exclusive of research equipment and that is included in that \$5 million.

Mr RICHARD EVANS—Are you planning to have a new fit-out, or are you bringing over things from Nedlands and Floreat?

Mr Moody—We would prefer obviously new fittings in the building but—

Mr RICHARD EVANS—Highly recommended, I would have thought.

Mr Moody—Yes.

Mr RICHARD EVANS—Dr Hobbs, just a general information question, please: you said there were a lot of people coming from Zurich; you are not having any trouble about bringing people over from Zurich?

Dr Hobbs—There might be one or two.

Mr RICHARD EVANS—In CSIRO processes do they come over here for a long time? What percentage take up citizenship in Australia?

Dr Hobbs—I would have no idea. There are some nationalities that, of course, would never take up citizenship. They are too proud of their heritage.

Mr RICHARD EVANS—The stars and stripes?

Dr Hobbs—Others from, say, the northern climes of the UK. I could have no guess at that whatsoever, although there are people in Nedlands who have taken up citizenship quite recently. Again, I would hesitate to guess. I could not guess.

Mr RICHARD EVANS—You do not have any problems about bringing them into Australia, with the immigration requirements?

Dr Hobbs—None whatsoever. It adds a lot of vigour to what is already there.

Mr RICHARD EVANS—This zero population increase, or migration net or whatever it might be, would that affect you at all?

Dr Hobbs—Most definitely, yes.

Dr Harvey—Mr Chairman, I have received that information Mr Evans requested earlier about the costs of relocation from Floreat to Nedlands. We estimate the cost of relocating the staff and equipment from both of those facilities to Bentley will be around \$470,000.

Mr HOLLIS—Mr Moody, you are confident that we can meet the cost, \$31.8 million?

Mr Moody—Our budgets are always tight and we design our buildings to ensure that we can get maximum efficiency and value for money. We believe the \$31.8 million estimate will provide us with the facility that has been designed to date. We have benchmarked, obviously, costs against our other facilities and it compares favourably with both those that are in design and those that have been built. We are confident that figure is appropriate.

Mr HOLLIS—I do not want to cut the budget at all and I am one who is always

very critical of cost estimates and contingencies. I have had a look at your contingency on that. I must say I am very impressed with this. If you can deliver that for \$31.8 million I want to be at the opening of it because I think it is a good project. Having yesterday

looked at expenditure of \$139 million in Townsville for what is proposed there and looking at what is proposed here for \$31.8 million, I am more impressed with this than I am with Townsville. Each have their own merits and each are important, of course, but I am impressed that you can provide this facility and, as you say, the budget is tight but I think it would be a good project for that amount of money.

CHAIR—I think we might take note of the fact that on this occasion they have to pay the money back.

Mr HOLLIS—Yes.

CHAIR—Thank you for that evidence. There are a few other witnesses and if you believe there is something you wish to respond to, it is our practice to call our principal witnesses back for that purpose. Otherwise, thank you very much for your attendance.

[2.23 p.m.]

ROSSITER, Professor Paul Lawrence, Deputy Vice-Chancellor, Research and Development, Curtin University of Technology, Kent Street, Bentley, Western Australia 6102

CHAIR—The committee has received a letter from you dated 19 August 1998 in which you request leave to appear before the committee to say some words in support of your proposal. There being no objection, leave is granted. I now invite you to address the committee, after which we will proceed to questions.

Prof. Rossiter—Thank you, Chair and the committee, for granting that leave. Curtin University of Technology is cited in section 2.3 of the submission by CSIRO and I welcome the opportunity to come along and amplify one or two of those points and also to be available to answer any questions the committee may have relating to it. Curtin University has had a strong and long collaboration with CSIRO on a number of bases; some very formal through cooperative research centres, some less formal through individual project arrangements. There are two main drivers for this interaction: one, as Dr Hobbs mentioned, is the need to achieve world competitive capability. The university itself in the area of minerals and petroleum certainly cannot achieve this; CSIRO might, but the combined forces have a very good opportunity to do that. That is because we recognise that if we do not have that world competitive capacity the market will simply go elsewhere.

There is also an internal driver because we see many benefits of university-CSIRO collaboration through the sharing of the activities of graduate students, for example. We are looking currently at five joint shares with CSIRO, that is, joint appointments at the professorial level. There is certainly great benefit in sharing infrastructure which is becoming increasingly expensive and increasingly more difficult to fund. There is also the need for us all to develop a critical mass of skills and people, so for a whole variety of internal reasons we welcome and certainly encourage this level of collaboration. I might mention in passing that we are both very interested in building this collaboration across the sector, not jointly or exclusively between CSIRO and Curtin but indeed including the other Perth universities as well. To that end we have set up a joint scheme for scholarships which is accessible to all of the universities. We liaise very closely at the deputy vice-chancellors' research level in planning this coordination and we also share a whole range of other activities through various centres of excellence and cooperative research centres.

Another comment I might make by way of opening—and I should say from the outset that we wholeheartedly endorse this submission and we certainly commend it—is that the planning provisions which have been made for Curtin's co-location on the site I believe will meet our requirements. The Curtin group going across there will be essentially the centre of excellence in exploration geophysics. That does involve some degree of

undergraduate teaching. It involves a number of postgraduate students we wish to extend as well. The planning of the building that is occurring will work very well in that the small involvement of undergraduate students on site can be fairly well quarantined from the mainstream activities. The main interaction we are looking for, of course, is at the graduate student and the research level. The building will facilitate and provide that very well.

The final comment I make is that the part of the building which would be occupied by the exploration geophysics group from Curtin is being fully costed and Curtin will be meeting those costs from its capital management program. We have a draft MOU being developed which will address those costs and also the ongoing operating costs and Curtin will be meeting those as well. I will close there, thank you, Mr Chairman, and answer any questions that I can.

CHAIR—Thank you very much.

Mr HOLLIS—You have summed it all up very well. It seems to me it is a win-win situation whatever way we look at it.

Prof. Rossiter—We hope so.

Mr RICHARD EVANS—I will take this opportunity to ask some questions about the university in relation to this particular area of petroleum and mineral resources, et cetera. You said there are five professors being jointly sponsored by yourself and CSIRO. Is there an increasing curriculum for mineral resources and petroleum study? If so, is there student demand in these areas? Is the student demand coming from Western Australia or nationally? With the so-called boom of mineral resources in Western Australia and with knowledge coming from overseas being ordered by companies, is the university planning to meet the future demand that may be available here in Western Australia?

Prof. Rossiter—Yes, if I might take them in reverse order: the question of student demand is an intriguing one because it is very periodic, of course, and it depends upon the periodic fortunes of the minerals industry in particular. That does create a management difficulty because we often produce students when they are not wanted and we are not producing them when they are wanted. We are, in fact, working very closely now with the state government and with industry to see if we can improve that situation. The state government has taken the lead to form a working party to look at coordinating the courses offered in the minerals and petroleum area. We are seeking industry involvement in that and we are also seeking a commitment from industry to try to level out the peaks and troughs in demand.

In terms of the actual level of demand, we are meeting that but we believe certainly the information we get from industry is that there is going to be an increase in capacity and we need to gear ourselves to that. That increase occurs not only in terms of

numbers but also in terms of quality of student. Through this collaborative exercise with Curtin University of Technology, University of Western Australia and Murdoch University we are actually looking at increasing the catchment so that as well as our traditional catchments—and for Curtin that started at Kalgoorlie and it is now on the Bentley campus as well—we are also looking to see if we can attract some of the top two percentile of students that might traditionally have gone into medicine or law, say, into the minerals and petroleum stream as well. That arrangement has been formalised in an MOU and we are now looking at putting the flesh around those bones.

Mr RICHARD EVANS—What is the gender mix amongst people joining?

Prof. Rossiter—In minerals and petroleum it is very male biased, as one might expect.

Mr RICHARD EVANS—Why would you expect that?

Prof. Rossiter—Because of the tradition of those professions. Across the university in fact there is a slight dominance of female enrolments in the undergraduate programs. It is about 51 per cent to 49 per cent. In engineering the history has been quite the opposite. Some areas in engineering are getting female enrolments up around the 30 to 40 per cent. They tend to be chemical engineering and areas like that. Some of the other areas, though, like civil engineering and some of the mining engineering are still male dominant but we do have a very active group of female students and they are actually out actively promoting that profession. We would, of course, like to tap into it because we are losing half the best minds from it.

Mr RICHARD EVANS—In relation to the national side of things, is Western Australia becoming the focus in this area, or do we share that with other universities?

Prof. Rossiter—We share it with a couple of other major players. On the minerals side the national council in fact has had a study running and it has recently prepared its final report to look at coordinating that offering nationally. It is accepted that if they do that there will probably need to be nodes in major centres and we see the enterprise that we are building here is clearly one of those nodes. It is interesting, though, that undergraduate students in Australia do not tend to travel very far outside their home metropolitan area, so the catchment is very much that metropolitan area.

Mr RICHARD EVANS—Is that trending away from that past?

Prof. Rossiter—It is not obvious that trending has occurred, although Mr West would like to think that could be the case. We can certainly accommodate it if it does occur. At the graduate level there is a lot more flexibility and mobility.

Mr RICHARD EVANS—In the bigger picture sense, how does Australia's

knowledge, teaching, compare internationally.

Prof. Rossiter—I think we are certainly at world's best practice. That does not mean to say there is not a lot of room for improvement. I believe there is across the world. We benchmark our programs with groups like Colorado School of Mines, for example. At the graduate level, of course, there is a lot of benchmarking through examination of theses and those sorts of things. We are quite comfortable that our standards are there but I personally do not take that comfort too greatly because I think we need to continuously improve the program. We are looking very much at expanding that through alternative learning strategies, distance deliveries, all of those sorts of programs.

Mr RICHARD EVANS—And you see this project as enhancing everything you are doing?

Prof. Rossiter—Absolutely. I think this will be critical, actually, to that strategy to attract some of the top two percentile of students in it. What we have been lacking in the past is a real image, a bricks and mortar image, of the excitement of a career in this area and that they hear about it and read about it. I think here we actually have a symbol which will say, 'This is really where the excitement is at,' and that is where in, say, our final honours year, we might want to attract more into research. We are looking very much towards this opportunity to show them exactly the excitement that is going on in a world leading laboratory, and that is the opportunity we now have.

CHAIR—Thank you, Professor. There are a couple of matters that I would like to address in that regard. There has been some discussion and mention made about interactivity. I am interested, if you wish, to have any comments on where there might be a greater opportunity because of this facility and its proximity to your university, although, just for the record, does Curtin still have the Kalgoorlie School of Mines in its campus?

Prof. Rossiter—Yes.

CHAIR—I thought so. Has any thought been given to the idea of interactivity of undergraduates in some of the more practical aspects of the operation of this facility, if they go out on the ground in some ways or in others? It just struck me that it might be in the context of lecturing that someone from the professional side of the world comes across and says, 'This is my problem. There's a hundred of you in the room'—and I mean a real problem, not an academic type exercise—'have you got a solution to it?' Is that sort of interactivity contemplated or could it be contemplated?

Prof. Rossiter—That is exactly the dream that we have. Partly doing that through joint chairs is, I think, a very good way to achieve that because we have people with a foot in each camp. That is the excitement that I mentioned. I as a student would find that exciting, whereas hours of chalk and talk I think tends to turn more off.

CHAIR—Yes. When you were answering that question, it suddenly struck me that it is nice to have a physical representation of where you might get a job when you have got your degree right across the road. I would imagine that might help considerably. My final question relates to one I have asked already. In terms of your data links and things, has the university looked closely at how it is going to electronically talk with this facility?

Prof. Rossiter—Yes, and this is tied up, I guess, partly with another development that you have probably heard about, with moving more into high performance computing. The university's central system is probably out of date now. Our network system is running at about 34 megahertz. We are upgrading the backbone of that to about 150, 155, I think it is, and we have nearly achieved that. That is part of the university's network, so we operate to their standards. The links across to Tech Park are good and we will be expanding that as well. But I think we have a new opportunity with the high performance computing activity as well, which CSIRO is an integral part of, as are we, to further develop that.

CHAIR—Thank you very much. It is greatly appreciated, and you encourage us with your comments.

Prof. Rossiter—Thank you very much.

[2.37 p.m.]

MARSHALL, Mr Ross Edward, Executive Director, Infrastructure, Department of Commerce and Trade, 170 St George's Terrace, Perth, Western Australia

CHAIR—The committee has received a letter from you dated 24 August 1998, in which you request leave to appear before the committee to make some comments in support of the proposal. There being no objection, leave is granted. I now invite you, Mr Marshall, to address the committee, after which we will proceed to questions.

Mr Marshall—Thank you very much. Basically, gentlemen, the main reason that we asked as a department to be able to address you is to reassure you, if that is required, of the state's very strong commitment to this project. In 1997 the state government signed a memorandum of understanding with the CSIRO for this facility. We see it as a very key part of the state's science and technology policy to attract and increase our R&D facilities in Western Australia, particularly in the resources and energy sectors, of which, as you would be aware and other speakers have already mentioned, Western Australia is Australia's leading state.

We also see that having such a facility in Western Australia will be a key and, to use the metaphor before, it will be a jewel in our crown as well. We are very keen to increase the number of CRCs in Western Australia and, obviously, this is a key part of it. We also, as Professor Rossiter mentioned, see that there will be this link between the universities and the CSIRO and various companies and, whilst we do not have the map on the wall, surrounding this facility—which I understand you had a briefing on this morning—will be lots within the expanded Technology Park for companies in this particular area. We already have had two national and three international expressions of interest for some of those sites which we have set aside. So we believe we will actually have, to use the terminology, a strong node of research linked with industry and with academia on the site, and we believe it is a fairly unique opportunity. That was all I wanted to say—just to outline the state's very strong commitment to this project. As you would be aware, the state has offered funding and so on to attract that to Western Australia.

Mr RICHARD EVANS—Mr Marshall, just in a general sense regarding the attitude of the Western Australian government to minerals development and petroleum development, could you just give us for the record a bit of an overview of the general attitude in the industry currently?

Mr Marshall—The size of the mineral industry in Western Australia?

Mr RICHARD EVANS—Yes.

Mr Marshall—There is someone I am very conscious of behind me, Dr Branch,

from the Department of Minerals and Energy, who could give a much better detailed analysis of that.

Mr RICHARD EVANS—How important is it to the state?

Mr Marshall—The state's economy?

Mr RICHARD EVANS—Yes.

Mr Marshall—In export dollars last year—and I stand to be corrected—over \$4 billion of exports out of Western Australia in the oil and gas and the minerals industry.

Dr Branch—It was 76 per cent of the state's exports.

Mr Marshall—But the figure of \$4 billion?

CHAIR—We were just told that if we are to record your comments directly it will be necessary to swear you in, otherwise you might like to advise Mr Marshall and Mr Marshall can tell us.

Mr Marshall—I am sorry about that. We are new to this system. I am sorry. I have been corrected. It is larger than I thought. Last year was \$17 billion, of which most of that is export.

Mr RICHARD EVANS—So it is an important aspect, not only to the state, but to the nation?

Mr Marshall—Yes. Of the order of over three-quarters of our exports out of Western Australia is in the oil and gas and minerals industry.

Mr RICHARD EVANS—And do you find a lot of the Australian companies and also international companies moving their headquarters to Western Australia, Perth, now?

Mr Marshall—Yes. A number of those have done that; Alcoa quite recently. Woodside has moved from Melbourne to Perth. Chevron, I understand, has its major headquarters here now, and quite a number of them are doing that. Similarly, a number of international construction companies are also moving into Western Australia.

Mr RICHARD EVANS—So you would say it is 21st century thinking of CSIRO to be moving their headquarters to Perth.

Mr Marshall—Very much so. In fact, Western Australia is now Australia's leading oil and gas producer and, with of the order of \$20 billion of projects on the drawing boards off the North West Shelf, it will continue to expand as, unfortunately,

Bass Strait declines.

Mr RICHARD EVANS—Is the skill base and the knowledge base in Western Australia, or is it being imported from the east, or potentially is it here?

Mr Marshall—There is quite a lot of it here, but obviously this is an international industry, and people are moving where the jobs are. There is a large build-up of that expertise coming in, but it is not only coming from the eastern states. It is also coming in from overseas.

Mr RICHARD EVANS—Thank you. That is all.

CHAIR—Thank you very much. I have no questions and Mr Hollis has no questions. We thank you very much for your attendance.

Mr Marshall—Thank you.

[2.43 p.m.]

MALE, Mr Robert, Principal Development Engineer, Woodside Energy Ltd, 1 Adelaide Terrace, Perth, Western Australia

CHAIR—The committee has received a letter from you, dated 19 August 1998, in which you request leave to appear before the committee to say some words in support of the proposal. There being no objection, leave is granted. I now invite you to address the committee, after which we will proceed to questions.

Mr Male—Thank you. Woodside is interested to support the proposal to establish a national centre here in Perth. Woodside has been active in WA since the 1960s and made finds in the early days in North Rankin, Goodwyn and the Angel fields, 1971 and 1972. Today the company has production facilities at North Rankin, Goodwyn and Wanaea-Cossack and is preparing to install an FPSO, floating production storage system, at Laminaria-Corallina field, and has onshore processing and export facilities on the Burrup Peninsula. Many of those you will know already. The company also has considerable expansion plans being developed for implementation. Yes, there is a boom on, but there is a slowdown as well.

The development of these facilities has required considerable technical knowledge on a wide range of subjects, spanning from upstream, which we categorise into exploration, geophysics, geology, drilling and reservoir management, through the surface production facilities—that is, platforms, FPSOs and subsea pipelines—to downstream facilities, onshore plant and export terminals. Woodside has relied on its technical adviser, Shell, and its other participants, consultants and contractors for a lot of the technical input. Some of the information required was specific to our circumstances on the North West Shelf. This included oceanography and meteorology, calcareous foundation engineering and the problems we had on North Rankin and Goodwyn foundations.

On those we chose to work with local groups to meet some of these needs and, as a result, we have in Perth today niche consultancies providing services in these areas, special centres of research and programs at the universities and in the CSIRO which support them. Other information was also sourced locally because the necessary knowledge or research capability was available here. Examples are the work done by the CSIRO Petroleum Resources Division and the Australian Petroleum CRC. This work helps us explore and drill more effectively and efficiently and recover more hydrocarbons from the reservoirs; that is, more income. It also leaves us with a technical capability here, ready for the next task we have and able to earn income in the meantime from other operating companies here and overseas. The end result is that we get a direct income from the oil and gas, and spin-off profits from the associated technical capabilities. This is a win for both the companies involved and the Australian community at large.

The Australian oil and gas industry has shifted from a centre of gravity in Bass

Strait to Western Australia. WA now provides more than half of the Australian petroleum production. Prospectivity in WA and the Northern Territory is better than that of the eastern states. Woodside, amongst others, has moved its head office to Perth, and BHP has moved a big proportion of its Darwin and Melbourne staff to Perth. A number of companies supporting the oil and gas industry have also established in Perth. It is clear that, if the CSIRO petroleum division is to serve this industry, it must also be located in Perth.

In establishing the economic environment for the industry, the government establishes a tax regime. This enables the regulation of the development of the industry and the recovery of most of the income on behalf of the Australian people. It also provides the opportunity for the government to reinvest some of that income in Australia's best interests. The location of the CSIRO Division of Petroleum Resources in Perth is a good opportunity for such a reinvestment. It enables the government to encourage and foster the development of a lasting capability which will increase national income both during and after the production of the petroleum.

Woodside itself is spending something like \$37 million per year on research and development. Of that amount \$1.2 million is being spent in Australia this year. This is over five times the amount of the year before. We are currently discussing the following programs, and I just use these as examples: a gas to liquid technology, which we are discussing with the CSIRO; CO₂ injection in aquifers with the APCRC; a CO₂ injection in the deep sea with CSIRO. The first two proposals could be funded at about \$1 million per year for six years for each program. The successful capture of these programs in Australia is more likely if the R&D facilities are local to the industry which sponsors them. I cannot overemphasise the benefit of the sponsors and researchers being able to work closely together. Overall the message is simple: the government can increase the return from our petroleum resources by supporting the development of the Division of Petroleum Resources and in particular its proposed move to Perth. That is the end of my statement.

Mr RICHARD EVANS—Mr Male, I have just a couple of questions. You mentioned the importance of it coming to Perth because it would be close to the industry. Most of your industry, I believe, is up in Karratha.

Mr Male—True.

Mr RICHARD EVANS—Why then wouldn't we be promoting it to move to Karratha rather than Perth?

Mr Male—You are correct that the field resources are in the sea off Karratha but the operations group, the development engineering and the consultants and contractors who service us are located in Perth.

Mr RICHARD EVANS—There was a change of government policy some years

ago—I cannot remember how many years ago—which promoted this fly in, fly out sort of thing that we are having. But if that sort of policy changed, and the north-west developed, would it be better then to move it north or would you still recommend it to be in Perth?

Mr Male—I think there is a record of companies moving people to Karratha and back and I have actually been part of that with Woodside. We actually consolidated our offshore and onshore engineering support groups in our plant at Karratha. Eventually I was part of the move back to Perth. There is always a vision that that is a good way to go but I think the hard track record of it is that you need a certain amount of infrastructure around you to support the sorts of undertakings we are going to do and it is usually done in Perth. It usually works out better and for the foreseeable future I imagine it will continue. The actual economies of it are that it is cheaper to have people here and fly them north.

Mr RICHARD EVANS—You mentioned that Woodside's annual research is about \$37 million, and about \$1.2 million is currently spent in Australia.

Mr Male—Yes.

Mr RICHARD EVANS—I would imagine a lot of that is locally spent.

Mr Male—Correct.

Mr RICHARD EVANS—You were suggesting that because of this facility moving to Perth that is likely to increase.

Mr Male—Not only because of it moving to Perth but facilitated by it moving to Perth. Anything we do, whether it is engineering or research or any other kind of collaboration, is far better done across the table face to face where you can get the people to come and look at your facility, where you can visit their laboratory and talk to them. There is nothing like face-to-face contact. We go to considerable ends to do that with our engineering and other service companies, and the research and development end of it is one part of that. So it certainly facilitates it.

Mr RICHARD EVANS—You have heard the government spokesperson, the university and CSIRO mentioning that it is now becoming leading edge here in Perth. Do you see the opportunity then of Western Australia attracting more of that \$37 million into Western Australia?

Mr Male—Definitely. That is why I threw these three examples on the table. Woodside has been organising itself a lot better than it was some years ago, in looking at its technology requirements for the future, and then what that is going to mean in terms of research and development programs, and then, next, where those research and development programs are going to be done. A lot of our work has in the past come from and still goes

directly to Shell Laboratories, KSLA and KSEPL in the Netherlands. Bit by bit we are moving some of the exploration in those upstream areas into the CSIRO Petroleum Resources and the APCRC. Already we have changed that mix and we are looking to change that mix further. Where those groups with their particular capabilities are competitive with what we can get overseas, then we will use them. Where they are not, we will go back overseas.

Mr RICHARD EVANS—If you are doing it, then other companies are probably considering it as well.

Mr Male—Exactly.

Mr RICHARD EVANS—What more impetus then do we need to attract even more?

Mr Male—I think it is already ongoing and the sort of thing you are doing here is going to help that. Adrian Williams, who is the chief of the Division of Petroleum Resources, some time ago established an arrangement with the Australian Petroleum Exploration Association, which is one of our industry bodies, to have a research and development panel that would advise him on the industry needs. I was appointed to that about a year ago. A lot of my colleagues in Woodside, and other companies in the upstream areas, have been on it for some time and we have quite a healthy relationship in advising Adrian and his colleagues as to where they might best put their efforts. In this last year, in our company, it has meant that we have had a series of seminars where we have explained what we think our future needs are and then had the CSIRO respond with what their capabilities are and then taken some of those issues. That has led to these three seminars that I talked of. I think it is quite a healthy way to interact.

Mr RICHARD EVANS—It seems not only from your comments, sir, but also from other people's comments today that we in Australia are really close to becoming a major player, if we are not already, in international research in this particular area.

Mr Male—Yes, that is right. In areas where we are interested in placing funds with Australian establishments it is our judgment that it is as good as we can get anywhere in the world or better. Mr Tuckey mentioned that, when you have a problem, the good thing to do is to go in and throw it down. We have had a couple of problems at Woodside, that you may have heard about, in our foundations area. We chose to do a lot of the research because there was research that was done here in Australia. We invested in Australia basically because we felt it was the best thing, and certainly because I am a West Australian and a national and all that sort of thing as well, but it paid off handsomely. The end result that you see today is that you have got a special centre for offshore foundation research at the University of WA.

The people involved in that were initially attracted to Australia by the problems we

had, and they have continued on. There has been a very healthy level of involvement from CSIRO, the University of WA, the University of Sydney, the consulting engineering firm Dames and Moore, and others. When you have problems like that, and you can only portion off a fraction of the total here into Australia—it was more than a fraction that came in in those instances—then you get quite a development here that in that instance became leading edge. So what you see at Nedlands at UWA in foundation research is as good as you will get anywhere in the world. In Nedlands at Advanced Geomechanics, a small company—a niche company that is using the university background and CSIRO background and marketing it—is as good as you will get anywhere in the world and it is winning contracts; not a lot, but it is winning contracts in the Philippines and in India, as well as here.

CHAIR—Thanks, Mr Male. In the light of some of your comments, and again for the record, do you believe that CSIRO has been sufficiently ambitious in its development plans for this site? Should it be doing it bigger and better?

Mr Male—I am rather impressed in what they have been doing. I think the divisional chief, Adrian Williams, is a rather entrepreneurial person and has at times perhaps shown a different lead from others in the CSIRO, where he has been very strong in his contacts with industry and built those, and been prepared to come around and knock on our doors and talk to us. He has certainly gained our attention and I think he has done an excellent job. The way he set up his interactions with industry where he sought an R&D panel from an industry body has also been helpful. He has pushed a number of initiatives to strengthen those, and in both the industry and in the research institutions—not just the CSIRO but the universities—we are getting used to it. There is a certain amount of learning and accommodation that have to happen and I think the CSIRO Division of Petroleum Resources is pushing and leading rather than following.

CHAIR—So it is big enough as it is.

Mr Male—I am not saying it is big enough as it is. That is not quite what I heard you ask me.

CHAIR—I said are they sufficiently ambitious.

Mr Male—Ambition and size I would have thought were different.

CHAIR—Ambition and outcome need not have the same results either.

Mr Male—No, we will always look at them on their merit. They can talk all they like and they can have all the ambition they like, but they have to deliver the results. For us, they have to meet our assessments of potential to make income from the things that we invest in.

CHAIR—You have expanded a bit on the foundation problems, which is

something I read about with considerable interest. I am interested to know whether those foundation problems resulted from the seabed or just, under design, being generated by the designers of your particular project. But it is interesting to see BHP experiencing similar problems at the moment with imported components of their hot briquetted iron facility. Are you prepared to comment as to the advantages for Australia, as it is better able to design and construct within our country using the assistance of people of CSIRO's standing?

Mr Male—I know a reasonable amount about the foundation problems. I do not wish to comment on the hot briquetted ones; they are in another company anyway. The foundation problems were not caused just by the deficiencies of the consultants or contractors that we use. We have a large group of joint venture participants and they involve many of the major oil companies of the world. We had the technical backing of the groups in those companies on the foundation designs that were used. We used some of the key leading international companies—Fugro, et cetera—at the time. We had Lloyds register the classification society behind us, and everyone at the time was convinced that we had an adequate design.

It is history that it turned out to be inadequate, and demonstrably so. We had a pile with a six-foot diameter being lowered into the seabed and we thought they would be penetrating 20 to 40 metres under their self weight. They penetrated up to 60 metres under their self weight, and one took only one blow to get to 105 metres of penetration. That is a considerable difference from what we were expecting. At the end, when they were at final depth, they were getting 300 and 400 blows instead of something like 10 times that, so there had been a considerably different performance of that material from what was expected, and this was at a time when people around the world were just beginning to recognise the difficulties of calcareous foundations.

You may or may not know that similar difficulties occurred in Bass Strait. There were lower percentages of calcareous materials in their foundations; nevertheless, quite expensive remedial works had to be done after the platforms were operational. They put some big braces on the side of theirs. We went through some work which ended up breaking new ground and eventually we held an international conference here in Perth. One volume was all of the other people who came to the conference saying what they knew about calcareous foundations and one volume was Woodside's story, along with all of its consultants and collaborators, and what we did on our work. We published it in the international sphere and, as I indicated earlier, we ended up with the UWA taking on this area as a specialty and it has ended up with a special centre of research there.

It is leading edge stuff. It does stand well with anything around the world. We know we still have problems. We still have to be very careful with calcareous foundations. To put it in very crude lay terms that you would not miss, it is like putting a cookie cutter through eggs when you go into this material because it is the residual shell bodies of tiny little organisms and they get, to a certain extent, partly cemented together and partly not.

When you go through them with a pile you crush them and you get a slurry close to the wall of the pile. Away from the pile you have the residual material partly cemented just standing there and looking at you. When we pulled out the conductors that we put in for wells, we actually cut some off and pulled them out and it just left it as if an apple corer had been in there. This is through the soft sands of the upper sediments, not even into the harder, more cemented materials. It does not re-establish radial stress against the pile in the way a sand or a clay might and there would be a friction.

CHAIR—As you are aware the federal government has made a very substantial \$80 million contribution to the development of Jervoise Bay as a facility associated with the gas and oil industry and I presume that development will now proceed. Do you see linkages there with these research capacities as that particular development comes on stream and hopefully generates more opportunities for Western Australia to be involved in the infrastructure side of these developments?

Mr Male—There is, indeed. That is why you have done that sort of work, to put that money in so there are facilities here, and that is down into the construction activities of a development. A lot of the work that is being done in the Division of Petroleum Resources is more in the exploration, drilling and reservoir management area. That is actually where most of the potential for big earnings from research is. If you can take an oil reservoir where you might normally be recovering 20 per cent of the actual oil that is down there through your wells and you can raise that to 60 per cent, clearly you are going to get three times as much oil. That is a very valuable thing to be able to do. Any reservoir management techniques that will enable you to recover more oil are going to be well worth while. That is one end of the operation and exploration end of the thing and it is all underground.

What you have just mentioned at Jervoise Bay is where you are building a facility that would enable us to fabricate and load out modules that might go on to the top sides of a platform, for instance. Sure, it is a help, but it is a different area and it is related through the operating companies like mine, the activities they do and the fact that when we do get a development we feel is justified investing in, then we would certainly look at Jervoise Bay as a possible construction site for some of the modules. That, as you probably know, back in the North Rankin days, was exactly what happened.

CHAIR—Good, thank you very much. That was a very informative session that will help us in the broader sense.

Mr Male—Thank you.

CHAIR—As a result of all that, Dr Hobbs, is there anything to which you think CSIRO might respond? I did not hear much criticism.

Dr Hobbs—No, I do not think so, thank you, Mr Chairman.

CHAIR—Thank you. As there are no further comments, I can make my formal closing remarks. As there are no further questions, it is proposed that the correspondence received which has been circulated to members of the committee be incorporated in the transcript of evidence. There being no objection, it is so ordered.

The correspondence read as follows—

CHAIR—Before closing I would like to thank the witnesses who have appeared before the committee today and those who assisted with our inspections this morning. I would also like to thank my fellow committee members, the Hansard representatives who in fact today are also a Western Australian group offering contract services in this regard, which is reasonably unique to our activities. I would like to thank them for their efforts and, of course, the secretariat.

Resolved (on motion by **Mr Hollis**):

That, pursuant to the power conferred by section 2(2) of the Parliamentary Papers Act 1908, this committee authorises publication of the evidence given before it at public hearing this day.

Committee adjourned at 3.07 p.m.