

REPORT OF PROCEEDINGS BEFORE

GENERAL PURPOSE STANDING COMMITTEE No. 5

**INQUIRY INTO A SUSTAINABLE WATER SUPPLY FOR
SYDNEY**

At Sydney on Thursday 23 March 2006

The Committee met at 10.00 a.m.

PRESENT

Mr I. Cohen (Chair)

The Hon. R. H. Colless
The Hon. G. J. Donnelly
The Hon. P. Forsythe
Ms S. P. Hale
The Hon. P. T. Primrose
The Hon. H. S. Tsang

CHAIR: Welcome to the third public hearing of General Purpose Standing Committee No. 5 inquiry into a sustainable water supply for Sydney. Before we begin I would like to make some comments about procedures for today's hearing. A proof transcript of today's evidence will be placed on the Committee web site for public and media access. It normally takes a few days before the transcript is available on the web site. The Committee has previously resolved to authorise the media to broadcast sound and video excerpts of its public proceedings. Copies of guidelines covering broadcasting procedure are available from the table by the door. In accordance with Legislative Council guidelines for the broadcasting of proceedings, members of the Committee and witnesses may be filmed all recorded. People in the public gallery should not be the primarily focus of any filming or photographs.

In reporting the proceedings of this Committee the media must take responsibility for what they publish or for what interpretation is placed on anything that is said before the Committee. Witnesses, members of the Committee and their staff are advised that any messages should be delivered through the attendants or the Committee clerks. I also advised that, under the standing orders of the Legislative Council any documents presented to the Committee that have not been tabled in Parliament may not, except with the permission of the Committee, be disclosed or published by any member of such Committee or by any other person. The Committee prefers to conduct its hearings in public. However, the committee may decide to hear certain evidence in private if there is a need to do so. If such a case arises I will ask if the public and media to leave the room for a short period. Finally, I ask everyone to please turn off mobile phones for the duration of the hearing.

I welcome the first three witnesses—Mr David Evans, Managing Director of Sydney Water, Mr David Nemtsov, Director-General of the Department of Energy, Utilities and Sustainability, and Mr Graeme Head, Chief Executive Officer of the Sydney Catchment Authority.

WILLIAM DAVID EVANS, Managing Director, Sydney water Corporation, Sydney,

DAVID NEMTZOW, Director-General, Department of Energy, Utilities and Sustainability, GPO Box 3889, Sydney,

GRAEME CHARLES HEAD, Chief Executive Officer, Sydney Catchment Authority, 311 High Street, Penrith, sworn and examined:

CHAIR: In what capacity are you appearing before the Committee—that is, as an individual or as a representative of an organisation?

Mr EVANS: Representative.

Mr NEMTZOW: Representing the Department of Energy, Utilities and Sustainability.

Mr HEAD: Representative.

CHAIR: Are you conversant with the terms of reference for this inquiry?

Mr EVANS: Yes.

Mr NEMTZOW: I am.

Mr HEAD: I am.

CHAIR: If you should consider at any stage that evidence you wish to give or documents you may wish to tender should be heard or seen only by the Committee, please indicate that fact and the Committee will consider your request. Before questions commence, if any of you would like to make a brief opening statement to outline some of the issues, please feel free to do so.

Mr EVANS: Thank you. We thought we would make a sequential opening statement but we will keep it brief. I thought I would lead off by making a few introductory comments and explaining the roles of the respective witnesses so the Committee will see how the puzzle fits together. We will be drawing heavily on the progress report on water supply, which was in February 2006. We will not go into all those details but obviously we will be happy to answer whatever questions the Committee wishes to ask. By way of general context, in Sydney we are facing a set of challenges with respect to water supply that are very similar to the other growth areas of Australia—the Gold Coast and Brisbane, Perth and Melbourne in particular. They are similar to issues faced in similar areas—the west coast of the United States of America, et cetera.

The essential conclusion that has been reached across all these areas is that you have to have a robust water supply and demand management approach that allows you to deal with the obvious climatic uncertainties we face—because we have a highly variable climate in Australia; the specifics of drought; and also the long-term needs. The other side of the coin is that there is a lot of technical change going on, which is opening the door for better demand management and better non-rainfall dependent supplies. Whilst we have the challenges of growth and climate variability, we have the opportunities of technological change and social change—better community acceptance of demand management, et cetera.

In this environment the common conclusion that has been reached is that, in effect, we have a basket of tools to provide water supply to major and growing cities. Essentially, we have to graze across those tools and pick the combination of tools that work best in the circumstances. The key lesson is that most of the tools are relevant under some circumstances. Many years ago there was really only one tool that was used and that was dam construction. Following major dam construction water was distributed—not even priced; people got it for free when they turned on the tap. A period of time would elapse after that and then another dam would be constructed.

We now live in a world where there is a range of pricing, water efficiency or demand management measures are available together with recycling measures and community education to

achieve supply responses—recycling, desalination, et cetera. The message is to learn to engage in a community debate where you have those measures on the table and you pick the combination that works best. What that necessitates, which I think reflects the reason why there are three of us sitting here, is that the solutions are not all tied up in one branch of government. Right across Australia there is inevitably a range of parties involved in combining to get the right solutions.

In our case the Sydney Catchment Authority, of which Graeme is the Chief Executive Officer, is responsible for management of the catchments that go all the way down past Goulburn and the harvesting and supply of bulk water. The responsibility roughly ends at the boundary of the water filtration plants, where the water supply issue passes across to Sydney Water. Sydney Water then takes on the water treatment, that is the filtration, the distribution of water, a collection of wastewater, application of trade waste policy, treatment, disposal, recycling, et cetera. That then leaves the role of the Department of Energy, Utilities and Sustainability [DEUS]. DEUS, as David will explain, has a statewide responsibility for water and energy efficiency, and is involved therefore in things outside Sydney Water's area of operations but is also heavily involved in what we call the demand management or water efficiency agenda. In order to cover all the things that have to be done, it you need have co-ordinated input from the minimum of the three of us. That is why we are pleased to be here together.

The other thing that is that we have to have supplies that work in normal conditions—long-term, so-called normal weather—and that is having a view over 25 years of the right combination of demand management, water savings, recycling, catchment-induced supplies, et cetera—but also, increasingly and obviously in the present Australian context where we have had eight or nine years of pretty severe drought, a capability to deal with droughts if they go on and on. That is where we develop contingent responses, such as the deep storage projects to access more water out of the dams, the capacity to develop groundwater if we need to, and, in an ultimate extreme drought, the capacity to develop desalination.

The rationale for having all this capacity is not necessarily to rush out and do them all instantly but to have a coherent set of responses that you can apply over time, and, given those backup responses, create the space or the opportunity to press here your primary instruments which are demand management, recycling, conventional storage solutions, et cetera. But I think it is important to have the backups available. That, in effect, creates the opportunity for us to do our climate change studies, pursue the demand management initiatives and implement basics and the like whilst avoiding the pressure of this instant fear: What if it all does not work? Are we going to run out of water? You have to be able to go to the community and say, "We have a coherent set of contingency approaches." That is what we have tried to develop as a spectrum of activities. We would like to briefly go through that spectrum and I think the logical place to start is with Graeme, because that allows us to sort of walk down the catchment, from the catchment to the tap, as it were, and quickly go through the component parts.

Mr HEAD: I thought it might be helpful just to touch briefly on some of the characteristics of this drought and where we presently find ourselves in terms of the state of the system in this drought. The dams were last 100 per cent full in August 1998. Currently, as at Thursday of last week, they were at about 42.2 per cent. It took seven years for storage levels to drop from 100 per cent to 40 per cent and it is during this drought that 40 per cent capacity was encountered for the first time. Both in terms of the whole system it has only been below 40 per cent once. Indeed, Warragamba Dam has only been below 40 per cent once since it was constructed.

Deep water projects that are almost complete that the Sydney Catchment Authority is involved in constructing and which I will talk about in a bit more detail, which bring extra capacity, were they already completed at the point the system dropped below 40 per cent it would not have dropped to 40 per cent. That is important to note in terms of the additional yield and security that that project provides. Just to give you a sense of the worst of this drought compared with other droughts that this region has experienced, the lowest inflows on record occurred in 1940, in the middle of the 1934 to 1942 drought. The inflows that year were just in excess of 60 gegalitres a year into the system. Compared with the worst year of this drought the inflows were about 60 per cent of the worst year of this drought, which was 92 gegalitres in 2004. Last year, for the calendar year 2005, we had around 350 gegalitres of inflows and already in the first three months of this year, inflows have been about

160 gegalitres. So we are already receiving about double the inflows in the first three months of this year that we received in the driest year of this drought.

Mr Evans has mentioned that we are involved in a number of key projects associated with managing the drought. The first of these that I want to mention in detail is the deep storage projects to access currently unavailable water in the Warragamba Dam and the Nepean Dam, the Nepean-Avon dams. Those projects will add about 8.5 per cent to the available supply, which provides several months of additional water in serious drought. They also provide an increase in annual yield of about 40 gegalitres a year, which is about a 6.5 per cent increase in yield. Those projects are very well advanced and will be completed in August of this year. The most significant engineering milestone of the Warragamba project, which is where the bulk of the water is occurring, will be completed in about four weeks time. The remainder of that project, which involved enlarging an existing cavern and making some modifications to the dam where access was being created that had been closed off when the dam was originally constructed, and building new pipe work. The cavern work is largely done, the pipe work is largely done, and the modifications of the dam will occur over the next four weeks. Then it is simply a matter of installing the new pumping facilities that are part of that project. Nepean is a much smaller scale project which involves building the new pumping station. That is well advanced and also will be completed in August this year.

The other drought specific measures that the Sydney Catchment Authority [SCA] is involved in are the ground water studies which were discussed in the progress report. We are involved in examining seven priority sites for determining the availability of sustainable ground water resources. We have five sites that have been investigated, two where the investigations or the first drilling is just about to begin. Of the five that have been examined to date, there has been a very advanced study undertaken on ground water resources in the southern highlands, which has determined a significant resource. The detailed studies, which do not only look at the quantum of that resource but also examine the range of issues associated with water extraction both in terms of local impact and broader environmental considerations, will be complete within the next few weeks. We are also quite advanced now at a site in Western Sydney at Leonay, which is also shows considerable promise and which I believe was touched upon by one of the experts who addressed the Committee earlier this week.

The southern highlands resource has been identified as being able to provide about 15 gegalitres of water per year for a period of about three years during times of serious drought. The proposal is only to access ground water during periods of serious drought, thus allowing significant periods of time for recharge of ground water resources. We have two additional sites, one of which is quite close to Warragamba Dam and one quite close to the Illawarra escarpment near Lake Avon where the drilling works will be commencing over the coming weeks. The quantum of available resources in each of the seven priority areas will be identified in the first report on the studies which is due to be completed in June this year.

Importantly we have also been involved in the development of proposals to examine the way water is extracted from the Shoalhaven River in the Sydney system. Of course the decision to integrate aspects of the Shoalhaven into the Sydney system was taken in the late 1960s. The first significant piece of infrastructure, which still operates today, was the Tallowa Dam and the associated pipelines which were constructed in the first half of the 1970s. So inter-basin transfers between Shoalhaven and the Hawkesbury-Nepean have been occurring during periods of severe drought since Tallowa Dam opened 30 years ago. The frequency of those transfers occurring has been about once per decade. We have been transferring during this drought for almost three years.

In the 30 years that the Shoalhaven has been integrated in that respect to the Sydney system, only about 3 per cent of Sydney's supply has been accessed through the Shoalhaven. During periods of drought, such as we have experienced in the past couple of years, around 20 per cent of the supply is accessed through the Shoalhaven. As the progress report indicates, the SCA is currently investigating options for modest increases to Shoalhaven transfers that do not involve the raising of Tallowa Dam wall. We are currently developing an options analysis on that. There are a whole host of issues to do with different yields from different operating rules for the system but also an examination of any local impacts that result from that scheme.

It is probably important also to mention before I pass to David Nemtzw that we are involved along with other government agencies in work to examine climate change issues in the catchment. We are involved in a number of studies with universities which are attempting to develop a more complete analysis of historic rainfall and inflow patterns in the catchment, going back many hundreds of years, in order to determine the relative severity of droughts we have experienced since formal records have been kept. We are also involved with other universities in a number of projects to improve the predictive modelling capability we have in terms of predicting short-term changes in inflows associated with climate. I think at this point I will hand over to David Nemtzw.

Mr EVANS: If it is okay with you, Mr Chairman, I will carry on and then take questions generally.

CHAIR: Yes, if you would.

Mr EVANS: I wanted to just pick up some of Graeme Head's points and go over the issues that Sydney's Water is responsible for. I wanted to emphasise in particular how multifaceted the approach has to be in the modern era. I want to start with what I call water savings, or what used to be called demand management. The thing I think to recognise here is that things like demand management and recycling are not just peripheral to how we have to manage Sydney's water supply. They are actually volumetrically significant and also financially significant. I think the CSIRO pointed out in evidence to the Committee earlier in the week that Sydney has accommodated 700,000 more people with the level of demand on the reticulation system remaining constant.

One of our key challenges is to accommodate the next generation of growth largely in the same way while having some capacity to also augment supplies as necessary, as Graeme has been explaining. That just does not happen by hoping for it. It happens by commitment of real resources and what we have really got to do is basically find, through what we call demand savings, around 140 billion litres a year, which, as a proportion, is quite significant, of the 600 billion litres annual demand. As I say, that just does not happen by hoping. There is a series of mechanisms designed to achieve that. Obvious ones historically have been pricing and community education, but more recently Sydney Water has spent \$100 million over the past five years and will spend around \$60 million over the next four years on a range of initiatives to encourage water use efficiency. Each one of these initiatives on its own is not enough but when you add them up, they do make the big difference. Some of them are just worth touching on.

We have retrofitted 300,000 houses with water efficient appliances. It is a heavily subsidised scheme where we go into a house, put in water efficient shower roses and more efficient taps, et cetera, et cetera. Basically for around \$150 of work, people pay \$22 and get their house what we call retrofitted. We are going to increase still further to get to 500,000 properties in the next four years. Often people, I think, underestimate the significance of this sort of thing. It does save a lot of water and it is permanent. It is also a very large scheme by world standards. I got out some numbers the other day which showed that Sydney spends roughly three times as much on this type of initiative as, for example, does Melbourne, notwithstanding the fact that similar drought has existed down there, and saves roughly three times as much water that way. These are big schemes by international standards.

Other dimensions of it, which I will not dwell on for too long, are rainwater tank subsidies and there are 20,000 of those being paid out. Often another one that is overlooked is the efficiency program for industry where we have an Every Drop Counts Program, and we get in and partner with industry to do water audits, et cetera. Those things have made good contributions but over time you have to be rolling out the next set of initiatives. We are presently just entering a period where we are offering a \$150 rebate for water-efficient washing machines. We are doing an accelerated program to retrofit 60,000 Department of Housing houses, which are quite large water users, with water-efficient appliances and we are also doing a number of other programs with regard to government instrumentalities, particularly the Department of Education and Training, to put in leak detection and water conservation in schools. I will not dwell on all that for too long because we can take questions, but we are also doing pilot studies of what might be the next generation of these demand measures.

Obviously, as you look to get into new generations of things, they become more complex. Retrofitting a shower rose, for example, is reasonably straightforward. We are doing pilot studies into

retrofitting dual-flush toilets. I will not go into all the detail, but it is more expensive and more complex. It does involve interfering with the tiling and all that goes with it in a toilet, and therefore it is something that needs careful consideration before we make a decision about its cost effectiveness. But we are in a position where we will be needing to roll out continually a sustained demand management effort.

Leakage control is important as well. Throughout the world, water corporations' pipes leak. The water lost is typically not a big gusher that you might see on a television, which is spectacular but is not really material in terms of water lost. The leakage happens in slow seepage in hidden waves. Technology has come to our aid a fair bit there. We now have a range of techniques, which enable us to inspect and detect these so-called hidden leaks. We have reduced leakage by 25 per cent in the past few years and we are going to reduce it by another 25 per cent in the next few years. That does not come cheap either. A lot of money has to go into that, but it can be done and it is being done. It means that Sydney Water's leakage performance will be very good by international and Australian standards.

I suppose that brings us to the recycling question. Again I think we need to emphasise that we are well past the era where recycling is only window-dressing or part of the process. These different initiatives are mainstream parts of how you cope with water supply, every bit as much as the matters that Graeme went through. The Committee visited Rouse Hill yesterday and we made some points out there which I will not repeat at length today. But one of the most profound things I think for us to manage in Sydney is the growth, particularly the western growth areas. That growth represents an environmental and water supply challenge, but it also brings with it opportunities. Under the BASIX laws new developments, no matter where they are, have to be 40 per cent more water efficient than previously. That creates the incentive for the development community to install what we call dual pipe systems to allow water to be reused in gardens and toilet flushing and the like, and as the development unfolds we expect to see that unfold to hundreds of thousands of properties.

The other recycling has to operate in two levels: one of them is what I call back backlog schemes where you can get recycling done where there are customers adjacent, for which it is economic and where they wish to receive the water. The classic ones of those are BlueScope Steel in the Illawarra and there is a series of possibilities which we believe will yield fruit around the industrial area at Camellia, and there are expressions of interest out on those. I can give you more detail on how we think that will unfold. The last and biggest of them is a program we discussed briefly yesterday: to take effluent from the existing highly-treated western sewage treatment plants and treat it still further, and change the point at which it is disposed into the river system such that we will improve the health of the river and it will allow us to hold additional water behind Warragamba Dam, which is presently released into the river. That is a very innovative and complex scheme but we are of the view that that can be implemented and completed by 2009.

The net effect of all this is to basically quadruple recycling by 2015, and again it becomes a mainstream part of what we are doing. There are a number of issues, which we can discuss at question time, about the challenges and opportunities for doing more with recycling and I will not go into that pre-emptively. I should perhaps touch on the desalination question; I am sure there is a lot of interest in that. The progress report identifies a series of actions to deal with drought, and Graeme has described the deep storage strategy, which if implemented will cost Graeme about \$120 million or \$130 million. The groundwater he has already discussed. Groundwater would represent, if you like, the next cab off the rank if we had a return to severe drought conditions.

Desalination has been identified as the ultimate fallback in the event of preservation of very severe drought conditions. It is clearly an area where use of it is growing around the world; it is growing very fast because there has been a lot of technological change and a lot of demand for diversification of supply. Perth is proceeding with a plant; the Gold Coast is actively considering one. Our position is not to construct one as a mainstream part of the water supply but to have it available as a fallback in the event we got reactivation of the very severe drought conditions Graeme referred to, and they were to be sustained.

The issue with major infrastructure projects of this type is that they typically take about four years to go from idea to construction and if you have severe and accelerated drought, the difficulty is that if you let the four years elapse you would be really challenging your available storages in severe drought. So what we are trying to do is get the best of both worlds by doing enough work to be

prepared to build a plant, not with a four-year lead time but with only a two-year lead time, and thus be able to postpone the need to do it until storages, after allowance for the deep storages Graeme has referred to, were down around 30 per cent. That means there is not a high probability of having to build a plant, but it means if we do the preparatory work we could do it quickly enough to bring supplies online in the event of severe drought being sustained, and therefore put the community in a position to know that they will not run out of water.

It comes at a cost, as we previously had on the public record, to do the necessary feasibility studies, land acquisitions, design, planning approval, environmental studies, project management, et cetera, et cetera, and be in a position to have a blueprint design available. It costs, all up, around \$120 million, and the vast majority of that has already been provided for in the existing IPART price path. The consequences though of not being prepared is that you would only be able to offer water supply security by making other investments, including in dams and the like, which are very expensive and which would all obviously create significant community interest. So we are using the groundwater and the desalination preparedness strategy to create the room to pursue the other dimensions we have already talked about. I might pass across to David now just to cover the matters of demand management and the like that DEUS deals with.

Mr NEMTZOW: As we travel down the catchment from the catchment to Sydney Water, the last part is the other demand management programs and recycling programs not directly run by Sydney Water but run by my agency and others in government. I will go through those briefly today. I am sure you are quite familiar with them. In aggregate they create a series of programs. There is not one single solution, as you have heard so many times, but the series of solutions are very important, very significant and they are making a difference. The work is not done yet, but the progress is very important. The first is the water savings fund. This is the first of its kind in Australia; it is a \$130 million New South Wales Water Savings Fund and it is to fund innovative water conservation, water efficiency, recycling, stormwater harvesting projects. It has recently received another \$10 million and it is expected to save between 35 billion and 85 billion litres of water every year by supporting innovation.

It is very important to note that the water savings fund provides funds on an open solicitation competitive basis to the community. It is a testament to the notion that we do not think in government that we have all the solutions. We know a lot of the best ideas and good ideas will come from the community and the water savings fund is a way to bring out those ideas and to support them financially to bring more projects that would not have happened absent additional support. Over time as technology progresses, as behavioural patterns change, there will not be the need for that, but in the meantime it can accelerate the progress that you have heard about. The first round of results was announced a few weeks ago—\$9.2 million to 27 water savings projects.

There is a range of projects we support in industry, such as DPK, a small fabric dyeing and finishing plant in Alexandria, which is helping them recycle water. What I thought was very interesting was a testament from one of their senior executives that not only does it save water, not only does it help the sustainable balance for Sydney, but it is helping his firm, DPK, compete against cheaper labour, Chinese competitors, by keeping his water bills down. So it is also part of a sustainable economy for Sydney as well as a sustainable water supply. We are helping the Ku-ring-gai council with stormwater harvesting to provide water for several of their golf courses, and we are helping other firms on recycling conservation. Just yesterday the Premier and Minister Campbell for Water Utilities announced the opening of round two, and we will solicit additional ideas from the community and support them. A very important action.

Number two is the new requirement for water-saving action plans. This is a requirement, as you may recall, from legislation that came through last year to require the largest water consumers in the State—approximately 244 different organisations, business, councils, State agencies, everybody is covered of the big users—to prepare plans; and they are not just technical audits going through a site and looking at ways to save water, we are also requiring the companies and others to look at the finances of these, to look at their own management situation, to do a self-analysis of where they can save water and asking them what actions they are planning to take. That is a requirement on the largest users.

Next we are progressing the removal of institutional obstacles to recycling. A lot of small recycling schemes do not get forward because the institutional barriers are just too hard for a small plan. I am not talking about the big programs, as Mr Evans just talked about, but the small, maybe one site, non-network programs, and our department is releasing for public comment a draft on setting up a regulatory reform guidelines; it is best practices guidelines for local councils, so a council can adopt it and it will be clear instructions to all participants what that council is looking for in terms of evaluating local recycling for planning purposes. It is the only one of its kind in Australia. By the way, I think when we are done with the public consultation and we finalise that in the coming weeks I am going to predict that other jurisdictions around the country will copy that as a best practices measure to pursue their own councils.

We are also removing the requirement for the small systems to have an environmental impact statement. So we are making it easier for them on small plans and we think that will help proceed things. We are working throughout the State—I will only mention that briefly—on something called Integrated Water Cycle Management, which is in the country towns of New South Wales, again to help them do what we have just described here for Sydney: looking at the water system as a whole, not just treating water supply separately from sewage—very important—we are working on the Water Efficiency Labelling and Standards Scheme [WELS] so that large water consuming appliances will have labels so that consumers can make informed decisions, State and national.

We have talked about BASIX. That is not from our department it is from the planning department. Of course, it is very significant because the building stock, even though it only turns over slowly—residential is less than 2 per cent of the stock constructed each year—it lasts for so long. So we need to progress that. The Government is reducing its own water consumption. You heard about the Department of Housing action that Sydney Water is helping with, but government agencies will have to prepare water-savings action plans and there is a new low interest loan fund from Treasury and government agencies to help finance these. Going forward, there are additional actions we are taking; we are not resting.

My department is soon going to release something called NABERS Water. NABERS is the National Australian Built Environmental Rating System; it is a rating scheme for office towers: they can get a rating from one star at the lowest to five stars at the highest looking at greenhouse gas emissions and their water performance. That will allow building owners and tenants to be able to compare different buildings. We are progressing recycling in the Kurnell peninsula in Botany Bay. As I said, we are looking at the next round of funding for the water savings fund and the requirements of large users to prepare water-savings action plans, due 31 March, and we will be reviewing those. So it is a series of actions and it is making a significant difference in management overall supply and demand.

CHAIR: You will appreciate our time limits. I know there are going to be quite a few questions, so if you could keep your answers as succinct as possible. I appreciate the information you have given the inquiry so far. Mr Evans, in documents released in the Legislative Council there were numerous drafts of reports by an expert panel advising the government and Sydney Water against the desalination option. Why do you think that advice was not followed?

Mr EVANS: What I can tell you is desalination is identified, as I discussed, as a contingency plan in the event of severe drought after you have exercised your demand management, your recycling, your groundwater and your other options. So the notion of using it as, as it were, a last resort is, I think, consistent with much of the advice that I am familiar with and it is in that sense decisions governments take and has to be seen in that context.

CHAIR: Did Sydney Water at any stage ask for a directive from the Minister under the State-Owned Corporations Act to pursue the desalination option? Did you ask for that direction?

Mr EVANS: No, not that I am aware of. I would have to take that on notice to check that. I am not aware that that has happened.

CHAIR: If you could take that on notice and get back to the Committee on that matter? A number of witnesses in this inquiry so far, including academics and those with former associations with Sydney Water, and other experts in the field—and I appreciate the amount of information given

on recycling options and alternative strategies which have been presented today and are before the Committee under other circumstances—however, they have spoken about major flaws in the culture of Sydney Water: they have talked about the Roman age; they have talked about pipe technology that is a direct descendant from the Minoans, et cetera. We have seen a lot of criticism.

Despite what all of you have presented to the Committee in terms of very commendable reuse and recycling strategies that are happening—and I will not ask for the percentage at this point, that is a bit of a tall order—but that still pales into insignificance, does it not, when we are viewing the quantity of effluent that is being released from our three major ocean outfalls. Is that, in itself, very much a part of the continuing culture of Sydney Water?

Mr EVANS: It is very difficult to differentiate culture of organisations from the communities in which they live. I have worked in three different water corporations, and I think in the end they come to represent the balance of interests that their own communities have, to a degree. What I find important in any sort of monopoly community service is that you have to come up with a way of providing services that are acceptable to the broad majority of the constituency, of the population. Unlike the normal business, where you can say, "I am producing for this market segment only, and as long as they are happy they will pay me, and I will go home," in the case of monopoly services like water, you are providing services for everybody, and you are charging them all the same. Therefore the things you do have to reflect a reasonable consensus of the broad view.

All water authorities that I have ever seen, indeed most areas of government, have outcomes that some component parts of the community do not agree with. They believe, for example, they ought to be more innovative or more risk-taking. On the other hand, other members of the community say, "No, stick to your knitting and just do the simple things well." Organisations like Sydney Water have to receive all those messages and provide a service that reflects the balance of those requirements. What is really critically important though is that in the last 20 years a situation has emerged where what organisations like Sydney Water and other monopoly utilities do is not just something that is dreamt up in a back room somewhere by the organisation and then implemented. Organisations, such as Sydney Water, right around Australia are now quite explicitly regulated in terms of what they do.

I believe communities have rightly said, "We want to set parameters that formally set out what people are required to do." So there are EPA licence conditions established for discharge, there are operating licences conditions established for how you run the water infrastructure, and there are a range of IPART conditions, which did not exist 10 years ago, to regulate price and to set different standards. So, whilst every organisation has its culture, what it actually does is a product of messages it gets, formally and informally, from the regulatory process, and we need to be thinking in terms of net outcomes of the combined effect of those regulatory processes. I think sometimes you could spend a lot of time over-analysing a cultural matter, when perhaps the thing to do is look at the outcomes.

CHAIR: In the past there have been accusations in the public arena that the ocean outfall extensions conveniently allowed Sydney Water, through trade waste agreements, to continue to dump in the ocean toxic substances that are in the system. Can you give the Committee, under today's trade waste agreements, the amounts of toxic materials—for example, mercury, lead, chlorinated hydrocarbons, arsenic, cadmium and cyanide—that are still going through the system and therefore being channelled out into the ocean by the ocean outfalls?

Mr EVANS: I cannot give those quantum as I sit here, but I am more than happy to provide them.

CHAIR: Perhaps you could take that question on notice.

Mr EVANS: I will take it on notice. But I would also point out that our performance, on all our discharges, is monitored by the EPA, and we have to meet licence conditions. What goes into the ocean or anywhere else is not on a whim; it is the product of regulatory, set requirements.

CHAIR: But is not your organisation, under licence operating conditions, reporting on the amount of those toxic materials going into the ocean?

Mr EVANS: That is right. As I understand it, we can make that material available. There is no problem there.

CHAIR: So it is your organisation that is actually responsible for the monitoring of that?

Mr EVANS: That is right. And we make every endeavour to intercept trade waste, and we have a rigorous program of not allowing into the system trade waste that will harm our sewage treatment plants, our work force or the environment. I can give you details of those programs.

CHAIR: You refer to the work force and the treatment plant. There is a relatively low level of treatment at the three major outfall sites. You said yourself in conversation with me—and I do not mean to verbal you here—that there is a very high level of treatment in the western areas, and a low level of treatment—some would say third-world treatment—with the major ocean outfalls. What are you doing at this point in time about in-situ monitoring—because I understand that, with the development and commencement of the ocean outfall extension, there was monitoring of the sewage dispersal field? Is that monitoring still occurring at the same rate and with the same degree of interest today as it was when the ocean outfalls were first put in?

Mr EVANS: The ocean outfalls have been there in their present form for well over a decade. I will have to get back to you on how the monitoring has evolved over that time. But we do have a very strong program of banning trade waste that is harmful, at source—only accepting it, with appropriate trade waste charging, if we can accommodate it, and then monitoring.

CHAIR: Where does that trade waste go if it does not go down the sewers?

Mr EVANS: There are two ways in which trade waste can be dealt with if we do not accept it. One of them is for industry to treat on-site, and get their effluent to a stage where we will accept it—so the idea of the regime is to encourage people to do that where they can so that harmful trade waste does not get into our system. Alternatively, trade waste has to be disposed of by other means, and there are a variety of options for that.

CHAIR: Do those other means include the Lidcombe liquid waste plant?

Mr EVANS: I would have to take advice on the exact status of that. But, yes, any legal licensed trade waste disposal entity is another option for people who have trade waste that we will not accept.

CHAIR: Can you provide the Committee, perhaps on notice, with the quantity of trade waste that goes into the sewers from the Lidcombe liquid waste plant?

Mr EVANS: Yes. I have no problems doing that. We would treat any facility the same: we would accept waste if it did not damage our assets, people or the environment; and, if it would damage them, we would not accept it.

CHAIR: In terms of monitoring ocean outfalls, does your organisation currently monitor bioaccumulation at those ocean outfalls? Is that being undertaken with fish and other species on site?

Mr EVANS: I have been with Sydney Water for two years, and I am advised that there has been monitoring over the years. I will have to take on notice the specifics of present monitoring, to make sure I do not run any risk of misleading you.

CHAIR: I would like to know how often that is. You are saying "over the years". Is that regular monitoring?

Mr EVANS: I would be happy to give you a whole schedule of how that has evolved over the last decade.

CHAIR: I would certainly appreciate that very much. And, if I might add, I would be very interested in the amount of toxic substances and trade waste going into the system—other than as a

concentration, because that can be somewhat misleading, but the kilograms or tonnes of those substances per year would be very much appreciated.

Mr EVANS: Okay.

CHAIR: I might give other members a chance to ask some questions, before I come back to you.

The Hon. RICK COLLESS: Mr Evans, you commented about the desalination plant being a last resort, if you like, in an extended drought. That is not the way that the current proposal was announced last year though, is it? It was announced on the basis that it was going to be a 500-megalitre plant, and that it was going to go ahead.

Mr EVANS: The material I am referring to is the Securing Sydney's Water Supply announcement of February, which is the current position, and which is informed by all the action of analysis we have undertaken in the last couple of years.

The Hon. RICK COLLESS: When the announcement was made—I think in July last year—by the former Premier, was Sydney Water aware that that announcement was coming?

Mr EVANS: Sydney Water has had input into all the processes.

The Hon. RICK COLLESS: But were you aware that it was coming?

Mr EVANS: The method and timing of government announcements are matters for government. We provide the inputs. And then, when governments make decisions, we get on with their implementation.

The Hon. RICK COLLESS: So you were not aware that that announcement was coming at the time it was made?

Mr EVANS: The details of individual announcements are not widely shared. Our job is to provide the inputs to them.

The Hon. RICK COLLESS: I would like an answer yes or no, Mr Evans, if you are able to give me one.

Mr EVANS: I think I have answered as best I can.

The Hon. RICK COLLESS: So you didn't know?

Mr EVANS: We provide all the information, and government makes decisions about when it makes announcements.

The Hon. RICK COLLESS: You referred to the decision not to construct a major plant at this point in time. Can you tell the Committee if Sydney Water is proceeding with a pilot plant? And, if so, what will the capacity of that pilot plant be?

Mr EVANS: As part of the process of being prepared to proceed within a shorter time frame, as I described before, one of the things you have to do is use what is called a pilot plant to test the quality of sea water, so that you can build into your contingency design what we call the right pre-treatment so that the water chemistry is correct and so that the membranes that would remove salt could be designed to, and do, and operate in the right way. So the pilot plant is like a laboratory. It is not a mini treatment plant, in the sense of producing the end product out the other end, with filters and all that sort of thing. It is like an on-site laboratory, to enable you to do, under match conditions as it were, the testing so that you can match the actual ocean conditions and the circumstances that you require in completing a design, and that will happen over the next six to eight months.

The Hon. RICK COLLESS: When that plant is complete, will it be producing water to go back into the system?

Mr EVANS: No. It is a part of the being prepared process. It is part of the process you need to limit the lead time, so that if you had to proceed at a later date you could proceed quickly. It is building up the stock of knowledge. It is not unlike the other way round, with the environmental monitoring that we were talking about before. It enables you to understand in advance the quality of your raw material, and therefore design something that can treat that raw material.

The Hon. RICK COLLESS: If I could now turn to your comments on water recycling and what we saw yesterday. Does the new plan basically reflect a change in direction of the Government's approach to water management?

Mr EVANS: I think the plan reflects a continuation of an approach that has evolved, really throughout Australia, over time. If you go back to 2004, when the Metropolitan Water Plan was put out, it foreshadowed recycling, it foreshadowed the investigation of desalination, it foreshadowed the testing for groundwater, to which Graeme Head has referred, and it foreshadowed the demand management initiatives. What happens over time is that you progress with these things: you lock in more knowledge, and you are able to decide which ones can be implemented. So I just characterise these things as an evolution in that, over time, as technology changes, as your knowledge changes, your knowledge of climate changes, and your understanding of the risk of drought severity changes, you will evolve the combination of measures you apply at any one time.

As I said earlier, the notion of periodically building a dam, and then in between going back to business, has gone. We are going to be in a period of continuous evaluation of options. So I think that is the key. It might seem an obvious thing to say now but, going back 10 or 15 years, that was not how it was. For technological and other reasons, the situation has changed pretty radically in the last decade.

The Hon. RICK COLLESS: As a result of that plan, and additional recycling initiatives—and I know you did mention some before—has there been any plan to expand the Rouse Hill type model?

Mr EVANS: Yes. The basic opportunity that I think presents itself most obviously to growth areas like that of Sydney, particularly where you are getting growth adjacent to sewage treatment plants with high levels of treatment—which the Chairman referred to a minute ago—is to basically replicate the Rouse Hill type situation for the growth areas that emerge out west. You make a virtue of the fact that you are going to treat the water to a very high level because of the environmental sensitivity of the receiving waters in the western area. You therefore know you have effluent which, with slightly additional treatment, can be made to a stage where it can be used for watering gardens, flushing toilets, et cetera. The next part of the puzzle is that we must deliver that waste water to customers. That means a dual-pipe system. When a suburb is laid out, we must install not only basic water and sewer pipes but also a third pipe network right up the customers' houses. That can be done when suburbs are being rolled out infinitely more effectively than if the suburb is already there. It is a fundamental part of the development of Western Sydney to provide for that recycling or third pipe network as the suburbs are rolled out.

The BASIX system—which contains a planning consent requiring houses, no matter where they are, to be 40 per cent more water efficient than they otherwise would have been—ensures that the development community has an incentive to participate in these recycling schemes that they did not previously have. I should point out that those same BASIX rules apply no matter where one is. People building in the eastern suburbs must still be 40 per cent more water efficient and therefore would have to install a rainwater tank or whatever. In greenfields areas the opportunity exists for the development community to participate in recycling schemes as the suburbs are rolled out, and that is what we believe will happen.

The Hon. RICK COLLESS: Rouse Hill was approved in about 1991 or 1992. Have other developments since then had the same facilities included?

Mr EVANS: Not all of them. The reason is that the BASIX system is relatively recent. That has created the incentive for people to—

The Hon. RICK COLLESS: What was the incentive for the Rouse Hill proposal to go ahead?

Mr EVANS: That was way before my time. However, it was done on the basis of an initiative to test out the community acceptability of much of the costing and other issues. Honourable members saw yesterday the results of that and some of the lessons that have been learnt.

The Hon. RICK COLLESS: Does Sydney Water measure the amount of water it recycles each year?

Mr EVANS: Yes.

The Hon. RICK COLLESS: How much is that?

Mr EVANS: The total amount at the moment is about 15 billion litres.

The Hon. RICK COLLESS: That is 15 gegalitres.

Mr EVANS: Yes. With the schemes at BlueScope Steel and elsewhere in the next few years, that will increase to 30 gegalitres. With the growth and the Western Sydney scheme I referred to, we expect it to be at 70 billion litres by 2015. That is not an immaterial amount; that is, in effect, 10 per cent of the demand for water that will exist at the time. So, it is a material part of the puzzle, not just an add-on.

The Hon. RICK COLLESS: What is your projection for the amount of water that will be going through ocean outfalls by 2015?

Mr EVANS: The Sydney system comprises two categories of plants. There are plants that service the non-coastal areas, which as I said earlier have very high levels of treatment because of the sensitivity of the receiving environment. We are planning for all the available effluent from those Western Sydney plants to be part of some form of recycling. The eastern-flowing systems—the established ocean outfall systems—are differently configured for historical reasons and also because of the relatively greater capacity of the Pacific Ocean to absorb waste flow compared with the Hawkesbury-Nepean system. Therefore, our recycling focus will be on those western areas where there is the advantage of a more highly treated effluent. We would not expect the outfall volumes to change materially, but we would be looking to recycle all the western stuff.

The Hon. RICK COLLESS: So we will still have about 450 gegalitres being sent out to sea. What about the proposal being put forward by companies like Sydney Services Pty Ltd in terms of harvesting some of that ocean outfall and reprocessing it? Is there merit in that and do you see that sort of private industry commitment going ahead at some stage?

Mr EVANS: First, private sector participation is excellent in the provision of services. About half of what Sydney Water procures comes from the private sector, water filtration plants are provided by the private sector, the vast majority of the \$600 million capital program is procured from the private sector, and many maintenance services are provided by the private sector. So there is no difficulty at all with the involvement of the private sector. The most material issue in this debate about the use of the outfall effluent is the social value of undertaking such an exercise rather than who might do it. It is a question of social economics as to whether the community can justify the effort and cost of retrieving that effluent and applying it to a use. In an engineering sense, it can be done, but the high social costs must be considered. We must also consider the social benefits side. As Graeme Head has explained, we have had nine years of drought and yet, after allowing for the deep storages to come on line, storage facilities are half full. We have the capability to cope with the growth through what we think are cost-effective means. There is no philosophical problem with using effluent from the ocean outfalls; it is purely a question of social cost effectiveness, and the costs are substantial.

The Hon. RICK COLLESS: What about stormwater harvesting? We have heard that that could yield about 500 gegalitres a year just from Sydney itself. Have you done any work on that and what is of the cost of that per unit of water?

Mr EVANS: The hydrological facts are that a lot of rain falls on Sydney and on the catchments, although in recent times that has not been as high as we would like. The issue with harvesting stormwater is not contesting the truth of the fact that a lot of rain falls on Sydney; the difficulty is harvesting, storing, treating and supplying that water in a city that is very highly developed, where land is expensive and so on. What tends to happen around the world is that in built-up cities it is very difficult to retrofit stormwater collection facilities. We can develop stormwater harvesting capacity by integrating it into flood control measures in new suburbs and then use the stormwater for social amenity and/or irrigating playing fields and so on.

CHAIR: The north-side sewerage tunnel is a massive storage area. I understood that according to the original agreement it was supposed to have a pipe back and a reuse strategy. That does not seem to have happened. Is that not one potential that has not been tapped, and does Sydney Water intend to tap it?

Mr EVANS: I am advised that the pipe is there.

CHAIR: The return pipe?

Mr EVANS: Yes. There seems to be some confusion about that, but it is there. I think it is 16-kilometre pipe. The underlying point with many of these issues, whether it be the north-side tunnel, sewage treatment plants or the gathering of stormwater, is the cost effectiveness compared with the other options of constructing the infrastructure and storage facilities and so on to utilise it. In any substantially built-up city in the world the approach is to have catchments or rivers from which water is brought to the community. Rainwater tanks are an obvious way of harvesting stormwater. We have subsidies for them and 20,000 have been installed. That internalises the decision to the household and avoids the need to create duplicate infrastructure and all that goes with it. However, the physical storage challenges in collecting, storing and then treating substantial amounts of stormwater are enormous.

The Hon. PATRICIA FORSYTHE: If the recycling focus is on the western suburbs, as you said, government policy at least since the late 1980s has been on infill and increasing densities in some inner and middle ring suburbs, which are not your focus area. What is the long-term solution for those areas and how does it sit with government planning policy?

Mr EVANS: That is a very good question. There is a perception that Sydney's growth is a western sprawl. That is not true. An enormous amount of growth is embedded in established areas. There are advantages to that in terms of utilisation of infrastructure and so on. The answer to the question is that the BASIX rules requiring each new dwelling to be 40 per cent more water efficient apply everywhere; they are not simply Western Sydney rules. Therefore, if I choose to build a unit on this side of town, under the law I must satisfy the 40 per cent water efficiency rule like anyone else. I may satisfy that by having a rainwater tank, water efficient appliances or by including different features in the design of my house or unit. However, I do not have to do it by recycling. If we were to mandate across the State one method by which everybody must become more water efficient we would force people to incur inappropriate costs. It is important to get across the message that the people in the east are not getting off free. They must simply do it by other means.

The Hon. PATRICIA FORSYTHE: Has Sydney Water done any modelling on permanent, long-term water restrictions? If so, what is the nature of any restrictions? Is Sydney Water considering anything other than the current methods?

Mr EVANS: Experience around Australia is showing us that there are two sets of restrictions that must be considered. One of them is drought restrictions, which are the restrictions we now have in place. The Government has indicated that it will not be implementing any additional drought restrictions over and above the ones we now have. The other issue is how to encourage water efficiency when we are not experiencing drought. That must be integrated with community education and all that goes with it. We will be looking at that as we come out of the drought, because we want to encourage continuation of the water awareness that has emerged during the drought. There is evidence from different jurisdictions that one can often lock in more efficient use behaviour through some of the habits that have been developed during drought restrictions. We will be looking into that to work out how to encourage the most efficient water use after we get out of the drought.

The Hon. PATRICIA FORSYTHE: I refer to the water saving fund mentioned earlier. What is the nature of the fund? Is it dollar for dollar with local authorities, a grant or a loan? What is the incentive for local councils to apply for funds under the program?

Mr NEMTZOW: It is series of grants, and the incentive for local councils is simply that there is money at the end of the day. There is no requirement on them; it is an opportunity. Many councils have made submissions. Councils were extremely well represented. That does not surprise us because they have been thinking about these issues for a number of years and have thought through projects. These funds are available as grants. If someone wanted a loan, we would certainly entertain that, but we find that almost everyone prefers a grant to a loan for obvious reasons. That allows these projects to go forward. We have an independent panel of experts to help us. The secret is to support activities, whether it is with councils, businesses or whomever it might be, that would not have happened without the fund. The fund has limited resources and we want to ensure that it is used for projects that we can get over the line that would not happen otherwise. That is the hardest part of reviewing all the applications we receive.

The Hon. PATRICIA FORSYTHE: How much money is in the fund and how much is being accessed annually?

Mr NEMTZOW: The fund has \$130 million over four years. The first round has just come to fruition and we made \$9.2 million in commitments. The second round opened yesterday. It does not involve a specific amount. Each year \$30 million is provided and this year an extra \$10 million will be provided for a separate sub-pot for the largest users, but that has a considerable overlap.

The Hon. PATRICIA FORSYTHE: How is the assessment of projects being undertaken? Who is doing the assessment? What are the criteria?

Mr NEMTZOW: The assessment is conducted by an independent panel of experts.

The Hon. PATRICIA FORSYTHE: Who?

Mr NEMTZOW: It is chaired by Alex Walker, who is the former CEO of Integral Energy and the former CEO of Sydney Water. The other participants, there is one person from my department. There is somebody from a regional water utility. I will get back to you in a moment about the other two people. So there is one person from the department for complete externals and then technical support provided by water experts at the department. We received over 70 applications in round one. They looked at all 70, and ended up supporting 27 projects. Not all of them received how much they asked for, and just about every one of them will receive obligations that they did not volunteer for, and that is part of the natural grant process. There are multiple criteria, but the most important criteria is cost effectiveness. We want to know how much water we can save through efficiency, stormwater harvesting, reuse, recycling, how much we can save for every dollar of the fund. Other factors are looked at—innovation, market transformation, public education, et cetera—but the cost effectiveness is at the heart of it.

The Hon. PATRICIA FORSYTHE: Given the independence of the panel, did it require ministerial approval before—

Mr NEMTZOW: The panel makes recommendations, then they go to me as Director General and then to the Minister.

Ms SYLVIA HALE: If I could turn to the desalination plant, the amended Metropolitan Water Plan states that considerable work has been undertaken, environmental and engineering assessments, and a site has been procured at Kurnell. Is that site just for the pilot plant or is that the site for the plant if it is ultimately constructed?

Mr EVANS: The site is where the pilot plant work will be done but pilot plants are very small. They are about the size of a shipping container. They are portable; you bring them in, you do your work and then you take them away again. So that site will be used but the actual site itself is

where the plant proper will be built. It has to be sufficiently large with sufficient screening and all those things to enable it to accommodate the drought contingency plant if you build one.

Ms SYLVIA HALE: Has that site been purchased or are they still looking for a site?

Mr EVANS: That site has in effect been purchased.

Ms SYLVIA HALE: So that is at Kurnell?

Mr EVANS: That is right and that is the significant part of the cost. The issue is that if you are trying to create this reduction in lead time I referred to before, so if you got into difficulties you could produce, then having a site is clearly a pretty important part of that.

Ms SYLVIA HALE: Mr Evans, on the information sheets that appear on Sydney Water's web site in discussing the desalination proposal, it showed that the costs for a plant at Malabar and at Kurnell were identical. However, at the time the decision was made to favour Kurnell because it was a clean site, whereas the Malabar site would need remediation and that could slow up the process. Given that the whole project has removed itself from centre stage, why was further investigation not done for use of the Malabar site, given that it was government owned and it was closer to the water supply that had to be fed into Sydney? It would obviate the need for an eight-kilometre pipe under Botany Bay. At the moment if it rains heavily there is toxic leachate from the Malabar site. Cleaning it up would obviously have been of great benefit to the citizens of that area. Why was the decision made to go ahead with Kurnell, rather than with the already developed site at Malabar?

Mr EVANS: The issue there was discussed in the feasibility study that was made public. There are multiple reasons why government chose the Kurnell site. They include issues like contamination, which you referred to. The Malabar site was previously a rubbish dump and therefore there would have been issues of potential delay and cost in dealing with that. But there are also issues of, for want of a better term, social amenity. The adjacent land uses at Kurnell are things like Continental Carbon and the refinery, and if you have a look at the site it is out of sight and well away from residential areas. In contrast, Malabar is very close to and in the sight range of residential areas. So there is a multiple set of criteria for making the decision and those criteria have not changed.

Ms SYLVIA HALE: As you just said, the Malabar site is contaminated. Is any work being undertaken to remediate that site?

Mr EVANS: That site is predominantly owned by the Commonwealth, as I understand it, and that would be a matter for the land owner. I am not aware of issues there. It is not owned by the State Government.

Ms SYLVIA HALE: But as we saw, for example, yesterday with our site visit to Rouse Hill, a desalination plant would not necessarily be visually offensive but by putting it at Malabar rather than at Kurnell we obviate the need for a potentially damaging pipe eight kilometres under Botany Bay?

Mr EVANS: These are always issues slightly in the eye of the beholder. What is visually offensive is a matter for people to consider. I would think that people would regard construction of what are effectively very large sheds in line of sight of a large number of homes, I do not think you would necessarily find everybody saying it was not a problem, whereas if you go and look at the Kurnell site it is literally out of the way so I think there are issues there of having to balance the social amenity issues.

Ms SYLVIA HALE: Mr Head, you mentioned that the catchment authority was investigating issues of climate change. You also mentioned the taking of water from the Shoalhaven and pumping it to Sydney, and he said that at the moment over the past three years it was about 20 per cent of Sydney's supply but there was the possibility of modest increases. What impact has the need to transport and pump water up the escarpment back to Sydney had on power usage or how much additional power is needed to be used to undertake that pumping?

Mr HEAD: Clearly when we are not pumping from the Shoalhaven one of the significant features of the Sydney system is that it is a largely gravity fed system. The intrabasin movements of

water from Tallowa Dam up to Fitzroy Falls reservoir require the significant lift and then there is a more modest rise to be gotten over in transferring the water into the catchment. We published details on that in our annual report. I would have to take on notice the specifics of the amount of energy consumed each year but it is reported on in detail in our annual reports.

Ms SYLVIA HALE: I notice it because I have your annual report for 2003-04. On page nine of that report it shows that in 2000-01 about five gigawatt hours were used for water supply infrastructure, but it shows that for 2002-03 that had increased to about 225 gigawatt hours—about a 45 times increase. That is in table three on page nine. On table four it shows that the emissions in terms of carbon dioxide went from about 5,500 tonnes in 2001 to just under 215,000 tonnes in 2003-04—again a massive increase, you would agree—and presumably mostly as a result of this need to pump the water up the escarpment.

Mr HEAD: That is right. The most significant activity in terms of electricity use when we are pumping is the transfer from the Shoalhaven and clearly one of the issues for examination in looking at the Shoalhaven long term is greenhouse issues and the capacity to offset any impacts from those transfers.

Ms SYLVIA HALE: The information sheet accompanying the desalination plant—I think it was the desalination plant frequently asked questions—showed that 225 gigawatt hours, which is very close to what we are currently using to pump the water up from the Shoalhaven, would be required to operate a 125 megalitre a day desalination plant. What I am suggesting to you is that the amount of energy we are expending to bring water up from the Shoalhaven is in fact the same as the amount of energy which would be utilised if the 125 megalitre desalination plant were commissioned, were in operation.

Mr HEAD: I would have to examine the figures but I want to make the point that one of the reasons for undertaking detailed analysis of how the Shoalhaven has been used in drought since the decision to build Tallowa Dam was made in the late 1960s and the dam started operating in the mid 1970s is to examine the way in which that system generates impacts today and the opportunity to improve those impacts by looking at modifications to the transfer system as well as looking at things like downstream impacts and the opportunities to improve those.

Ms SYLVIA HALE: I am sure you will agree that concern about power usage or the generation of carbon dioxide, which is quite considerable at the moment as a result of the transfer from the Shoalhaven—there was such concern about generation of climate change gases and carbon dioxide that the Premier announced that the desalination plant, if it came on line, would be powered entirely by renewable energy, and I gather the only source at the moment for renewable energy possibly would be through wind farms. Given the phenomenal impact of that water transfer from the Shoalhaven, is Sydney Water or the catchment authority contemplating using a renewable energy source for the Shoalhaven transfers?

Mr HEAD: I will make two points in response to that. It is also important to recognise that the Shoalhaven scheme as it currently operates is used for generated hydroelectricity by Eraring Energy and its operations are in a sense jointly co-ordinated between the two organisations so that in its routine operation when water is being transferred it can also be used to generate hydroelectricity. The other point—

Ms SYLVIA HALE: Excuse me, but would you be able to quantify that?

Mr HEAD: Yes, I will take that on notice so we can provide details. At this stage it is probably sensible to relate those details to the period you are talking about since 2001. The other point is that, as I mentioned before, we are developing in accordance with the announcement that was made in the progress report a paper identifying the issues associated with different uses of the Shoalhaven. Greenhouse issues will clearly be a set of issues that will need to be considered in that paper, along with discussion of possible offsets for different ranges of greenhouse impacts depending on different modes of operating the scheme.

CHAIR: Just on that point, I understand that approximately 190 gigawatt hours per year is the production of renewable energy in New South Wales. Would that include the output from the

hydro scheme? So we are actually looking at, because I am interested in continuation with Ms Hale's questioning, on the announcement by the Premier at the time that in building a desalination plant would be powered 100 per cent by renewable energy with zero net greenhouse emissions. That seems to be a bit of an absurdity in terms of the current output from alternative systems, be they hydro or other systems, compared to what the reality of the end use would be.

Mr HEAD: I am not really the best person to answer the question on the entire State's performance in that particular regard, but I am happy to take it on notice. Mr Nemtzow may wish to comment.

CHAIR: Mr Nemtzow, would you like to comment on that?

Mr NEMTZOW: Yes. I do not have it in front of me, but I am not sure if that 190-gigawatt hour number you just cited is all renewable energy or just certified green power, which would be subsidised. I think it is probably the latter, which is a smaller number.

CHAIR: I have it as renewable energy, but you are saying that it could well be more than that, that it could be green power?

Mr NEMTZOW: That is right. But regardless of whether I am right about that, your earlier point is it is not an absurdity. We are aware of quite a few plans—wind farms that have DA approvals, waste from landfills, biofuels, et cetera—that can provide that level and that is not a concern. Before that commitment was made by government we conducted vigorous analysis to make sure that resources were available. They are available. It is important to note that it is an offset. It does not necessarily mean that a wind farm will send electricity directly to a desalination plant. It will send it into the grid and it will be purchased by Sydney Water to offset completely the carbon dioxide emissions. We get the same result, but we have a multistate grid, which is the only way it works in reality. It is a real commitment, and it is technologically and financially well within control.

The Hon. PETER PRIMROSE: My first question is to everyone. I note your comment that our system works largely on the basis of gravity. Although the details differ, a number of suggestions we have received involves pumping from the east uphill and back to the west. Has any work been done on the indicative costs of various schemes for construction, acquisition of land, the use of electricity, greenhouse gases and the likely effect on the electricity account and the water bills? Has any work been done at all on the costs of those schemes? I know that it is a big question.

Mr EVANS: Initially, we can answer that in general. Firstly, and I think this is implicit in the question about the electricity cost of the transfers from the Shoalhaven, any system that pushes water against gravity requires two things. It requires a pretty big pipe conduit to transmit it, and it requires energy and pumps to push it. The further you have to push it the more expensive it is. Generally speaking, schemes of the sort you are talking about have two components of cost that have to be thought about. The first one is the treatment cost of getting the waste to a form where it could be reused, and that means finding locations and all that goes with it. As a subset of that you still have to dispose of your concentrated waste because any major recycling scheme still produces a waste stream, a brine stream, a solid stream, whatever is the concentrate you have left when you are finished. To cost these things you have to cost the cost of treatment, the cost of disposing of your existing waste stream, and any energy and other costs of transmitting the product you make back uphill to where you want to use it.

It is difficult to be specific because any one scheme will have different costs depending on all sorts of technological and engineering issues. But just taking it in general, if you wanted to return treated effluent from the coastal plants to Western Sydney for industrial use then there would be quite a significant cost in transmitting and laying the pipes—the pipes cost about \$1 million a kilometre to build—but that cost would not be as high as if you were trying to take it all the way back to the Hawkesbury-Nepean for an environmental flow substitution or all the way back to Warragamba Dam to shandy it in to drinking water. The further you go up the hierarchy, the higher and higher the costs get, and the higher and higher the energy demands become. You go to those things and you say, "We have to be rational here about deciding where the gains lie in outlaying those costs." We are trying to progress by using the systems where the costs are reasonable and benefits are high. For example, there is an industrial cluster around Camellia centered around Shell and others, and the idea of servicing

that under the Camellia expression of interest is to allow people to extract sewer effluent or influent on site, treat it and provide it direct to industry, not bring it all the way back from the coast.

Similarly, down at Wollongong you extract water from the sewage treatment plant there and you send it across, literally over the fence, to BlueScope Steel. In those situations recycling schemes can be brilliant successes. But as you go to grander and grander schemes you have to ask yourself one really important question: Who is going to use the product, where are they and how are we going to pay to get it to them? The western recycling schemes I have spoken about have highly treated effluent available out there and potential customers nearby, so it can work. But if you are taking, as some of the bigger schemes are implying, effluent right from the coast and somehow getting it to a customer in the west it is very expensive. Such schemes are possible technically, but we have to ask ourselves about their social cost benefit. Proponents of those sorts of ideas can come forward to purport a savings fund or put their views, but you have to confront the fundamental points I was speaking about. The further you have to lift it, the more and more greenhouse gas you have to burn and that raises the whole question of the environmental footprint.

My view is that if we were in desperate straits, for want of a better term, some of these schemes could and would be done. But as is shown in this plan we have just survived nine years of drought. The storage is half full. We have a series of recycling and other steps that we can and will take that are reasonably cost effective. Therefore, at this stage there is not a need to progress to some of the more expensive options. However, in the future with technological changes all sorts of things might change and you never rule anything out. But you have to be careful about committing to things that impose a high cost on the community without the benefits being there. That is not a matter of philosophy or anything else, it is just a matter of using the community's resources widely.

CHAIR: Does that not make the desalination plant, which, by its very nature, is next to the ocean, somewhat of an absurdity if you look at some of the issues and consider some of the things you have said and add to that the immense amount of energy used by the plant itself—pumping and utilisation—would make it cost prohibitive, would it not?

Mr EVANS: There are two issues here. First of all, the desalination plant is expensive but it is there for a circumstance where the water would be very valuable because we would be in severe and extreme drought and we would have 4 million people looking for where their next drink was coming from. It is not proposed as a base load facility, if you like. It is there for a situation where the scarcity would be much elevated.

CHAIR: It would have to pump all the time to work effectively.

Mr EVANS: Yes, but the second thing is—and this is just an engineering fact—with desalination if you are near the ocean you do not have to pump the water far from the ocean and you can take the water you produce and inject it into the distribution system without having to go back to Warragamba to shandy it and therefore your transport costs are not as high. That does not mean it is not expensive. We all know that it is expensive. But you have to think not only of the factory costs but also of the delivery costs when you are factoring in all these things. The other thing you have to think about is community acceptance and the need to make sure, as we were discussing yesterday, that you are able to bring the community with you on your recycling initiatives rather than force them into ways with which they are not comfortable.

The Hon. GREG DONNELLY: Mr Head, earlier you spoke about climate change and the work that Sydney Water had done in that regard. Would you be able to provide more detail about the implications of climate change as you understand it and Sydney's future water supply?

Mr HEAD: A lot of the commentary around climate change and Sydney's drinking water catchments comes from extrapolating work that has been done at a national level, which is not necessarily the most precise work in terms of understanding implications for system planning. As I said earlier, we are involved in a number of projects, one of which is doing work similar to that which is being done in a number of other countries around the world to try to look at, using a range of analytical tools, what has occurred in the last 1,000 years in Sydney's system in terms of wet and dry periods. We have a very good record for the last century, but we know that climate cycles in this country have a very long duration and it is important to be able to contextualise the events we are

experiencing today against a more detailed understanding of what we reasonably might expect in the future. In addition, we are doing some more precise catchment focus work with another university on how we use the SCA's modelling capability to predict better likely scenarios in the storages depending on changes in the inflow sequences and changes in rainfall. This is work that is consistent with the type of work that large water utilities elsewhere in the country are starting to do, and it is about developing information that provides a more detailed understanding of how local conditions are being seen and being able to make sensible adjustments to programs and policies accordingly.

The Hon. GREG DONNELLY: Mr Evans, earlier you gave evidence about the success of water saving device uptake by consumers in Sydney. From Sydney Water's point of view how far can you see this going in picking up the difference? In other words, where is the tipping point when it becomes the end of that part?

Mr EVANS: The answer to that is that it is going to be like painting that Sydney Harbour Bridge: It will never stop. As new homes come onto the system they will be water efficient from the time they are created. You lock in that gain and then you look to your backlog. We have implemented a spectrum of means to go to the community to say, "Here is your opportunity to install these water efficient shower heads." That means a continual process of promoting, writing to people, making sure the kits are available, and having plumbers go out to install them et cetera. We think we will get to 500,000 properties in the next few years, which is getting towards half of the stock. The question is how to get at the other half. The first thing we have done is introduce a system of targeting specifically the Department of Housing by just going in there and doing it. The second thing is to promote it continually to customers. There are some customers who, for reasons of the configuration of their household plumbing and the like, do not find the devices attractive. It might be how their hot water is configured or it might be the aesthetics of how their houses are plumbed. But we think that if you keep going back and promoting it then more and more people will see the virtue in saving on water bills, et cetera.

The other thing we are doing is moving to a system of a do-it-yourself kit, where you do not have to have a plumber come into your house. There is a simple system, for which there is no charge at all, whereby people can get a do-it-yourself kit to install the use pressure-reducing devices and the like in their own showers. It is like attempting to sell most products, you have to be continually promoting it but also continually thinking of different ways of presenting it to accommodate the tastes of different people. For example, in these do-it-yourself kits we have pressure-reducing valves that one can install without changing the showerhead. You do not necessarily have to change the aesthetics of the bathroom design. It will be a continual matter of promotion and development of these things. They are tremendously cost-effective and they work really well.

The other thing you have to do is push out the frontiers. Some of these other things are more expensive but we have introduced the \$150 subsidy for water efficient washing machines. That is designed to increase the uptake of those types of machines, but it is also designed to change the social attitude; to get people to realise they work. One person has one and the neighbour looks at it, and all that sort of thing. Something we are looking at but will have to do pilot studies on is this question of retrofitting the dual flush toilets. Dual flush toilets are required in all new properties, so that sort of takes care of itself, but it is a big opportunity for improvement in established properties.

As I said earlier, the issue of sending a plumber into someone's house and having the plumber in effect mess around the configuration has to be looked at carefully. It gets progressively more expensive when you have to send people out, but the question is to balance the gains and the costs. One of the effects of the drought, and inquiries of this sort and all that goes with that, is that people are becoming more aware of the contribution they can make and that helps with the uptake rates. It will be a never-ending thing. It is now part of the mainstream of water management and it will just keep flowing through.

The Hon. GREG DONNELLY: On the question of domestic reuse, for example grey water, has Sydney Water given consideration to how that could be something in the future that will become a reality in the issue of water saving in Sydney? To the extent that you have done, where you detail what that consideration is?

Mr EVANS: I will pass you over to David because this issue is one of, if you like, community education but also regulation. There has historically been our desire for public health reasons to separate the waste stream from where people live and their fresh water consumption. That goes right back to why we had municipal water authorities in the first place. We have to remember that that has made a massive contribution to public health, massive. However, what we are trying to do now is blur that distinction in a way that does not undo the gains of the original separation. There has been a set of regulations come about over many years to achieve this separation. We have to remove those regulations that inhibit putting washing machine water on the lemon tree, and that type of thing.

The Hon. GREG DONNELLY: Without compromising the system.

Mr EVANS: Exactly. Whilst it sounds very trite, and we are often accused of being very conservative here, when you do this sort of thing for four million people you often produce outcomes you did not anticipate. For example, someone wants to run the bathwater onto the lemon tree and it is not a problem. It dries out or soaks into the soil. Then one hears these stories: the drought breaks, there is a lot of rain, the connection is left in place and before you know at the neighbours are complaining that the water is running downhill into their backyard. I believe all that can be dealt with, but we just have to manage it in a way so that you bring the community with you and you do not get backlash. I think David can speak about some of the regulatory changes that are designed to make it easier for people.

Mr NEMTZOW: David described well the cultural and technological change, but regulatory change is happening. There will be soon a new code of plumbing regulation—normally a pretty boring, tedious topic only for professionals to deal with, but, because of the water issues, it is more important. It will affect the issues of rainwater tanks and of grey water, and also the guidelines I referred to earlier. It is a series of changes to the regulations that we are progressing in government and that we are assisting the councils with, as well as the cultural, household and business changes that David described earlier.

The Hon. GREG DONNELLY: My final question, which may be taken on notice, relates to the issue of trade waste agreements. There was some comment this morning about trade waste agreements, but in evidence from witnesses on other days there has been some comments about the comprehensiveness of Sydney Water's trade waste agreements. I wonder if you would provide to the Committee on notice the details of how those agreements are struck and the details associated with them?

Mr EVANS: Yes. That is not a problem.

CHAIR: Mr Nemptzow, in light of your extensive experience in areas of water and energy utilities overseas, what do you regard as the major problems in the management of Sydney's water resources? I wonder also if you could touch on the issue of the discharge of 450-odd gigalitres of effluent into the ocean, and a similar amount of stormwater that, so far as sustainability is concerned, would appear to be wasted at the present time? Are you able to throw any light on some creative solutions to these major problems?

Mr NEMTZOW: Yes. Let me tackle your first question, because I know from your earlier questions that this is important to you and to the Committee. I think we should reflect on what David Evans said earlier about the role of Sydney Water, my department, the Sydney Catchment Authority, and the rest of us the broader community. If you look at experience elsewhere—and I think the American experience is more relevant here than the European experience because of the nature of rainfall patterns, if I might overgeneralise—there is a worldwide shift taking place and the CSIRO paper submitted to your Committee did a nice job of looking at the paradigms, how we used to think about things and how we would like to think about things, and want our colleagues and the citizenry to think about them. So, that is change is happening. I think Sydney Water is doing an excellent job. I think they are leaders. If you compared Sydney Water on any kind of objective metric to other utilities in New South Wales, in Australia and around the world it would score extremely highly on just about every metric.

CHAIR: Compared to Orange County in California?

Mr NEMTZOW: Let me respond to that. Is Sydney Water the best in the world on every metric? No. Is it overall one of the very best in the world? Yes. Orange County is a good example. It is if not the world's best then one of two or three best in using and recycling water, pumping it into an aquifer and getting it back out. It is a world leader, there is no argument with that, and in the future that might be something in Sydney's future. It is something in Sydney's future I think we could have confidence that Sydney Water and the Sydney Catchment Authority would run such a scheme appropriately. There are other utilities that have much worse records. David Evans talked earlier about leak management. The Government did not worry as much about leaks in the old days. Now we do worry and their performance is increasing significantly.

I might also note it is now in their operating licence. The former Minister for Utilities added that to their operating licence and they are responding. If you look at the overall pattern it is quite good. Is our collective work done? Most certainly not. When I say "collective" I mean the seven million people of New South Wales as well as the government utilities. Our collective work is not done, but we are making progress, we are innovating and we are experimenting, and trying to get right as much as possible. I think we are doing a good job. I think that record is good and I think we have work in front of us.

In terms of the other issue you raised about the outfalls and stormwater, there are couple of things to think about. One is that we are a coastal-based population. The growth historically started closer to the coast and is moving westward and the Pacific Ocean can handle a large amount of waste. Obviously, the biowaste is easier to deal with in an oceanic environment than the trade waste that you referenced earlier, but that is there, it does happen and there is virtually no impact. That has been measured. Can we do better? Yes. Would we like to recycle it and to use the stormwater more? Yes. But for reasons we have talked about today, and I know your Committee has looked at, there are limitations to that—engineering limitations, pumping water uphill, social and financial limitations. I guess I would just describe it as progress and I think it is in the right direction. I think the pace is pretty good, but there is more if to go, a lot more left.

CHAIR: How important do you think energy efficiency is related to overall procurement of Sydney is supply? What methods of water supply do you think are best in terms of energy efficiency?

Mr NEMTZOW: Certainly water efficiency is number one. The important thing about water efficiency is that if we are using hot water more efficiently with showerheads, we are saving energy simultaneously very significantly. In fact, when our departments and others prepared the 2004 plan and used outside consultants, the way we do the methodology showerheads had a negative cost associated with them. Because you save so much energy, that more than pays for the cost of installing them. That is where you start, then you have things such as toilets that conserve water. Obviously they do not conserve hot water. Water efficiency is the best way. After that there are varying degrees of impact. We talked about the fact that it is not energy free to pump water within the Sydney catchment system, especially indeed non-gravity fed part of it, and the commitment government has made to use 100 per cent renewables on desalination as a major commitment. That is very significant.

I think the short answer is, yes. There are significant energy impacts of most water decisions and if we can use water more efficiently as a society, that is best. If we can reuse it locally, that is the next best because the movement of water is the hard part here and the further we have to move water the more energy intensive it is likely to be, in which case we have to look at these methods to offset because it is difficult to get the energy consumption in the first place. So we can offset the impact when we are shipping it long distances. I would think of the spectrum that way, in terms of the energy impact.

The Hon. RICK COLLESS: Mr Nemtzow, to follow up on a question that the Hon. Patricia Forsythe asked you earlier about the ministerial approval of projects, did the Minister approve all of the recommendations that were put to him?

Mr NEMTZOW: That is a question to be asked of the Minister, in this case the former Minister.

The Hon. RICK COLLESS: You would know how many recommendations were put forward. Were they all approved?

Mr NEMTZOW: I would not know the answer to that. That is between the director-general and the Minister, and I think it needs to stay private.

The Hon. RICK COLLESS: Does Sydney Water pay a dividend to the Government?

Mr EVANS: Yes.

The Hon. RICK COLLESS: How much is that?

Mr EVANS: It is around \$140 million. It varies with trading outcome and the like. That is a regime that was first introduced in the early 1990s.

The Hon. RICK COLLESS: Do you take out loans to pay those dividends?

Mr EVANS: No. The dividend is paid out of trading outcomes and it is less than the profit for the year. It is a fast paid for in the same sense as any other commercial enterprise would pay a return to its owners.

The Hon. RICK COLLESS: In other words, you to have money in the bank to pay those dividends?

Mr EVANS: We have a very large capital program, which is ongoing and we borrow money like any other enterprise would do to invest in the capital. But we do not have to borrow money to pay dividends, no.

The Hon. PATRICIA FORSYTHE: Did you make a recommendation that there should be a grant to Sutherland council?

Mr NEMTZOW: I do not recall. I will take that question on notice.

Ms SYLVIA HALE: Are you required by legislation to make that \$140 million dividend to the Government?

Mr NEMTZOW: Under the legislation under which State-owned corporations work, there is provision for dividends to be paid out of profits. That is in effect most of the cost of capital of the assets we employ to provide our services, so it is an integral part of the environment in which water authorities throughout Australia work. It is in effect to allow the cost to capital to be reflected in the decisions we make. Without going into all the detail, because it is not the time, I think there are two observations to make. One is that it is paid after we have provided funding for the other things we need to do, not before, and secondly of course it is paid to the Government, not to a private owner.

Ms SYLVIA HALE: Have you requested of the Government that that dividend be returned to the authorities to allow them to undertake additional water saving initiatives?

Mr EVANS: I have been at Sydney Water in relatively recent times and I am not aware of any such request and the reason for that is that we have a capability to do the things we need to do, our capital and operating activities, from within the funds that are allocated to us by the Independent Pricing and Regulatory Tribunal [IPART], so we believe we can do the things, including all the things we have talked about here today, within the resources that are available to us.

Ms SYLVIA HALE: Yes but I think the point you have consistently made as well is that a number of projects which might be of very long-term benefit, such as major recycling, re-use, whatever, are very capital intensive.

Mr EVANS: Yes.

Ms SYLVIA HALE: And 140 million is not to be scoffed at every year in terms of additional funds going towards that end.

Mr EVANS: Yes. I see the point you are making there but when and as investments become good value to the community, we commit to doing them. We then make the case that they are good value to IPART and they give us the money. So there is not a constraint—if you like, a cash flow constraint—for doing things that are good value to the community. The original hurdle, I think, is a different constraint, as it were, which is: Is it a good idea? If we can establish that something is a good idea and represents good value to the community, we will go off and do it. So I think we should not sort of assume that we are operating in a capital rationed world. I think that would be a very unfortunate world to be in because the whole nature of a water authority is to be making long-term investments and you would value it. It requires you, of course, to justify those investments—you cannot just go off and do the first thing you think of—but it is very unfortunate if you get a capital constraint. The onus therefore, though, is that you have to be able to establish to the whole community that what you are doing represents value.

CHAIR: Unfortunately we are out of time. I think there are quite a few questions that Committee members have. With your agreement, we could ask questions on notice—

Mr EVANS: Absolutely.

CHAIR: In addition to the ones that have been taken on notice this morning.

Mr EVANS: Certainly.

CHAIR: I am wondering, with your agreement, if, in relation questions on notice that you have taken today, you could furnish the answers in a week. Are you comfortable with that?

Mr EVANS: That is okay.

CHAIR: We will get those further questions to within a week.

Mr EVANS: Great.

CHAIR: Similarly you will have a similar time to answer further questions.

Mr EVANS: Sure.

The Hon. PETER PRIMROSE: May I just say that when I asked my question, I know it was very large in relation pumping from east to west, et cetera, I asked if I could get a preliminary response, but I wonder if people could take on notice any additional comments that people may wish to make. I know it is a very big issue.

CHAIR: We appreciate that. We will take that into account. We very much appreciate your ongoing efforts to provide information to the Committee. I thank you very much for your attendance here today and look forward receiving those further answers.

(The witnesses withdrew)

(Short adjournment)

ELIZABETH CORBYN, Director General, Department of Environment and Conservation, 59-61 Goulburn Street, Sydney, affirmed and examined:

SAM HADDAD, Director General, Department of Planning, 23-33 Bridge Street, Sydney, sworn and examined:

CHAIR: Ms Corbyn, are you conversant with the terms of reference for this inquiry?

Ms CORBYN: Yes, I am.

CHAIR: If you should consider at any stage that evidence you may wish to give or documents you may wish to tender should be heard or seen only the Committee, the Committee will take that into consideration.

CHAIR: Mr Haddad, are you conversant with the terms of reference for this inquiry?

Mr HADDAD: Yes, I am.

CHAIR: Similarly, if you should asked at any stage that evidence should be given in camera, please request that of the Committee. Before we commence questioning, would either or both of you like to make a short statement on these matters?

Ms CORBYN: Yes.

CHAIR: That would be most appreciated.

Ms CORBYN: The Department of Environment and Conservation [DEC], which incorporates both the Environment Protection Authority [EPA] and the National Park and Wildlife Service, has an advisory and potentially a regulatory role for some projects relating to Sydney's sustainable water supply. The DEC has participated in the development and review of the Metropolitan Water Plan and we placed particular emphasis on the need for a multidimensional strategy, looking at both demand and supply side strategies. In particular we concentrated on promoting the importance of demand management, emphasising the need for recycling and providing technical expertise in the design of environmental flow regimes.

We are also an environmental regulator and will regulate any of the projects that require an EPA licence under schedule 1 of the Protection of the Environment Operations Act. This could potentially include an advance treatment plant for recycling in Western Sydney, depending on whether it would trigger the need for an EPA licence or not. Recycling at industrial sites that are already licensed by the EPA and the desalination plant, if it were to be built—noting that the Government has decided that it will not proceed to construct the desalination plant at this stage—DEC also has a role under the planning and assessment approval system for projects where we are the environmental regulator. The precise nature of that role varies, depending on the details of the project.

We work closely with the Department of Planning, both in providing advice on impacts of proposals and because of the linkage between planning consents and the EPA licences. In relation to the inquiry's terms of reference, I do not intend to spend much time going through the detail of the individual in terms of reference but, rather, will take questions. However, I would like to make some overview comments on those relating to particularly the desalination. DEC has provided input to the assessment of the environmental impacts of the desalination plant at Kurnell. Of course, the Government has announced that desalination is now a contingency measure, only to be considered in the event of extreme drought conditions. However, the DEC will continue to work with the Department of Planning on any matters associated with the completion of that assessment.

Given our licensing role, a key issue for us in the assessment has been water quality. For example, we have been concerned to make sure that the best approach is provided to reduce impacts from any discharge from a plant. We have asked that the proponent address detailed comments on water quality, and although we are not responsible for regulating greenhouse gases, we have also recommended that Sydney Water develop credible and secure offsets for energy usage of the plant,

which the Premier announced would be a commitment to 100 per cent renewable energy if the plant is built. And we have advised on the importance of considering any construction impacts on threatened species and Aboriginal cultural heritage and protection of all the nature reserves, national park and aquatic reserves in the vicinity of the proposal.

In relation to the measures for reducing the use of potable water, DEC strongly supports the need for demand management and reducing the use of potable water. We are involved at many different levels, from education programs to cleaner production programs, to developing new schemes such as the water efficiency labelling scheme, and are involved in the development of some of the recycling proposals. We were the lead agency for New South Wales at the national level in the development of the Water Efficiency Labelling and Standards Scheme [WELSS], which is now being implemented by the Department of Energy, Utilities and Sustainability in New South Wales. This scheme started on 1 July 2005 with a voluntary labelling scheme and is expected to save 13 gegalitres of water per year by 2015.

On cleaner production we have many examples of industry who have reduced their water consumption through participation in our cleaner production programs, with the added benefit of energy and waste reduction. As an example of that, Hawker de Havilland's involvement in our cleaner production program provided, all up, savings of about 5 million litres per month, a 50 per cent drop in water usage and savings of about \$80,000 per year to the company. On stormwater, we have a role on the Stormwater Trust in addition to preparing guidelines on stormwater harvesting and reuse. There are at least 10 harvesting and reuse projects funded to the amount of about \$3.8 million at the local government level, particularly across golf courses and parks and gardens, which give us some good practical experience on the ground. These projects saved about 95 million litres of water in 2004-05.

We are excited about the new Environmental Trust new Urban Sustainability Program, which is part of the city and country environmental restoration program which provides a logical transition to councils to progress strong water recycling and harvesting proposals, and we are working with the Sydney metropolitan CMA and councils on the transitional stormwater programs. On recycling we continue to be an advocate for recycling proposals because it not only provides potable water savings but it can also reduce the amount of pollutants discharged to waterways. DEC has a staff member on the interdepartmental committee that is progressing the development of recycling projects, and we also sit on an advisory committee on the water savings fund, which is also bringing forward some new projects. So I think there is some real momentum behind recycling now. That concludes my opening remarks.

CHAIR: Mr Haddad, did you want to make any opening remarks?

Mr HADDAD: Yes, thank you, Mr Chairman. There are three major roles undertaken by the Department of Planning, which are all relevant to the terms of reference of this inquiry. Firstly, the strategic planning function, and I am referring here to the metropolitan strategy for Sydney which was released by the Government in December 2005. The Metropolitan Water Plan is a major component of the metropolitan strategy. The water strategy comprises a range of both demand and supply side initiatives to deal with long-term pressures on the Sydney water supply and population growth for urban expansion.

The metropolitan strategy is a public document. It sets a series of targets and it also establishes sustainability criteria which we intend to use, particularly for new release areas. Of particular interest to the Committee is that the strategy introduces innovative integrated water and sewerage schemes with the provision of up to 80 billion litres of recycled water to new homes, farms and rivers targeted by 2029 through the Western Sydney Water Initiative. The second role of interest to the Committee's terms of reference is the integration of specific development standards. The Committee would be aware of the BASIX initiative, the Building and Sustainability Index, which mandates requirements for new houses, townhouses, villas and units; it obligates using 40 per cent less potable water and the generation of 25 per cent less greenhouse gases.

BASIX commenced in July 2004 and it will be extended to apply to large-scale alterations and additions by mid-2006. Over the next 10 years it is estimated that 300 billion litres of water will be saved across New South Wales, with the equivalent of about 140 billion litres in Sydney due to the application of BASIX. To date we have dealt with almost 20,000 certificates issued under the BASIX

initiative. It may be of particular interest to the Committee to know that BASIX also includes seven residential water recycling schemes in New South Wales.

The third role performed by the department of relevance to the Committee's terms of reference is that of environmental impact assessments and advice to the Minister for Planning and the Government, the Minister being the consent authority for major development and infrastructure projects. The proposed desalination plant for Sydney at Kurnell has been declared a major project of State significance under the relevant State policy on major projects. This project is being assessed by the department and will be determined by the Minister for Planning. The proposal is being assessed under part 3A of the Environmental Planning and Assessment Act and was declared "critical infrastructure" by the Minister in August 2005.

The declaration of the project as "critical infrastructure" was made on the basis that the project is essential to the economic, social and environmental benefit of the State. The declaration is available on the Department of Planning's web site. The fact that the project is of State significance in no way diminishes the obligations and requirements on the proponent to follow proper environmental assessment processes, including appropriate community consultation. There are statutory provisions and obligations for the department and the proponents to follow in that regard. The environmental assessment being undertaken is the equivalent, if not more in some cases, of that which applies for other major development and infrastructure projects.

Early in the process a planning focus meeting was held and the purpose of the planning focus meeting was to identify key environmental and amenity issues. The meeting involved participants from relevant government agencies, the Department of Environment and Conservation, the Department of Primary Industries, the Commonwealth Department of Environment and Heritage and Sutherland Shire Council. Key issues were identified as a result of that meeting. These requirements included considerations of greenhouse gas emissions, water quality, ecological impacts, terrestrial impacts, supply management and associated infrastructure, and national requirements under the Environmental Protection and Biodiversity Conservation Act. The environmental assessment requirements were issued by the director-general, and they also specified the need for Sydney Water to undertake a proper level of consultation with the local community, with key State and Commonwealth agencies, and with the relevant councils in the area. The environmental assessment requirements are also available on the department's web site and have been publicly available since.

The environmental assessment documentation was publicly exhibited. It was made widely available during the exhibition period. My advice is that the exhibition period lasted more than 70 days—and that is in excess of the 30-day statutory requirements. The project was exhibited at seven separate locations. It was made available for inspection and downloading on the department's web sites. A dedicated e-mail address was also created, and the proposal was twice advertised, I understand, on some 11 local and metropolitan media outlets. More than 1,200 property owners and occupiers were also directly notified by me, and invited to make submissions by the departments. I am advised also that Sydney Water undertook a separate community consultation program, both before and during the preparation of the environmental assessments, and during the exhibit period, with a variety of groups and agencies.

In response to the exhibition period, the department received about 760 public submissions. Ninety-one per cent of those submissions opposed the projects. Key issues raised included sustainable alternatives to the desalination plants, energy impacts, and impacts on aquatic and terrestrial ecology. Ten per cent of submissions raised concerns about the environmental assessment process itself for the projects and the lack of proper community consultation.

The Committee would be aware that the Minister has appointed an Independent Panel, chaired by Professor Prince, to ensure there is independent scrutiny of all submissions and of the issues raised in the submissions. The Independent Panel is progressing its work. The terms of reference of the Independent Panel are on the department's web site, and were widely advertised. The submissions received have also been forwarded to Sydney Water, to the Independent Panel, to the departments of Environment and Conservation and Primary Industries, and Sydney Water is currently preparing what we refer to as its preferred activity report, which will be made available to the public once we receive it. It is expected that this report from Sydney Water will address all issues raised in the submissions. As I said, the report will be made publicly available before the decision is made.

The Committee is aware that the Government has decided that the proposal will not be implemented unless dam levels fall below 30 per cent, and that the Premier has also announced the desalination plant will have its greenhouse gas offset 100 per cent by renewable energy. The department's assessment and advice to the Government will be governed by these policy statements. Thank you.

CHAIR: Thank you, Mr Haddad. Ms Corbyn, I would like to ask you a few questions. I have a number of concerns, which I might have expressed earlier at estimates committee hearings and such like. You mentioned that there was enthusiasm to reduce pollutants discharged to waterways by recycling programs. Is there any impediment to recycling programs by virtue of the fact that currently there are pollutants in the waste stream and effluent stream? In your experience, do trade waste agreements give industry the opportunity to still place toxic materials into the system? Does that create a difficulty, whereas at the present time it is a case of out of sight out of mind while it is being discharged into the ocean environment?

Ms CORBYN: Let me start by saying that we would always want to make sure that we understood what the characteristics were when looking at a recycling scheme. So we want to make sure, whether the concerns are about chemicals or nutrients for that matter, if there is going to be recycling, what the recycled product is going to be used for. So it would be a focus for us, in looking at any recycling scheme, to make sure that the recycling was appropriate, according to the conditions that any particular proposal might have.

I can start by saying that, on trade waste, just in general, we have in New South Wales, and particularly in relation to Sydney Water, probably one of the strongest and most controlled trade waste programs certainly that I have experienced. We have had significant experience of that over the years. It comes in two parts. I can certainly speak from the DPA perspective on our interactions with Sydney Water. Sydney Water has a very strong trade waste program, in part because of the licence conditions that the EPA places on Sydney Water. So it has a strong trade waste policy, which actually scrutinises very carefully what does come into the system. Over the years we have had experience of setting very tight licence conditions on Sydney Water regarding what might be discharged from the sewage treatment.

In particular, there were legislative requirements placed on Sydney Water to look at, I think, about 120 chemicals in respect of which we had previously had interactions with Sydney Water, making sure we required the right kind of information to understand what was happening from a chemicals and trade waste perspective. That led us in particular to a new approach to continue to deal with some of the discharges by way of what were called whole effluent toxicity limits. And so, only in the last couple of years, after about 10 years of experience with dealing with individual chemicals in particular, there was concern that there might be a sort of synergistic effect within the effluent. So we developed a program to regulate them on whole effluent toxicity, as it is called, which does look at the toxicity of the effluent for all of the things that might be in it. We set very tough licence limits on them, and we require them to monitor toxicity once a month, I think it is, and then they report to us through their annual returns. So it is a very focused program in general.

But, all that having been said, we would always, in any recycling program, want to make sure that the end use for that recycled water is appropriate. We have had separate discussions about recycled water to supplement environmental flows in the Hawkesbury-Nepean. In particular, our concern would be nutrients, and making sure that nutrient levels would not exacerbate any issues in the Hawkesbury-Nepean. One of the recycling projects being looked at now has, as a consideration, an advanced treatment plant in addition to the existing STPs, to make sure that the nutrient levels would not exacerbate problems in the Hawkesbury-Nepean. So you would certainly need to look at each proposal and each project on its merits.

CHAIR: I have already asked the Director of Sydney Water about quantities of certain materials—such as mercury, lead, chlorinated hydrocarbons, arsenic, cadmium and cyanide—in the system. Would your department, through the EPA, monitor specific amounts of those materials, if indeed they are going into the system, or is that the question that I or the Committee would better direct to Sydney Water?

Ms CORBYN: It is better to ask Sydney Water about materials going into the system. They also then do toxicity testing for what might be coming out of the system as well. I know that our people have looked previously, probably about a year ago, at some issues to do with mercury. The mercury levels were at undetectable or almost undetectable levels. So they were not levels of concern. Sydney Water has the data on what goes into its system. But it is truly a very strong trade waste program that Sydney Water has. From our interactions with them, they are no-nonsense in dealing with the people who might be discharging things into their system that would affect their interaction with us as the regulator for what comes out of their system.

CHAIR: So, from your perspective, Ms Corbyn, would it be reasonable to say, in respect of that the effluent flowing from major Sydney outfalls, there is no impediment, you would expect, to the reuse and recycling at the present time in terms of the quality of the effluent?

Ms CORBYN: Again, it depends on what it is.

CHAIR: In terms of toxic substances and chemicals, rather than nutrients in the outflow.

Ms CORBYN: As I said, it depends on what the actual analysis says. We have assessed it in terms of the impact of discharge to the ocean, and that is the only thing I could really comment on at this point. But they have a very strong program, which would prevent things from getting in that would affect their licence conditions. But the licences are geared now for an ocean discharge, rather than reuse, so you would need to look at that issue according to what the use would be.

CHAIR: I understand if those types of waste materials are taken out of Sydney Water systems they actually go to the Lidcombe liquid waste plant. Is your organisation, which has oversight of such an important processing plant, able either now or on notice to give the Committee any assessment or details of the amount of waste that is actually released from the Lidcombe liquid waste plant into the sewerage system?

Ms CORBYN: I could certainly give you information that we would have about what our licence conditions would be for the Lidcombe plant. I would have to take the question on notice, because I do not have that information off the top of my head.

The Hon. RICK COLLESS: Ms Corbyn, am I correct in saying that Sydney Water holds a licence to discharge?

Ms CORBYN: They have many licences, yes.

The Hon. RICK COLLESS: They do have many licences, and that was going to be the basis of my next question.

Ms CORBYN: Each sewage treatment plant would have a licence.

The Hon. RICK COLLESS: So it is not a singular licence; it is on a plant basis?

Ms CORBYN: Sydney Water has 27 systems. I might not have that number right. We not only license them for discharges from their sewage treatment plant, but we also have controls over their reticulation system as well, and sewer overflows.

The Hon. RICK COLLESS: Do any other water authorities hold licences to discharge primary-treated sewage into ocean outfalls?

Ms CORBYN: I do not know the answer to that question. I suspect that there are others. Do you mean in New South Wales?

The Hon. RICK COLLESS: I am referring to authorities in New South Wales.

Ms CORBYN: I am sorry, but I will have to take that question on notice. Not that I am aware of, but I would need to check that. I do not know all the licence conditions for every sewage treatment plant on the coast.

The Hon. RICK COLLESS: Why is it then that Sydney Water can still do that?

Ms CORBYN: Well, we have had a very strong program associated with Sydney Water's ocean plants. We license according to environmental conditions and controls, and we have had in place an environmental monitoring program to assess whether there were any environmental impacts associated with the ocean plants. That is a quite extensive program, and the results of it showed that the environmental impacts were within the bounds that we would have expected and were not of concern. There always has to be a setting of priorities about where you want to have upgrades in particular, and so we focus our attention in particular on the inland plants, where there are much more sensitive receiving waters.

The Hon. RICK COLLESS: If the environmental impacts of ocean outfalls were within bounds that you are comfortable with, why would you be approving ocean outfalls for other coastal centres?

Ms CORBYN: Why would we?

The Hon. RICK COLLESS: Why wouldn't you?

Ms CORBYN: There are ocean outfalls at other centres.

The Hon. RICK COLLESS: Are you able to tell me where those are?

Ms CORBYN: Up and down the coast there are a range of treatment plants that discharge to the ocean.

The Hon. RICK COLLESS: Primary effluent?

Ms CORBYN: As I say, I would have to check, because I do not know the detail of every treatment plant. We have had a study of the ocean outfalls for every sewage treatment plant up and down the coast. Again, we look at the environmental outcomes, and we assess it on the conditions for the circumstances of each particular plant. We have had more extensive analysis of Sydney Water's ocean outfalls than those of any other system. I am going by memory now, but I think it was a five- or ten-year program called the EMP—environmental monitoring program—for Sydney's ocean outfalls, and it demonstrates that there was not a significant concern. We want to ensure we have the upgrade programs progressed on a priority basis where there are issues of greater concern. Our emphasis has been on ensuring that we had upgrade of sewerage treatment plants for the Hawkesbury-Nepean, the mountains and some of those much more sensitive areas.

The Hon. RICK COLLESS: When the approval was given for some of the other coastal outfalls was it a condition that they had to be treated to a secondary or tertiary level?

Ms CORBYN: I cannot answer that from memory. Ocean outfalls are obviously controversial and numerous communities do not want them. So there is a very extensive public consultation process for proposals from the north coast all the way down to the south coast.

The Hon. RICK COLLESS: There appears to be an inconsistency between other communities and Sydney, whereby Sydney has approval to continue its ocean outfall of primary-treated sewage, yet any other community has to go to a much higher level.

Ms CORBYN: As I said, we look at the environmental outcome. We do not set a proscribed technology approach as a one-size-fits-all system. It is not appropriate to do that. We need to look at the circumstance of each individual case.

The Hon. RICK COLLESS: How much does Sydney Water pay you for the right to dump through ocean outfalls?

Ms CORBYN: We have licence fees. Is that what you mean?

The Hon. RICK COLLESS: Yes.

Ms CORBYN: They go into consolidated revenue; we do not keep that revenue.

The Hon. RICK COLLESS: What fees do you levy?

Ms CORBYN: I do not know the exact amount. I will have to take that question on notice. But I reinforce that the money does not come to us.

The Hon. RICK COLLESS: I understand that. Does the department want the current regime of ocean outfalls for Sydney Water to continue, or would you prefer to see the level of those discharges reduced?

Ms CORBYN: We look at opportunities for recycling from their plants. Again, we would come back to pursuing an approach from an environmental perspective. If there is not an impact, we would want Sydney Water to upgrade plants that might have more significant impacts than traditionally has occurred on the inland rivers. We have not pushed Sydney Water to upgrade its plants on the ocean because of our priorities with regard to other treatment plants and also because of the significant work done under the environmental monitoring program. We would like it to recycle more. We have participated in some discussions with Sydney Water about opportunities for sewer mining to ensure we get appropriate access to opportunities to use the sewerage system from a recycling perspective. We have pursued it on that.

The Hon. RICK COLLESS: Mr Haddad, you mentioned in your opening address that the Department of Planning has a strategic planning function. Were you aware that a 500-megalitre-a-day plant was going to be announced in July last year?

Mr HADDAD: I cannot remember whether we were aware, but we participated earlier in the formulation of the water plan.

The Hon. RICK COLLESS: Was that before July last year?

Mr HADDAD: It was before July, from memory. That was one of the very early strategic documents being formulated, and then the outcome was incorporated as part of the Sydney Metropolitan Plan.

The Hon. RICK COLLESS: It appears to me that it is not very strategic, or there is a distinct lack of strategic planning, if a \$1.3 billion major infrastructure project such as a water desalination plant to produce to 500 megalitres of water a day was announced by the Premier but the Department of Planning did not have a strategic planning role.

Mr HADDAD: As I said, we participated in the formulation of the water plan, which looked at various options to supply water strategically.

The Hon. RICK COLLESS: Was the desalination plant included in that?

Mr HADDAD: Yes, it was one of the options being considered. It was not the only option; a number of options were being considered and they all formed part of the plan.

The Hon. RICK COLLESS: Did you recommend that the desalination plant be classified as a critical infrastructure project?

Mr HADDAD: Yes. Under part 3(8), which is the legislative scheme, there are provisions for certain projects to be declared critical infrastructure. This is the only project that has been declared as critical infrastructure, and the process adopted requires Sydney Water to put up a case.

The Hon. RICK COLLESS: When did you make that recommendation, was it after it was announced or before?

Mr HADDAD: It was after it was hinted that a plant was to be considered; that is, a project must be put forward and it would be considered early on. That is the normal process. Before any project is declared a major project it must be either announced or put forward publicly. There was nothing unusual in terms of the process of declaring it after or at any other stage. I also note that the Act provides for the declaration to be made at any time during the assessment of major projects.

The Hon. RICK COLLESS: Now that it has been "shelved"—and I use that term in inverted commas—can we assume that the critical infrastructure classification has been removed so that it can go through a proper environmental assessment process?

Mr HADDAD: The critical infrastructure status still applies; it has not been removed and the assessment is ongoing on that basis. The critical infrastructure status does not substantially affect the statutory nor the project's policy assessment requirements. It does not mean that because it is critical infrastructure that there is no environmental assessment process, including exhibitions and consultations. There is no difference in the assessment process for a critical infrastructure project and other major projects. The major difference is that critical infrastructure projects do not attract appeals after the Minister has made the decision. Notwithstanding that, when a Minister constitutes a panel before a decision is made for any project there is no right of appeal after the decision is made. I am trying to highlight that process-wise it is very similar to any other project in terms of its being critical infrastructure.

The Hon. RICK COLLESS: I find it strange that while overseas the Premier announced a project of this enormity—\$1.3 billion—apparently without any previous processes being put in place in terms of community consultation. The community certainly did not know anything about it and there was very little pre-evaluation or strategic planning process.

The Hon. HENRY TSANG: What is the question?

The Hon. RICK COLLESS: Did the Minister discuss the desalination plant project with you prior to the Premier's announcement in July last year?

Mr HADDAD: No.

The Hon. RICK COLLESS: Thank you.

Ms SYLVIA HALE: Mr Haddad, you said that the desalination proposal was first determined to be a major project of State significance and then that it went on to be deemed critical infrastructure. The essential difference is that being deemed critical infrastructure removes it from the appeals process. What were the criteria used to determine that it was a major development?

Mr HADDAD: There is a state environmental planning policy on major projects that lists a range of projects and various criteria. Any of those projects automatically becomes a significant development. There are criteria. In the case of desalination, there is a clause in the policy stating that a desalination plant with a capital investment of more than \$10 million, I think, is a significant development. So there is automatically no discretion on my part or the Minister's part for it to become a major project under the policy.

Ms SYLVIA HALE: Given that you have suggested that the assessment process was essentially the same, what was the factor that tipped it over to becoming a piece of critical infrastructure and rather than its simply remaining a major project?

Mr HADDAD: Because it had been classified and a judgment made on the basis of a submission that it was an essential piece of infrastructure for the social, economic and environmental wellbeing of the State.

Ms SYLVIA HALE: Who made that judgment?

Mr HADDAD: The judgment is made by the Minister for Planning upon recommendation from the department.

Ms SYLVIA HALE: So the department made that judgment about—

Mr HADDAD: We made a recommendation by way of an analysis against established criteria. As I said, the declaration is on the web site.

Ms SYLVIA HALE: Is the analysis there as well?

Mr HADDAD: I would have to check that.

Ms SYLVIA HALE: Can you make available to the committee the basis for that recommendation?

Mr HADDAD: Yes.

Ms SYLVIA HALE: Was the department consulted when it came to determining that Kurnell was the best site for the plant?

Mr HADDAD: No, the department was not consulted. Perhaps I can clarify this. I am not saying that that is the right or the wrong approach; I am reflecting the practice. When a project is proposed, there is a lot of consultation, site evaluation and so on before it is put forward. Most of the consultation and analysis is undertaken after that. So, the fact that a desalination plant appears as a broad proposal at Kurnell is not necessarily unusual compared to a lot of other projects, whereby people make a determination and propose something somewhere and then they come as proponents for to us evaluate it. There is not usually extensive consultation before assessment. The obligation is on us and others to do the evaluation after that. That is where the trigger comes.

Ms SYLVIA HALE: You have said that this was a piece of infrastructure that was critical to the State and that planning for it was very important in terms of expenditure and presumably a range of environmental and other impacts. Surely it would have been desirable to consult the Department of Planning about the proposal, and specifically about the location of that proposal, before any announcement was made? If not, is that not putting the cart before the horse and then scrabbling for justification?

Mr HADDAD: Basically, the justification is simply undertaken. There was a strategic overview about the number of supply sources and all the rest of it. That went to a committee, it went to Cabinet, there was a decision by government that this is one of the alternatives that has to be done and then the sites mooted and then, as I said, critical infrastructure which lifted the status of the project to something important. There is still the test of environmental merit assessment and all the rest of it, but, yes, the fact that it has been nominated as critical infrastructure, it does say that it is an important infrastructure and that a decision has been made by government as to its proceeding to that stage of its estimates.

Ms SYLVIA HALE: In the environmental assessment the Government gave a commitment to 50 per cent of the energy required for the plant being from renewable sources.

Mr HADDAD: Yes.

Ms SYLVIA HALE: It then has subsequently said that 100 per cent will be from renewable sources. In view of that subsequent announcement would you be making it a condition of approval of the project?

Mr HADDAD: The answer to that is that there are two stages. We are expecting when Sydney Water will come forward with what we call their preferred activity reports, which as I said would be made public. They will tell us how they will meet this 100 per cent offsetting, and then there will be an assessment with other government agencies. If we are satisfied, then the answer to that is yes. If the project is recommended for approval and approval is granted, then obviously we will have to lock in some of their critical key elements of impacts, and energy and greenhouse are obviously key elements so I expect them to appear somewhere as part of the conditions.

Ms SYLVIA HALE: To ensure that the renewable source of energy that is required, the 100 per cent commitment, is not just obtained by draining the rest of the system from it, will you be putting in place requirements that that renewable energy be generated specifically for the site, for example, requiring a wind farm to be established next to, co-located with, the desalination plant?

Mr HADDAD: I will have to be satisfied, before making a recommendation, that this 100 per cent offsetting can be delivered in broad terms. There must be enough certainty, adequate certainty, to be able to progress to that stage. Then to go through the details, that is, the details of saying it will come from a windmill located at X, this is something that will depend on the circumstances but I have to be reasonably satisfied that the number of these options that are there are practically and realistically available and then being able to put conditions so that they occur at certain times before certain other events happen.

CHAIR: Does it not seem a little absurd that we have this infrastructure being put in if there is an emergency, and given that we do not have anywhere near the production through renewable to facilitate a full-scale desalination plant, if an emergency comes about and the plant is needed, then this is empty rhetoric on the part of the Premier and Ministers? It means nothing. We will have to have a critical emergency piece of infrastructure. Will it then wait for renewable energy to facilitate it? I do not quite see the logic.

Mr HADDAD: I do not know all this stuff that is there, but I suppose one of the reasons why we are progressing the assessment as you are doing now so that we can resolve and clarify all these items and we can provide, if it is an approval, enough certainty that these things will happen in enough time so that before they put the plant in time all these things will have been clarified.

CHAIR: What will you say if the water runs out, the desalination plant is needed and there is not sufficient renewable energy source? What will you do?

Mr HADDAD: As I said, that will have to be provided as part of the conditions and they will have to comply with the conditions. Basically that will have to say that these are the things and a judgement will have to be made as to whether these offsetting activities, facilities, whatever it is, are available and are available within certain times. This is part of the assessment. So maybe we can judge when the assessment report is out. It is an issue that obviously we will have to look at.

Ms SYLVIA HALE: How much of the assessment will be affected by the fact that the Government has already purchased the site?

Mr HADDAD: I am not sure about the purchasing of the site as being a major component. I think what is more important is that the Government has said that this is part of a mix of facilities and stuff that is available. They said that there is a decision and our job now is to make sure that it can pass all sorts of other environmental and amenity tests within the context of this government decision. I am not sure that the purchasing of the site—I mean, there are a lot of developers who purchase sites and proposals and they do not get their approvals. So I do not think this is the key determinate—probably more important is the fact that it is part of a strategy. That is probably more important than the site, in my submission.

The Hon. HENRY TSANG: In announcing the desalination plant, as was mentioned before, during a prolonged drought period the plant will be powered by using 100 per cent renewable energy. Does the planning for the plant also address local environmental impacts?

Ms CORBYN: Yes. Certainly, the assessment process we are going through, they have to do detailed assessment processes about construction impacts. They had to look at issues associated with threatened species that might be on the site. They have to look at issues associated with Aboriginal cultural heritage. They have to deal with any proposals, for example, if there is going to be a discharge in a local area, what are the constituents of that discharge and whether there will be any impacts or not. As I said, we have made a submission to ensure that the assessment process deals appropriately and effectively with a range of issues, and that will be progressed through that assessment process but all the local issues will clearly have to be dealt with through the assessment process.

The Hon. HENRY TSANG: So it is still in progress.

Ms CORBYN: Yes, that is right.

The Hon. HENRY TSANG: You cannot assume it is an automatic approval because it is a critical project. If the environmental impact is such that it is not positive, your department could then recommend a refusal.

Ms CORBYN: The approval coming through the Department of Planning but we certainly work with them and provide advice on any of the issues that we have expertise or have a regulatory role in to make sure that the assessment has covered all the issues at a local level as well.

The Hon. HENRY TSANG: This Committee is not really aware of the process. Can you perhaps tell the Committee how community participation has been enhanced during the statutory planning process for the desalination plant? The critical one is about the process. How did you communicate with the community about what is happening?

Mr HADDAD: Basically, the community consultation process, as I said in my opening statement, was in a sense and still is equivalent and in some cases even more than what has happened with other projects in that there is a requirement first for the issuing of what we call Director General requirements which impose obligations on the proponent, Sydney Water, to go and consult with the community during the preparation of this environmental impact statement, which they have to follow. I am advised that they have. There is evidence that everybody may have a different view on that but that is part of our assessment, to what extent they have or not. Then there is a statutory obligation on us to make available all this documentation publicly through public advertising, and I am informed that we have done that twice through 11 media outlets and we have notified by letters about 1,200 people and there were a number of community meetings and all the rest.

I fully appreciate that all that is in the context of community. You were saying, why not alternatives and all the rest of it, and I fully respect that. But this is basically a consultation in relation to this proposal which has been put forward and letting people know what it is, where it is, what are the environmental impacts and all the rest of it. These are statutory requirements which are specified in the legislation. There are other practices that are being used, and I am advised that Sydney Water has followed those practices through a number of community consultation processes and all the rest of it. In terms of certain practices, we are now obliged to make all our environmental requirements, our Director General requirements, publicly available. We put them on our web site. We make them available to people. We are also obliged to make available publicly the proponent's response to the issues raised in the submissions.

When people have raised all those submissions and highlighted what they are, the response of Sydney Water will have to be made publicly available and what they have done about it or not. That is a practice that we did not have before in all cases. Then there is the panel, which is overseeing everybody. People have different views, whether they are doing it this or that but there is this independent, we will submit, mechanism that has been put to make sure that not only the submissions are being answered but our own assessments have taken into account the issues raised in the submissions. That is the regime we have been following to try to do our best to involve the community.

As I said before, we usually do not, very rarely that we go before the project is approved and do a lot of consultation around. There have been very few cases, from my experience of what we do. We do these things, that is, we go out and say we are thinking of a desalination plant, want to put it somewhere in New South Wales and all the rest of it, what does the community think about it? Whether that is right or wrong, I do not know. I am just saying that that is the practice. So there is nothing unusual in that process.

The Hon. HENRY TSANG: So the lead time for a project of this size could be a couple of years.

Mr HADDAD: Yes, it could be. I know that people talk about the time as the main determinate. We are always having different views; we should do it. We try to do it as efficiently but

credibly as well, and we rely on input from other agencies and whether it takes those but there is usually a lead time for it. It could be two years, it could be less, depending on the circumstances.

Ms SYLVIA HALE: So you do not expect to assess something in the 40 days that you expect councils to assess any development application.

Mr HADDAD: With major developments, it depends, as I said—the criteria should be to try just to be efficient in terms of resolving some of the key issues. Then if there are difficulties, they have to be addressed.

The Hon. GREG DONNELLY: Can you elaborate a little about stormwater harvesting, because a number of witnesses have spoken to us about it? Secondly, in relation to that, is stormwater harvesting likely to impact on the quality of local waterways?

Ms CORBYN: As I said, we have had some good progress in trying to look at stormwater. Initially our focus was looking at stormwater quality and that certainly has an impact on local waterways. We have made some real progress over the last eight years in getting stormwater cleaned up and programs in place to prevent litter from getting into the stormwater, et cetera. On stormwater harvesting itself, the Stormwater Trust Program, which was about an \$82 million Government program to get stormwater both from a quality and quantity perspective, gave us a good platform for understanding better some of the challenges in progressing stormwater harvesting. As I mentioned, we have done a document called "Managing Urban Stormwater: Harvesting and Reuse", which is to try to help local councils and looking at their programs. That is based on experience that we had overtime with those 10 projects that I mentioned. It is quite challenging to get a good system of stormwater harvesting in place in part because you need a larger storage capacity, and that presents a significant challenge at times.

If you are going to do it in the quantities it presents some challenges in understanding where those storage capacities might be and how you might manage them. The stormwater trust gave us much more than practical experience about how you might progress, particularly with local councils getting stormwater harvesting programs that work and are practical up and running, and overcome some of those challenges about the infrastructure that has to go around it. In particular, stormwater programs need to look at both the harvesting and the quality side because with some less run-off you may get these pollutants going into some of the local creeks or rivers. At the same time you need to make sure that you have adequate flow in those rivers. There is a real balancing act that needs to happen. There are real positives that can come from stormwater harvesting projects in reducing pollutants, but we need to make sure that we understand that balance.

The Hon. GREG DONNELLY: My next question is to Mr Haddad. Yesterday we had the opportunity to have a good look around the Sydney Olympic precinct. We had a very thorough briefing by people there. I was impressed with what can be achieved when you start with a blank sheet of paper and the appropriate legislative framework and you integrate planning with recycling and reuse. What are your thoughts on that sort of model? We understand that it had significant public support and money. How could that model be replicated in various forms to achieve results in the greater Sydney metropolitan area?

Mr HADDAD: I am happy to provide the Committee with more information on this. I do not have all of it. We are now working specifically on water recycling initiatives in Western Sydney as part of our growth centre—the north-west and south-west centre. Our State environmental planning policy, which is just off exhibition, provides specific requirements for recycling and other issues. There are quite a number of innovative mechanisms and requirements that, in a sense, build on what is happening at the Olympic precinct. I am more than happy to provide the Committee with more of these details. We are working seriously on it for some of our release areas. We have a program for about eight other areas, including the re-use water scheme around Rouse Hill, which is working quite well. Wherever possible we are trying to challenge some of these opportunities. It is always easier and you can be more amenable when you start with a greenfields site. We are quite serious about our sustainability criteria, which is part of our metropolitan strategy. We are working with a lot of other government agencies and mandating them to evaluate any new release areas so that we will see more and more self-contained and recycling schemes that, hopefully, will fit into the overall scheme in the metropolitan area.

Ms CORBYN: One of the things that has been significant is to get demonstration projects up and running so that you can see how they work. The Olympic site in particular was a real positive charge to people in understanding how you can get that integrated solution. Certainly out in Western Sydney, where we had some real opportunities with greenfields sites, we also had some significant programs. We have one at South Creek, which is a polluted Creek, but we have a trading scheme that has been looking at how market gardeners might get reductions in their pollutant loads, but also reuse. We have made some real progress in taking some smaller steps. The stormwater trust has done similarly with some councils, golf courses and other areas. That combined experience, along with places like the Olympic precinct, which shows how you can integrate it as a whole, has given us a completely different picture of what can be achieved, and it gives a real positive step forward. You can go to developers and others and say, "This is not pie in the sky. This is something that can be done on the ground." That is why I think the momentum really has built for some of those integrated programs.

CHAIR: Earlier you mentioned looking at threatened species assessment as part of the process. Given that the EA did not include detailed surveys for threatened species beyond the plant site, does the DEC consider that the assessment complies with the DEC's guidelines with threatened species assessment? Does the DEC consider the level of assessment for threatened species on the plant site sufficient to make an informed assessment?

Ms CORBYN: We have asked to make sure that there is sufficient information. Generally we have quite good information on the site from a range of different work that has been done, but certainly we raised with Sydney Water the need to make sure that the configurations that might come forward ensured that we avoided biodiversity loss. They have some capacity to do that.

CHAIR: But that would not include saline plume or the intake area?

Ms CORBYN: There has been quite a bit of work done not only for the pilot plants but also for the full-scale plants so that people have a much better understanding of not only what is there but what might be affected as well. We have kept it on the agenda to make sure that we have sufficient information to be able to assess that.

CHAIR: Was the DEC consulted as to the adequacy of the EA between the period of lodgement with the DOP on 18 November 2005 and 24 November 2005 when the EA went on public exhibition?

Ms CORBYN: Not that I am aware of. I think we have gone through a very standard process, if I can use that word. We were aware of, and certainly were consulted about, the pilot plant process. We knew the issues that are coming up for the pilot plant and we had an opportunity to identify the main categories of issues that we wanted to make sure of because they are very broad. As I said, they cover cultural heritage through to threatened species through to noise and water quality issues, et cetera. I do not have all the exact dates, but if you are asking were we consulted on the adequacy of the assessment before, I will need to come back to you specifically on that.

CHAIR: Yes, if you could take that on notice?

Ms CORBYN: Yes, I am happy to do that. I know that we have been providing comments into the Department of Planning about our evaluation of the assessments through the standard process. We have provided comments in and we have asked for some improvements in some areas.

CHAIR: Back to the overall ocean outfalls, I understand that your department relies on Sydney Water self-reporting under licence conditions on the condition of materials in the effluent.

Ms CORBYN: We would not do that in an ongoing way once we have sufficient information, but we had a very extensive and ongoing monitoring program, the EMP program.

CHAIR: That was from the beginning of the extent of the outfall program for several years, was it?

Ms CORBYN: I am sorry, it was either five or 10 years. I cannot remember it because it went on for many years. I know that. Then we would ask Sydney Water to report. We have the capacity to do audits if we think that there is a need to do that, but we have a regulatory program that requires licensees to report to us.

CHAIR: Post augmentation of the ocean outfall extensions and the impact on the sewage field of the extensions, that would have happened for a number of years. Would that have included any research or assessment of the bioaccumulation of toxic materials in fish and marine organisms?

Ms CORBYN: I will need to come back to you with some of the detail, but I am pretty sure it did.

CHAIR: I would be very interested to know whether that is continuing, who is doing it and the method of reporting.

Ms CORBYN: I know that we have stopped the Environmental Monitoring Program, but the results were such that that was appropriate to do. We did not need to continue to monitor. I will have to come back to you with what is incorporated into the EMP.

The Hon. RICK COLLESS: A general question for both of you. Can you tell us whether it is a whole of government policy that the Government speaks in billions of leaders rather than gegalitres?

Ms CORBYN: I do not know that there is a policy. What we have, certainly from the bureaucratic perspective, is consistent terminology and not flip flopping between the two. It is a habit that technical people have been using terminology with which they are most familiar.

The Hon. RICK COLLESS: But is not gegalitres the international standard for large amounts of water?

Ms CORBYN: I think it is a communication process about what people understand. You can use billions of litres, you can use megalitres or you can use gegalitres and they all come in with a different perspective. Sometimes we talk about megalitres a day, which is very different to billions of litres or gegalitres a year. People get confused by the process. Our approach from the bureaucratic perspective across the whole of government has been to try to use a consistent term.

Ms SYLVIA HALE: Am I to understand that Sydney Water has a licence for all its ocean outfalls?

Ms CORBYN: Yes, separate licences.

Ms SYLVIA HALE: There would be a licence for the ocean outfall that covers the Diamond Bay, Rose Bay, Vacluse peninsular and that ocean outfall discharges raw, untreated sewage into the ocean. How long is that licence to run or how long will Sydney Water be permitted to discharge raw sewage?

Ms CORBYN: It has been a concern to us for many years and, again, I come back to my earlier comments. We have had to try to set some priorities on where the impact might be, where there might be environmental concerns of high priority or public exposure. We have had discussions with Sydney Water about the appropriate time frame for upgrading Diamond Bay. It is frustrating to us. That said, it is at a cliff face where there is no public exposure, and from an environmental perspective it is not as high a concern to us as some of the other discharges where there needed to be upgrades of sewage treatment systems, whether it be from the Illawarra or the Hawkesbury-Nepean. I cannot give you a time frame, but it is on our agenda and we want to see it upgraded. But it is not as high a priority as some of the other treatment plants.

Ms SYLVIA HALE: An of out of sight, out of mind approach?

Ms CORBYN: No. It is not, in our perspective. We have had very heated discussions with Sydney Water about getting the appropriate timeframes from a regulatory perspective. I would have to

say that it does not have the public exposure or environmental impacts of some of the other sewage treatment plants that we would prefer that they spend their money on in the short term, but it is on our agenda.

Ms SYLVIA HALE: But you are aware that there were moves to upgrade it dating from the late 1980s, and in 1993 I think, approval was issued to proceed with the preferred upgrade scheme. Sydney Water's web site says, "Although Sydney Water received approval to proceed with its preferred scheme, a change in funding priorities resulted in the project being deferred." It is now 2006 and the project has been deferred from 1993. What change in priorities could be so great as to suggest that raw sewage being discharged is of no immediate concern?

Ms CORBYN: There were quite significant environmental assessments done in the Blue Mountains and in the Hawkesbury-Nepean river system that showed environmental concerns that were very significant priority, and they were not the same level of environmental impacts as came out of Diamond Bay. Similarly, we have the Illawarra sewage strategy and there are people exposures as well as environmental impacts of there. It is a challenge and I would be remiss if I did not say that we were frustrated as well. However, it is absolutely the case from our perspective that we would like to see those issues with higher environmental impacts and public exposure to be dealt with first. That is why we have made that a lower priority for upgrade than some of the others.

Ms SYLVIA HALE: Does your department have the power to withdraw a licence should Sydney Water continue to fail to treat the sewage, at the absolute minimum?

Ms CORBYN: We do have the power to revoke a licence.

Ms SYLVIA HALE: Have you ever done so?

Ms CORBYN: Yes. Not for Sydney Water, but we have for other places. However, there are also our appeal provision and you cannot just revoke it willy-nilly. Because it is an existing part of the system I do not believe that it would be something that we would do. We need to actually get a solution to the problem; not just cause a bureaucratic response.

Ms SYLVIA HALE: Mr Haddad. Approval was given in 1993 for the upgrade and whatever, presumably that approval would since have lapsed into the efflux of time?

Mr HADDAD: Not necessarily. I will just have to check because presumably that approval was given under what we call part five, which is a public authority. I am not sure there are lapsing provisions for public authorities as there are for the private sector. I will double-check on that if you want.

CHAIR: On that point, Ms Corbyn, in terms of primary treated sewage going out from our ocean outfalls, does the Environment Protection authority have a limit on suspended solids? My understanding would be that if it is over 60 per cent suspended solids you really would consider that to be third-world standard of treatment.

Ms CORBYN: I will have to take that question on notice. I did not come with all the details of the sewage treatment. If you have asked me five years ago I probably could have told you the answer to that, but we do have a suspended solids limit on most of the sewage treatment plants. Where we do start truly is from an environmental outcome perspective, and on the ocean outfalls we looked at those impacts. We do not necessarily say everyone has to have a standard level of treatment. We do not say everyone has to be tertiary, everyone has to be secondary or everyone can be primary. We actually look at the circumstances that we base according to the environmental outcomes, and priorities as well.

We have had discussions about whether we would require Sydney Water to upgrade their primary treatment plants—they are actually about primary treatment, but that is a technicality. The question is, and many community groups raised this, that in the face of not having a significant environmental impact, if you require them to spend the hundreds of millions of dollars needed to actually force them to a standard treatment technology, you have locked them into ocean discharge forever because of the money that they have spent. The community quite legitimately raised concerns

with us as well about whether that was a good outcome, particularly in light of the push that we have been having to get people to reuse effluent. If you push them to a standard technology process in the face of no significant environmental improvement that is needed in the receiving environment, then you have entrenched an ocean outfall process that is not necessarily really where at we wanted to go.

CHAIR: We are out of time. I thank you both your attendance. Some questions have been taken on notice and the Committee secretariat will provide those to you. There may also be some additional questions in writing from the Committee. After you have received those a week would probably be a reasonable time in which to deal with them.

Mr HADDAD: Certainly.

(The witnesses withdrew)

(Luncheon adjournment)

ANNETTE LEE HOGAN, Member, Combined Community Groups of Sutherland Shire Concerned with Water-saving in Greater Sydney, 1 Superba Avenue, Cronulla, 2232, and

ROBERT DANIEL WALSH, Convenor, Combined Community Groups of Sutherland Shire Concerned with Water-saving in Greater Sydney, P. O. Box 589, Sutherland, 2232, and

KLAAS BOES, Representative, Kurnell Progress and Precinct Association Incorporated, 150 Prince Charles Parade, Kurnell, 2231, affirmed and examined:

CHAIR: Mrs Hogan, are you conversant with the terms of reference for this inquiry?

Mrs HOGAN: Yes.

CHAIR: If you should consider at any stage that evidence you may wish to give or documents you may wish to tender should be seen or heard only the Committee, please indicate that and the Committee will consider your request.

Mrs HOGAN: Yes.

CHAIR: Mrs Hogan and Mr Walshe, if you wish your addresses to be deleted from the public transcript, please let the Committee know. Mr Walshe, are you conversant with the terms of reference for this inquiry?

Mr WALSH: Yes.

CHAIR: Mr Walshe, if you should consider at any stage that evidence you may wish to give or documents you may wish to tender should be seen or heard only the Committee, please indicate that and the Committee will consider your request. Mr Boes, if you wish to have your address deleted from the public transcript, please let us know.

Mr BOES: I have no objection.

CHAIR: Are you conversant with the terms of reference for this inquiry?

Mr BOES: Yes, sir.

CHAIR: If you should consider at any stage that evidence you may wish to give or documents you may wish to tender should be seen or heard only the Committee, please indicate that and the Committee will consider your request.

Mr BOES: Thank you.

CHAIR: Before the Committee proceeds with asking questions of any of you or all of you, would any or each of you wish to make a short opening statement?

Mr WALSH: Yes, Mr Chairman. We are an alliance of 11 community organisations of the shire that are most involved with the historic Kurnell Peninsula. As such, we are recognised by the Sutherland council. Sutherland shire, with it is 220,000 residents, is the second largest of New South Wales's 170 local government areas, that is, numerically. We commend to the attention of the Committee the 10-page written statement we have made, and I would like to make some comments about issues and highlights from that. At any point, Mr chairman, we would be happy to get questions.

CHAIR: Could I suggest that you briefly go through the comments? The more time for questions, the better it will be for the Committee.

Mr WALSH: Yes, okay.

CHAIR: If you want to raise some issues, please feel free to go ahead, and there will be ample time for questions.

Mr WALSH: Yes I will make a few points. Mr Chairman, we see this upper House inquiry as significant because it can be of first rate importance in the mission to guarantee Sydney a drought-proof water supply. We regard it as a mission. We have noted with regret that since the Premier's 8 February shelving of the desalination project, there has been a drop in public interest, in water-saving campaign spirit. You might say it has given way to relative complacency. So we hope this inquiry's report will be at once hard hitting and enthusiastic and that it will resurrect public determination.

I might say that we have a second reason for wanting the inquiry's recommendations to spark big water-saving initiatives throughout Sydney because that is the best hope we have of ensuring that this shelved and barely begun plant will never be resurrected and Kurnell Peninsula will be saved from an unwanted and damaging development.

We want to see a water-conserving campaign that spreads right across Sydney and sparks local initiatives. We want to urge the Committee to consider ways to intensify the campaign. Our shire's community groups, I might say, initiated the idea that government and Sydney Water could announce a three-month period of public involvement in a water-saving discussion; that is to say, a widespread public forum that would stimulate participation by individuals, clubs, schools, utilities, businesses, big industry—every part of society—with emphasis really on “what can we do?” quite apart from what government is doing, so that there is decentralisation, the very opposite of a centralised mega plant on Kurnell—a locality emphasis and a diffusion of expedients. That is our aim.

This suggestion of a three-month campaign was taken up, Mr Chairman, and elaborated by the Nature Conservation Council with its 120 affiliates at its annual conference late last year, and it won unanimous support. We are in no doubt that Sydney people would rise, as they always do, to an opportunity to co-operate constructively. Such a project would need to be well led at all stages—that is, well presented, well reported week by week, and finally, well summed up—and should make appropriate use of the media throughout. I turn now to the specifics of the Kurnell Peninsula and the 45-hectare site. In that connection I have a couple of photographs of the site, which I might just pass around, if that is all right.

CHAIR: Thank you, Mr Walsh.

Mr WALSH: There are just two shots of the site. It makes the whole matter that much more material. Our written submission names a large number of official and scientific documents. We call them baseline documents that can inform government and Sydney Water officers. The fact is, Mr Chairman, that no part of Sydney has been more studied, more worked over in the past 50 years, than has Botany Bay, and its greatest adjunct, the Kurnell Peninsula. At this moment I will draw attention to only one such study, the one that was made in 2002-03 by the Government's Botany Bay Strategy Advisory Committee—at a cost, I may say, of \$800,000. It produced four large reports, all of which are now stamped, “Draft” and are lying in that draft state in the Department of Planning. I have brought them along just because I think their physical presence is of some importance. There are four big studies, all marked, “draft”, and they are lying in the Department of Planning, awaiting finalisation.

In particular I draw attention to this very thick one which is titled, “Botany Bay Strategy—Kurnell Land Management Framework”, which includes a draft action plan. This is tremendous material and I am saying, in effect, let the Government look at its own documentation at this stage. The intention of these and other forgotten studies was to warn again embarking on further major industrial development. After all, we have seen a refinery go up, we have seen an enlarged, expanded airport, we have seen of course the big container port which is now undergoing further expansion. Because of all that we are in no doubt that this proposed desalination plant will impact detrimentally on the ecology and heritage of Kurnell Peninsula.

I now state our policy preference for the 45-hectare site. Our first preference is that the scarcely begun plant should be abandoned and the site turned over to the public domain, probably as an addition to adjacent Botany Bay National Park. If the Government will not do that, our second preference is that Sydney Water will maintain the site responsibly, managing site water effectively,

keeping the site clear of weeds and caring especially for the health of the 15-hectare conservation zone, which is a precious, relatively unspoilt piece of bush-covered wetland. Need I add that we would be completely opposed to the Government selling off part or all of the site to private industrial development.

It is necessary for me now to reflect the attitudes of our Aboriginal constituents to the mega plant. The fact is they are wholeheartedly opposed to it. To them the whole peninsula is sacred, not just some part where bones or artefacts may have been dug up. After all, their view has always been that the people belong to the land not the land to the people, and, even so, Kurnell has always been a special place in the eyes of tribal people for hundreds of miles around there: a special place because of its extraordinary fauna, its abundant marine life and its much sought-after clays, all of which supported a relatively settled clan, the Gweagal people, part of the Dharawal tribe. Their elders tell us that they were horrified at the way the refinery was thrust on the peninsula in 1953. Now they are aware that the world's oil has peaked, so they are looking forward to the refinery being closed at some point in the not distant future and they greatly fear that an expensive desalination plant will install a much more lasting presence than the refinery.

I will make one further point. We want to argue very strongly that there is now plenty of time for an EIS. We ask the Committee to see that the Premier's announcement on 8 February shelving the plant in fact has created an entirely new state of affairs. Up to February the rationale was urgency; the timeframe was 2008; so there was no time for an EIS. Instead, the critical infrastructure legislation was invoked to speedily get construction under way. Preparation of the ground began, we believe, in October. Sydney was given the impression that its system of dams was fast nearing acute danger point. The Premier's announcement makes clear that imminent acute danger is not upon us. Professor Wright in his report to Cabinet has said that we have until 2015 before even the worst conceivable scenario might need attention.

That is the entirely new stage we are in. So we have time to do what this Committee is aiming to do: to look carefully at all available options, but of course to do so with tremendous scientific resources and so on. We submit that the important first option is this: require Sydney Water to expertly construct an EIS. It might take up to two years but we have time to do the job thoroughly, and we similarly have time to then get maximum critiquing of the EIS, and we believe something very good will come out of that process. Certainly all impacts on the environment would then be fully examined.

I will stop at that point. I would like to make some further remarks perhaps a little later about what we might expect an EIS to achieve, but you may care to ask any one of us for some thoughts about this. Both of my colleagues are very well versed in the whole terrain of Kurnell peninsula.

CHAIR: Thank you, Mr Walshe. The Committee appreciates the substantial input you have made in terms of the written submission, all parts of which could be used by the Committee, and we are certainly looking at that. I wonder if any one of you would be able to go into a little bit more detail on the issues of decentralisation and locality emphasis and looking at ways of proceeding in terms of Sydney's water resources on a sustainable basis. Do you have any specific ideas? I very much appreciated the idea of public forums, getting the education and the community participation side of things, which is valuable. Do you have any specific points you may like to give to the Committee on strategies that could avoid the emergency measures that have been mooted by the Government?

Mr WALSHE: Perhaps I could just make a point. What immediately comes to mind, to give a popular example, is the Dragons football club—St George Illawarra Football Club. They have extensive gardens, greens and the rest of it and, having problems there, they began to think about the issue; they noticed the way water hangs around a bit around the club, even on the parking area. They thought about it, put down a bore, struck into an aquifer and now, at a cost of no more than \$25,000, they have handled the whole job of providing all the water that they will ever need. That is just a little practical example.

My belief is that there is tremendous creativity in the community. Give them a chance; start up something that has a little drama to it. I have listened and appreciated the good things that Sydney Water is doing and the campaign, but the campaign has slumped; it needs reviving. I suggest it needs

that touch of drama with a three-month Federal campaign, regular reporting and use of the media. I think both sides of politics would applaud such a measure and only good could come of it.

Mr BOES: Being a resident of Kurnell, and have been for the last 48 years, I have seen the comings and goings of the Kurnell refinery. Once a year the Kurnell refinery management put on a presentation for the resident representatives of Kurnell and I have been able to talk about what I am doing at Kurnell peninsula on behalf of the community in keeping the roadside clean. I have been emphasising the fact that Caltex refinery could, if they wanted to, make use of the water that comes out of the Cronulla sewage treatment plant. The amount of water that goes into the ocean is relatively clear and it could, with an additional cost, be used by the Caltex refinery. As far as I am aware, and I will stand corrected here, I believe there is something like 240,000 litres of water being used at the Caltex Oil Refinery. When I put this to Caltex management over the last three years at those meetings—

CHAIR: Is that litres per year?

Mr BOES: 240,000 litres of water per day is used by Caltex Oil Refinery in the processing of the fuels. Caltex management told us that yes, it is a very good idea, but there is a costing involved and there is the negotiation with Sydney Water. Caltex had a meeting last December and I put it again to them and the answer I had was that they were negotiating with Continental Carbon, which is now Koppers, and Sydney Water in trying to get an agreement whereby they would be able to use the water that goes into the ocean at present at Potter Point, and start making use of that in the process in the Kurnell refinery.

CHAIR: That 240,000 litres per day, is that coming in as potable water from—

Mr BOES: As far as I am aware, it is potable water coming out of Sydney's fresh water supplies.

CHAIR: I presume that Caltex has a discharge pipe off the Kurnell peninsula somewhere.

Mr BOES: Two. There is a discharge out of the Australian Lubricating Oil Refinery, which is a separate sort of process, and the main Caltex Oil Refinery has got its effluent going back to Yena Gap.

CHAIR: Do you have an approximate figure of what is discharged from those refineries in terms of volumes of effluent?

Mr BOES: No. Since that is internal information they would not hand this over willingly. I could get it illegally but that is not the point. I have got my son working there and it would not be fair to him.

CHAIR: I think I blocked that refinery pipe.

Mr BOES: Yes, I am well aware it was blocked some years ago. I am conversant with most of the issues that have been around the refinery and the other industries. Whilst I have worked there myself for more than 20 years it did not stop me from criticising if something was wrong. And whilst the industry has cleaned itself up considerably, there are still issues going on even today that the Kurnell community is concerned about. Coming back to the water issue: regardless of the quantity of water that they use, the water they do use is potable water and I am fully prepared to get Caltex refinery and Koppers to make use of the water that goes to the ocean, albeit at a cost, but I think the cost would be highly offset by the amount of water that could be saved for the greater use of the Sydney metropolitan area. I will leave it at that for the moment.

The Hon. PATRICIA FORSYTHE: Mr Walshe, you said a couple of times that the campaign for saving water has stalled in recent months. Could you indicate what evidence you have for that please?

Mr WALSH: Pretty anecdotal and personal. I am in touch with a lot of people around Sutherland shire, obviously, and also, as it happens, with some people on the North Shore. I am

amazed at the number of people who say, "Gee, isn't it good there is not going to be any desalination plant". That is the level of understanding that there is out there. I just detect that people think the crisis is over. I cannot be more specific than that.

Ms SYLVIA HALE: Mr Walshe, the photographs you have provided are of the actual site itself?

Mr WALSHE: Yes.

Ms SYLVIA HALE: Have you any indication of how many trucks will be involved in its construction? Do you know the details at the moment?

Mrs HOGAN: There is a lot of filling to be done apparently on the site but because there is not really any great amount of information on environmental studies, there is just none of that information available, so nobody really knows how many trucks would be involved.

Ms SYLVIA HALE: The evidence we had earlier from both Marrickville and Sutherland shire councils was that neither council had received any information as to the proposed route of the pipeline across the bay. Have you have any further information?

Mr WALSHE: No, absolutely nothing definite at all. There is even talk of will they be laying a pipe across the bay or will they be tunnelling under the bay. Things are as open and undecided as that. This is what an EIS would specifically cover and can conclude.

Mr BOES: If I may dwell on this for a moment. At the last site inspection that Sydney Water organised for the community groups, we took them to the foreshores of Botany Bay to Kurnell village and we also looked at the site of a possible route for the pipeline. For those that do know Captain Cook Drive, and in particular the section that they are referring to in regard to an eventual pipeline position, there is very little scope to put a pipeline on either side of Captain Cook Drive due to the fact that there are Electricity Commission high tension wires running and on the other side they have got gas pipelines running, sewer systems and what have you. So if they had to break up the road to put a pipeline in, it would be very disruptive to anything that comes and goes from the Kurnell oil refinery, as well as to the population of the Kurnell village.

That population of about 2,600 is entirely dependent on Captain Cook Drive, as no doubt all Committee members know. There is only one road into the Kurnell village, and therefore to the refinery. I have been living there for 48 years, and on numerous occasions over those years we have had interruptions due to motor car accidents as well as other interruptions, the latest one being the drop-down of the high-voltage power line last year. That meant that Captain Cook Drive was isolated, and closed to traffic, for numerous hours. I had a disabled wife, who I nursed for four years. I have been in a situation where if I needed an ambulance to take her back to hospital, there would have been quite a delay. It is anyone's guess how long that could have been. Depending on the severity of the accident involved, the road could be completely closed or partly closed. So that is one aspect of the pipeline proposal regarding Captain Cook Drive—the interruption of traffic flow to and from the village and the refinery.

The other aspect is that the community, myself included, as persons looking after Captain Cook Drive, could not get from Sydney Water people doing the actual drafting of the planning a commitment, one way or the other, or even an interpretation, of how they could see this pipeline going from the desalination plant site to the shores of Botany Bay. They had a quite clear understanding of how it would go under the bay, because there were only a few options to do that. But how it would go from the site to the shore remains a very open question. If they were to go under the road, then they are only partly there.

The other aspect is that, once they reach the actual village, they have very limited scope to get them to the shoreline. There is one obvious opening there, and at the moment that is a strip of land owned by Caltex that is being used for a pipeline system across Botany Bay. Therefore, if they were looking at an option to incorporate the pipeline into that parcel of land, we the community feel that, in the first instance, that would run into legal problems, because Caltex owns that land, and obviously it has flammable product flowing through it. There would be legal hassles, as far as we can read, about

putting a pipeline next to fuel lines. How then would we get this water from the site to the shore? Are they going to tunnel it? No one could tell us what options would be available.

So we in the Kurnell community have quite a few questions that we would like answers on. We do not have those answers. Those things of themselves provide enough reason for us to object to a desalination plant being put on the Kurnell peninsula. Unless we get some clear answers on how it is proposed to do this, we feel we should strongly object to what is proposed. Thank you, Chairman.

CHAIR: Regarding to potential reuse of the plant, do any of your organisations have the figures on what is coming out of the Potters Point outfall itself at the present time?

Mr BOES: Do you mean the Caltex oil refinery?

CHAIR: No, the outfall.

Mrs HOGAN: I fear it is quite significant. It is one of the things that we have always questioned. Sydney Water did a very good job with upgrading the sewage treatment plant there. The water that comes out of it is nearly drinkable at the moment.

CHAIR: Well, it is a tertiary treatment plant.

Mrs HOGAN: Yes, it is very good quality water. In relation to water resources, it is ridiculous that it goes back into the ocean as it is. I would have thought that would have been one of the things looked at. Recycling to industry is one thing, but it is ridiculous that it is going into the sea at the moment, when with very little further treatment it could be recycled. That is one of the things that any water forum could get through. I think governments think that the people will not accept recycled water. However, I think that attitude is changing now. With some education, I think people would much more readily accept the concept of recycled water. Many of these water treatment plants are producing such good quality water that I think none of it should be lost at all.

CHAIR: Perhaps we could ask the relevant authority, the EPA. But, as far as you know, there is no impediment to the effluent coming out of the Potters Point outfall being reused in Caltex's processes?

Mrs HOGAN: No.

The Hon. GREG DONNELLY: Point of order: I would have thought that is a rather technical question, because it involves specifications of the water needed by Caltex.

CHAIR: We might ask the EPA the relevant questions on that.

The Hon. GREG DONNELLY: The use of the water by Caltex is a question that would be better directed to the user, because obviously Caltex will have specifications on the water it needs for its production processes. I do not know what those processes are, but I do not think the EPA could tell the Committee what specifications will meet the needs of Caltex.

CHAIR: Thank you for that. Perhaps we should write to Caltex and seek that information.

Mr WALSHE: Could I make the point that the Cronulla sewage treatment plant has been such a successful construction because it was the subject of a five-volume EIS. Compare that with the environment assessment for the desalination plant—one small volume! The Cronulla sewage treatment plant has drawn admiration from many places. It gets water to tertiary level. Former Deputy Premier Refshauge famously stood there at its opening in 2002 and drank the tertiary water and said, "Here is the future of Sydney's water."

The Hon. PETER PRIMROSE: The Sutherland Environment Centre has a very good reputation for its community education campaigns and campaigns to raise community awareness. What specific approaches would you as community campaigners suggest the Committee should recommend to all the relevant authorities to lead households and industry to become aware of the issues in relation to water that we are raising through this inquiry? What things have you found to be

successful? Mr Chairman, could I suggest that the witnesses take this question on notice and perhaps come back to us with some points on the types of campaigns that we should be recommending, particularly in relation to households and industry?

Mr WALSH: We will take that question on notice. Our basic approach is: Trust your community; as long as you can get information out to them, they will give a lot back that is excellent.

Mr BOES: If I might highlight this point. At the moment the Kurnell peninsula is receiving quite a lot of attention due to the fact that lots of developments are taking place. I can mention at least three sites involving big developments. Nothing in the form of structures has been built on two of them. One complex has been completed; at the moment, the buildings are there, but they are standing empty. I wonder whether we could not urge those who own the developments, whether it is one company or a consortium, to make use of the water that could be made available in the form of effluent to Potters Point by the addition of infrastructure, because some of those developments are still being developed. They have still got the bulldozers in, they are still forming roadworks, and if at this stage they were to put in an additional pipeline to make use of so-called recycled water, that would be a step in the right direction. Those sites are being developed for industry—warehouses and the like, small factories—and, as far as the population is concerned, industry could use the recycled water. If it was not just for toilet flushing, it could be at least for garden systems and the like. Maybe the Committee could take this on board and put emphasis on that to whomever this information is being made available.

The Hon. RICK COLLESS: Lady and gentlemen, another famous quote from former Deputy Premier Refshauge was, as noted in your submission, a major environmental study into the entire Botany Bay catchment, including the sensitive Kurnell peninsula. Did that study every go ahead?

Mr BOES: Yes. That is the study which is the subject of what is called the Botany Bay Strategy Advisory Committee's report. These four reports have emerged from that. We are angry that the whole thing has not been completed—\$800,000 was allocated, and eight personnel worked on it for a year or perhaps more than a year.

The Hon. RICK COLLESS: It certainly appears from those statements of Dr Refshauge that this current proposal completely ignores that commitment that he gave, does it not?

Mr BOES: I wrote to the former Deputy Premier and said, "Did you jump up and down on the spot when you heard on July 11 that a desalination plant was to be erected at Kurnell?" He said, "Oh, you've got my words out of context." Since then he has resigned, he said, to go scuba diving. And people wonder why community people get angry!

The Hon. RICK COLLESS: Absolutely.

Ms SYLVIA HALE: And cynical. At page 7 of your submission you talk about the deteriorating littoral marine condition—and it is in the context of Cudgerie hole, is it—but you talk about this deterioration affecting Towra Point's Ramsar protected wetlands. Your submission indicates that you are looking at the long-term impacts of the oil refinery and the site itself, and the contiguous land being impregnated with oils and chemicals. What do you anticipate would be the impact on the wetlands of the construction of the desalination plant?

Mr BOES: I can only think that it would be made worse by that work. There are these three wonderful sub-bays of Botany Bay—Quibray, Weeny and Woolooware Bay—and you have the fairly famous Towra peninsula, which is protected by the international Ramsar agreements. In Quibray Bay, which was beloved of oyster growers and so on, you have got Cudgerie hole. It is a deep hole within the bay, and its water quality was pristine. Some of our active people are former oyster growers—Jim Towart in particular—and he testifies that the quality of Cudgerie hole has declined. It is a stone's throw across to Towra Peninsula. Any pollution centring on Quibray Bay will have an effect on the shoreline of Towra Peninsula, which has already been hammered by all the wave energies that have been sent across the bay from the construction of the airport runways and Port Botany. It is sending wave energies across there causing erosion of about 100 metres of beach and flooding of the famous lagoon from which Captain Cook drew his pristine, beautiful water supply.

CHAIR: You mentioned in your submission that there was some consultation, I think held at Cronulla Leagues Club on 9 January, that you had several hours of discussions at Kurnell with officers of Sydney Water on 23 January, and that that was followed by two onsite inspections. Is that not adequate consultation by Sydney Water? Did you have any other issues? It appears that Sydney Water has gone to some pains to communicate or to consult with the community.

Mr BOES: Yes, you are right. It invited the community to two communication processes. I have already said that at the last one we could not get concise answers; they would come back to us as soon as they had that information. Events overtook everything else. It was only two or three days later that the announcement was made that the whole project was going to be pigeon-holed, so there was no answer on that one.

I come back to the question about polluting of the Botany Bay area in its totality. Kurnell Peninsula, as honourable members may or may not be aware, has a natural drainage phenomenon due to the fact that the underlying rock formation has a lateral slope towards what we consider to be the Sydney metropolitan basin, which has Botany Bay as its centre point. Therefore, anything coming out of heaven or put there by nature in the form of groundwater will ultimately find its way to Botany Bay. Therefore, it must pass through this so-called wetlands area. Mr Walshe has already made reference to Cudgerys Hole. It is a pristine part of Quibray Bay and an unusual piece of nature. It is a clear waterhole surrounded by mangroves and there is no explanation for it. It is very clear and no more than 200 metres from Captain Cook Drive.

The desalination site, as the photograph shows, has natural surface water drainage going to Botany Bay, which in turn probably goes to Cudgerys Hole. There is a natural drainage system running from the council sand dune, as we usually call it, to the other side of Sir Joseph Banks Drive, which is part of the Botany Bay National Park. That drainage area passes this site. There is the road junction with Sir Joseph Banks Drive and some reeds that grow there. That is the natural drainage system going into Botany Bay. It is one of only four areas on the peninsula that has natural drainage going into the bay. Any work being constructed on the desalination site would have to have a slope to ensure that the water drained off rather than settled in puddles and pools. As far as I can read it, that would automatically have to go towards the lowest point; that is, ultimately draining towards Botany Bay.

That runoff would have to be guided towards either a new drainage system or the drainage system indicated on the photograph, which in turn goes directly into Cudgerys Hole. The existing drainage runs underneath the junction of Captain Cook Drive and Sir Joseph Banks Drive. That drain was upgraded one and a half or two years ago because a development was taking place on private land. That development is called Cook and Banks Estate. When I drove past this morning they were eradicating some of weeds because the land has been idle and the weeds have grown very high. Any runoff produced by this new proposal will ultimately find its way into Cudgerys Hole, and therefore into Botany Bay.

CHAIR: We are running over time. Thank you very much for your appearance here today. You have agreed to take some questions on notice. The secretary will organise a letter to you and give you adequate time to answer them so that we can potentially incorporate that information in our report. Thank you very much for your detailed written submission and for your interest in this issue.

Mr BOES: I hope you can put it to use.

(The witnesses withdrew)

TERENCE STEWART BARRATT, Chair, Shoalhaven River Alliance, PO Box 263, Nowra, and

HENRY ROBERT THORNE, Member, Shoalhaven River Alliance, 19 Adelaide Street, Greenwell Point, affirmed and examined:

CHAIR: Mr Barratt, are you conversant with the terms of reference of the inquiry?

Mr BARRATT: Yes, I am.

CHAIR: If at any stage you consider that certain evidence or documents you may wish to be tendered should be heard or seen only by the Committee, please indicate the fact and the Committee will consider your request. Mr Thorne, if you wish, your address can be deleted from the public transcript.

Mr THORNE: Yes.

CHAIR: Are you conversant with the terms of reference of the inquiry?

Mr THORNE: Yes.

CHAIR: Similarly, if at any stage you consider that certain evidence or documents you may wish to be tendered should be heard or seen only by the Committee, please indicate the fact and the Committee will consider your request.

Mr THORNE: I have already spoken to John Young about technical data in my submission not being made public, including graphs, and he has agreed not to include it.

CHAIR: We have deliberated on that. If you have any similar material we will consider it in the same fashion.

Mr THORNE: There is material I would like to be distributed now that contains further graphs.

CHAIR: Is that to be made publicly available?

Mr THORNE: Not the graphs. It is technical data that has not yet been published.

CHAIR: We will accept that now and deliberate on it. I invite either or both of you to make a short statement. Time is limited, so please keep it succinct.

Mr BARRATT: We will both make a five-minute presentation. I will be addressing my attention mainly to the submission that we have prepared

CHAIR: Which we have.

Mr BARRATT: I will be drawing attention to each section to assist the Committee in going through it in more detail. I would like to proceed by reminding honourable members who have seen the submission—

CHAIR: I think you can take it that we have all seen it.

Mr BARRATT: The last page contains my biography. I point out that my experience relevant to this matter is 10 years as a manager with National Parks and Wildlife Service for a large part of the Shoalhaven River catchment. I found it very interesting to listen to the discussion about the Kurnell Peninsula because I was once the manager for the Sydney district, and Kurnell Peninsula and the national park lands there were my responsibility. It took me back to the 1970s and quite a few nice memories about the area. It also reminded me of its importance. I have also spent 10 years as an environmental scientist with Sydney Water.

Robert Thorne is an oyster farmer of 11 years standing and during that time has studied the Shoalhaven River estuarine salinity and processes with the aim of understanding the publishing his work. Prior to that he was a geologist for 24 years, including a hydrogeologist.

I would like to use the submission as a guide and talk about each section briefly. For example, section two on page five deals with the background of the Government's plans for the Shoalhaven River water transfer scheme. This submission clarifies why the Shoalhaven River falls under the category of "any other relevant matters", because there is no mention of it in the terms of reference. If honourable members wish to ask any questions on our views about why it is relevant we can certainly expand on that.

CHAIR: I think you might be interested to know that there has been considerable discussion about the transfer and such like. We see it as a very important matter.

Mr BARRATT: I am pleased to hear that. We believe the sustainability of water for Sydney cannot rely upon supplies from the Shoalhaven River. There is no future in that in the long term for Sydney. The main point in the background—and this comes back to the concerns we have had about the quality of the work that has been done and the lack of community consultation—is that all those plans for extracting significantly more water than is currently unsustainably extracted were developed in a technology and community participation vacuum. We like to make that point clear. The facts, science, the environment issues behind the conclusions were acknowledged in the Hawkesbury-Nepean forum report they presented to government have been inadequate and the community consultation has been inadequate. Their recommendation was that before the Government made a decision, the decision announced about taking more water from the Shoalhaven River in its 2004 water plan, that before it makes decisions in regard to the Shoalhaven River that it does the necessary studies to determine what would be appropriate environmental flows and what would be sustainable to take from the river and use those as the basis for a community consultation process. None of those things were done.

With regard to the second paragraph on page seven, Sydney's ecological footprint, we make the point that Sydney's growth is dependent on increasing extractions of resources from a hinterland, wherever that may be—not just the State but general, its regional, State, national, international hinterland. The Shoalhaven River extractions are just one significant part of that process and a good example of the limitations to Sydney's growth. Section 4 of the submission, page nine, deals with the impact of the current system. There are different levels of impacts and one is the current system. People do not realise that the current extractions based on the current drought conditions of being able to withdraw water from the Shoalhaven once Sydney's supply system drops below 60 per cent are having significant impacts.

There are such things as excessive levels of salinity in the estuary that have been existing for the past 2½ years. That is an extremely long period. Those levels of salinity, from the basis of records we have, have no precedent. It is not the drought in itself; it is the extent and quantity (volumes) of extractions from the dam for Sydney which is preventing flows over the dam and only providing a low level constant flow from the low levels of the dam, the so-called environmental flow requirements of 90 megalitres per day. So it is unprecedented that the levels of salinity and the extent of that salinity up the estuary of the Shoalhaven—and the estuary of the Shoalhaven is 50 kilometres long so it is a significant part of the river, the estuary. Also pollution from the low level releases. I will not go into the details of those pollutants but it has been acknowledged by the EPA that the river is technically polluted by those releases.

The financial impacts on oyster farmers, professional fishers and the tourism industry of these inadequate flows in the river due to the extractions, the current rate of the extractions. Recreational fishing resources are depleted and are having an impact on people who fish in the river. Canoeists, bushwalkers, water-skiers and swimmers are all suffering. Water-skiers and swimmers, body contact recreational sports I have referred to. Summer of last year you could not swim in the river. People suffered tremendous impacts from other jellyfish infestations—huge intense numbers.

The Hon. RICK COLLESS: How far up the river are you talking about from the coast?

Mr BARRATT: It got up to—

Mr THORNE: Twenty kilometres.

Mr BARRATT: Yes, about 20 kilometres up the river. So if you want to swim in the river you have to go that far up the river. With regard to the salinity issue, Mr Thorne will be giving you briefly but detailed information based on the research he has been doing over the years. Moving on to section 6 on page four, the needs of a healthy river. This is often not appreciated. You can put tubes in the river and do a chemical analysis, and a river that is full of salt and is not getting any flows of fresh water can look quite good in terms of water quality standards. But when you think of it in terms of a biological system, the biodiversity area, it is a different story. It is quite clear that the high saline levels have had a serious impact on productivity in terms of commercial fishing and oyster farming, that sort of thing, and in terms of production in terms of the diversity of fish and that is more a sign of river health than some chemical analysis and certainly a one-off type chemical analysis that does not look at the long-term environmental effects of these things.

It is very difficult therefore to say that we will do a study of this, get the facts and figures here and now, does not tell us this is the condition. You do not get that. In fact, what you do get in terms of the health of the estuarine section, often the people who are not seen as experts, the users of the river, the resource extractors from the river, the fishers and the oyster farmers, they are the people who can monitor the river in terms of what they take from the river and the quantities and qualities of what they are taking from the river. That is a better indication of river health than all the chemical analyses in the world, except for the estuarine conditions, and Rob will fill you in on that one.

Those are the impacts of the current system. The impact of the Government plans—and let me point out to you the background papers produced at the time the Government made its announcement about not increasing the height of the dam, no extractions or further extractions from the river, when you read them, that is at best a temporary delay of the system and both types of projects, the dam and the tunnel and pumping systems, could very well be on in a fairly short time. I think we have about 12 months guaranteed that nothing will happen.

CHAIR: Has there been a pumping regime?

Mr BARRATT: Yes.

CHAIR: And all round that has taxed the system quite significantly during times of low flow, drought and dry conditions. The promise by the Government that the Tallowa Dam wall would not be raised and then before that there was discussion of a regime that would be more environmentally benign in terms of extracting during times of high flow. Are you saying at the moment there is no extraction from the Shoalhaven?

Mr BARRATT: No.

CHAIR: Can you explain that? Because of what you said, perhaps I got the wrong impression. Can you briefly explain the regime at present and what you expect the regime to become and why it will change?

Mr BARRATT: I mentioned the impact that the current extraction is making on the river is based on the traditional set up of how it will be done. It was a sort of series of dam hopping processes and then running down the rivers, and there are restrictions on how much they can pump because of that. I will not go into the details but for environmental and other reasons they are limited to certain amounts and it is below their current pumping capacity. In fact, in summer it is only a third of their current pumping capacity, and in the winter it is half of their current pumping capacity. So the quantities they can pump vary from season to season depending on environmental factors. So it is occurring. It has over the last 2½ years. It has now reached about 80 gegalitres—that is 80,000 million litres—per year. That is 80 gegalitres per year extractions. They wanted under the proposed system to increase that to 180 so another 100 gegalitres so they would have to move into those higher flow periods because they cannot get any more than 80 gegalitres.

They are talking about, even at the moment, if they stick to the present system they would like to get another 30 gegalitres per year. They will only get it if the heavens open and we get more

water down the river. They are taking absolutely as much as they can at the moment but if they build their tunnels, bypass this dam hopping system and go straight from Fitzroy Falls Dam—they would pump it up from Tallowa Dam to Fitzroy Falls Dam at huge cost, I can tell you now, millions more than they were warning you. The idea is to build a tunnel from Fitzroy Falls Dam to Avon Dam and directly pump the water there and bypass these environmental problems, therefore doubling to trebling the amount of water that they can transfer. So they achieve 180 gegalitres per annum but to do that they have to move into the higher flow periods.

At the moment the Government has refused to guarantee to rule out altogether taking water in low flow periods because once they are in this tunnel situation the Shoalhaven River is on tap to Sydney. They can take it any time they like, and I am sure they will. If things are low in Sydney they will take it out of the Shoalhaven in dry times, and they would be more inclined to not take it in really high flow times because the dams will be overflowing. They will take it in those medium flow times. So we will move progressively up through low flow periods into medium flow periods until such time as they meet their 60 per cent levels in the dam. If the new rules come in which allow them to extract at a higher level they will keep moving up until they reach those levels. At the moment 20 per cent of Sydney's water supply is coming from the Shoalhaven.

I could go and get a glass of water and I'd probably recognise the flavour. It is almost certain that until they reach whatever levels in dam supply in securing Sydney's needs, they will continue to move into it so we will go through this low flushing situation—there is no natural flushing in the river—until such time as Sydney feels secure. That is fine except it will not keep Sydney supplied in the long term. In the meantime the health of the Shoalhaven River suffers. Even if they get themselves to some equitable balance in the shorter term, in the long term who knows what the environmental conditions and weather conditions will be? There will be other times when the Shoalhaven River will be visited on in huge quantities. If Sydney continues to grow it will be even greater quantities.

The growth of Sydney cannot be sustained by the Shoalhaven River. Sydney has to get onto a reuse system instead of dumping in excess of 400 gegalitres per annum in the ocean. That is obscene. That is waste water. Water should not be regarded as a waste. Waste water is a resource. When we recycle cans and bottles we do not call them can waste and bottle waste. So why do we refer to water waste or waste water? We are taking a perfectly good resource, an extremely valuable and essential resource to Australia, and we are wasting it. We should not be doing that and we do not have to. So that brings us into not only the needs of a healthy river, because the needs of a healthy river are to get environmental flows in volume, variability and quality that equates somewhat to the natural flows. To do that we need a water sharing plan for the Shoalhaven which comes up with what the river needs before government decides to build dams, raise dams or build tunnels, and look at the river's needs first. Then we can start to judge whether all this other infrastructure really can be justified in terms of the expenditure of the infrastructure and the cost of transferring it, which is huge, and whether it is a better investment to reuse water in Sydney and not waste it to the ocean.

I would like to talk very briefly about a sustainable water supply for Sydney. In my years with Sydney Water I spent a lot of time looking at reuse schemes both in the Shoalhaven in my part time and at the Gerringong Gerroa Sewerage Treatment Plant in my Sydney Water days as an environmental scientist. The outcome of those studies was that we had a reuse scheme for Gerringong and Gerroa, as well as probably the biggest reuse scheme in New South Wales and certainly on the Shoalhaven. One of important issues that was being investigated by Sydney Water in the 1990s was potable reuse. It was about whether we should use it directly or indirectly. In section 7 on page 17 of my submission I refer specifically to potable reuse. I talk about direct and indirect, and I refer you to the reference of Smith of the Parliamentary Library where there is a lot of good technical data about potable reuse. I relied very much on that for my submission prepared on potable reuse on both direct and indirect. We believe it is an appropriate thing.

In conclusion, I draw your attention to something that not too many of you may know about, but I remember because it came up in the mid to late 1990s—the water factory proposed for Quakers Hill. I do now know whether you have ever heard of the water factory. It was to be a demonstration plant of what could be done with water treated to potable standards. In other words community consultation, a visitor centre where people could go to see what the processes were and Sydney Water could look at what processes they needed. As well as a community demonstration to get people used to the idea, and understand the technology and how it worked, it was also to allow Sydney Water to

work out best technology, and the best process for treating water. They had two process trains in this idea, a physical chemical treatment train and a membrane-type train, which was microfiltration and reverse osmosis—the very process for desalination. That was in the early stages of development in those days and they still had these two processes. If they were doing it now I guess they would say, "Let us just look in detail at the membrane-type technology." The project was adopted. They had done the planning, design and environmental assessment and they had received approval to go ahead with it and put the tenders out for construction.

The plant was to be built at Quakers Hill. It was to take tertiary treated effluent, probably to the standards that you have at Cronulla. I do not know whether they dump it in a creek that goes to the Hawkesbury or, as they do in Cronulla, they get it to almost drinking water standard and they dump it in the ocean. They were going to pick it up, treat it, invert it through this technology and approach the steel rolling mill at Rooty Hill with a view to supplying water to them. They are like BlueScope, they require very high, special quality water, which is close to, if not at drinking water standards, for their processes. If that worked out successfully they were then going to put it into Prospect Reservoir where it would join the water supply system for Sydney. Our view is that we could have another water factory, take people through in an educative process, take the politicians through who say, "We can't drink toilet water" so they can understand this issue. We could all be educated and we could all become much more comfortable with the concept. You could claim water from any of the treatment plants in any way you wanted to get it to Prospect, where it would then go through yet another treatment system before it hit the reticulation system for Sydney. Keep in mind that what was arriving at Prospect would be of better quality than the water coming from Warragamba Dam.

CHAIR: Mr Thorne, did you want to say a few words?

Mr THORNE: First of all, I apologise for not having page numbers on the supplementary note I have given you. It might be an idea for you to put them on. I would like to address briefly the six graphs at the back of the presentation that I have just given you, and I will speak briefly to them. First of all, to the estuary salinity graphs 1995 to 2000 and 2001 to 2006, these two graphs show the fluctuation in estuary salinity over the period from 1995 to 2006 with periodic cycles and of total flushing of the estuary during periods of high river flow following heavy rain. Higher salinities progressively return to the estuary as river flow decreases and oceanic water is mixed progressively further into the estuary by tidal pulses. Periodic intermediate rainfall events result in freshes of varying magnitude. Prior to mid 2003 periods of high salinity of less than 30 parts per thousand were mostly of short duration and intermediate salinities of 20 to 30 parts per thousand occurred for the greater proportion of time. From January 1995 until May 2003 the estuary received total or near total flushes on 12 occasions, or on average of a flush every eight to nine months.

Following the flush of May 2003 a new salinity regime was imposed on the estuary. During the following two years the graph is characterised by a lack of freshes in part brought about by drought, but mostly resulting from diversion of flows away from the river by the Sydney Catchment Authority. Moderate flows occurred following good coastal rainfalls towards the end of this period, but are barely reflected in the graph with no spillway flows being permitted to occur over Tallowa Dam from May 2003 until July 2005. All river flow in excess of 90 megalitres a day environmental flow and Shoalhaven Council's requirements were diverted to the Sydney water supply system. I refer now to the annual salinity graph, which shows the proportion of time for each year that various salinity conditions have existed in the lower estuaries since 1995. The dark purple represents the proportion of each year that high salinities above 30 parts per thousand occurred, bearing in mind that seawater is 35 parts per thousand, occurred. The years from 1998 to 2003 are characterised by high salinity conditions averaging about 42 per cent each year relatively consistently. A dramatic increase in estuary salinity occurred in 2004 under the combined effect of drought, but mostly due to massive extractions by the Sydney Catchment Authority.

Following almost total conversion of Shoalhaven River flows to Sydney after mid 2003, high salinities were effected on the estuaries for 90 per cent of the time compared to 42 per cent under natural condition. If the physical health of a river or estuary can be defined by its proximity to the natural conditions, the Shoalhaven estuary clearly has been in a very unhealthy state since May 2003, despite any claims that might have been made to the contrary. It might be reasonably assumed that the biological health of a river will reflect the physical health of that river. I turn now to the salinity intrusion graph. River water flowing into the top of the estuary at Burrier, 50 kilometres from the

ocean, forms a freshwater pool that varies in length depending on the inflow rate. Downstream of this pool, fresh and saltwater is mixed progressively under the influence of tidal pulses. The solid red graph shows the salinity profile late in the drought of 1998. The salinity at the top of the estuary at Burrier was about five parts per thousand, or 14 per cent of seawater. The average flow at Grassy Gully during the previous month was 126 megalitres per day and the Shoalhaven water supply was taken from that flow.

That produced consistently higher salinities in the lower estuary of 32 to 34 parts per thousand. This graph might be considered a benchmark for high salinity due to drought conditions in the estuary. The graph shows the progressive intrusion of the saline water into the estuary following the total flushing of the estuary at the start of July 2005. Although seemingly complex, the graph shows five key features: One, at the start of July the estuary had been totally flushed—that is the dark horizontal line lying along the zero axis—freshwater throughout the estuary. Two, as the saline front progresses upstream a linear mixing curve of constant gradient develops in the estuary. The implication of this is that the salinity at any point along the estuary at any point in time can be estimated reliably from the historical record of estuary salinity at Greenwell Point, which I have for over 11 years. Three, as the saline front progresses upstream the length of the freshwater pool contracts progressively to the upper reaches of the estuary. Four, at the end of February 2006 the freshwater pool has diminished to about five kilometres in length and the salinity profile was approaching that of the 1998 drought.

The next graph refers to river inflow, estuary salinity profile and shows the increase in salinity down the length of the estuary from Burrier to Greenwell Point under three flow regimes. They are representative. The brown curve is the 90 megalitres a day so-called environmental flow. The salinity increases downstream from a five-kilometre long fresh water pool at Burrier to near oceanic salinity at Greenwell Point. At higher river flows the length of the freshwater pool increases and at peak river inflow of about 5,000 megalitres a day, the freshwater pool occupies half of the length of the estuary and the salinity in the lower estuary falls to about 20 parts per thousand. At higher river inflows progressively lower salinity profiles develop in the estuary until the estuary is flushed completely of all marine water at a flow approaching 25,000 megalitres a day. It is clear that the so-called environmental flow of 90 megalitres a day imposes on the estuary a salinity regime that is effectively that of a drought. It totally fails to reflect the physical environment in the estuary on which the web of life is dependent.

The final graph refers to the correlation of river flow at Grassy Gully with estuary salinity. The impact of Shoalhaven river inflow on estuary salinity can be demonstrated by comparison of river flow at the Grassy Gully gauging station a few kilometres above the start of the estuary with the salinity in the lower estuary at Greenwell Point. This sample graph from 1995 to 1997 highlights this relationship and, in particular, the 25,000 megalitres a day flow required to flush the estuary. My 11-year record of salinity data from Greenwell Point should be used to define minimum acceptable ranges and frequencies of salinity in the lower estuary. From this the flows at Grassy Gully required to produce these conditions can be defined. Ultimately, this can be related to the flows required to pass Tallowa Dam and to define any surplus flows that might then be available for diversion to the Sydney water supply system. The first two graphs about which I spoke, with all the dots, show that under natural conditions salinity in the lower estuary has historically fallen below 20 parts per thousand half a dozen times or more per year.

This requires peak flows greater than 5000 megalitres a day, bearing in mind that the environmental flow is 90 megalitres a day. At this time the freshwater pool extends for more than half the 50-kilometre length of the estuary, and the salinity at Nowra bridge is about three parts per thousand. The current freshwater pool is about five kilometres in length. The salinity at Nowra bridge is 25 parts per thousand and there are rabbit-eating sharks in the river. That is a fact. This situation will not be improved until heavy rains produce river flows that significantly exceed the capacity for storage and diversion by the Sydney Catchment Authority. With Tallowa Dam being held at almost three metres below full supply level at the moment the available storage capacity in the reservoir is 22,000 megalitres. This is more than sufficient to continue to trap all the intermediate flows in the river for diversion to Sydney, as has occurred for almost three years, and to continue to impose on the estuary protracted high salinity conditions equivalent to the worst drought.

Ms SYLVIA HALE: I have one indirect question, but you may not be in a position to add to it. On the last page of your original submission you talk about the need for multilevel offtakes, but you make comments about poor quality water taken from the bottom of the dam, which you say is cold, acid, hypoxic and sulphurous, resulting from reaction with organic matter, such as dead trees at the bottom of the reservoir. Do you have any comment about the lowering of the level at which water is extracted from Warragamba Dam? Would you expect that to have any adverse impacts?

Mr THORNE: I do not know the situation. With Tallowa Dam, when they cut down the trees there are a lot of stumps and things like that and they produce chemical reactions that result in these poor water conditions that come from the low-level offtake. I am not familiar with what the situation is at Warragamba Dam.

Mr BARRATT: Are you talking about extractions for human consumption or for environmental flows? Our problem with the pollution we see as the environmental flow pollution, the pollution of the river, rather than the pollution of the water for human consumption.

Ms SYLVIA HALE: No. Sorry. One of the Government's strategies has been to lower the level at which water is extracted, presumably for human consumption, from Warragamba Dam.

CHAIR: It could be either. In your report you state—and it is the same point that I saw—that it is considered that the Shoalhaven, below the dam, is a polluted watercourse. You talk about that low-level extraction process, the cold and also the pollutants in it. Is that going to have issues for both potable water use and for environmental flow?

Mr BARRATT: Our advice is that it is not a problem for consumption. Say, for instance, that the people of the Shoalhaven drink the stuff, the cold water is no problem for humans; the cold water is a problem for fish and other organisms. By the time it gets to the Burrier offtake or the Shoalhaven water supply, some things have rectified themselves. Anything that kills prawns when it hits them, which a lot of fish rely on, particularly Australian bass—it will not kill us. And it goes through a treatment plant. It goes through storage in the Batemarang offtake storage system and it then goes through a treatment plant. The authorities assure us it is certainly potable. Our concern is the impact on the health of the river itself and the organisms cannot adjust to these chemical and physical changes in the water quality.

The Hon. HENRY TSANG: I emphasise the importance of the flow to the river. Are there any measures you can advise the Government about so that the health of river can be improved? Are there any measures or initiatives the Government should take?

Mr BARRATT: I guess if you are taking it to a multilevel offtake, which means that the offtake drops as the levels of the dam drop, if you are taking from the top you immediately get environmental improvements. You overcome that pollution problem. The Shoalhaven River Alliance was established because that one area of river flows has never been looked at. There is a Riverwatch community group, for example, who are into issues of bank stability, planting mangroves, and those sorts of issues in terms of river health, catchment values and that sort of thing. I have been involved with the Shoalhaven LandCare Association. We do catchment management type issues. All those things need government support and assistance.

It is recognised that catchment management and stream bank stability are very important from the point of view of river health. Because this issue has been brought up by the demands of Sydney for water supply, and because there were no community organisations set up to address those issues, we established the Shoalhaven River Alliance for that purpose, to look into those issues and see how that aspect of river health could be dealt with, as opposed to the other good work that Riverwatch and other organisations were doing in regard to other aspects of river health.

Mr THORNE: Could I make a brief response to that question too? In October of last year the Sydney Catchment Authority put compressors at Tallowa Dam with a pipe heading out into the river. Compressed air is pumped out to destratify the water column and turn it over so that it mixes the colder poor quality water at the bottom with the top. Whether this has any long-term effects remains to be seen.

Mr BARRATT: There was one point I missed out on with regard to the water factory, two points, I suppose. One is that I have spoken to the project manager—I knew him when I was at Sydney Water and he is still there project managing BlueScope, for instance. The treatment plant there is basically a water factory, basically a desalination plant, to get water to BlueScope it is a microfiltration system and a reverse osmosis system. He did a presentation some time in 1998 to the Singapore Water Supply Authority. They went away, and while we were busy—incidentally, the water factory did not go ahead because the cryptosporidium scare suddenly came up and they said, "Oh, I do not think we can sell this one at the moment. We will put it on the backburner." It has remained on the backburner. While that project was being canned at the demonstration site, New Water from Singapore took the data and specifications away with them and built the potable water reclamation plant that now provides something like 2 per cent of Singapore's water supply, using the reverse osmosis microfiltration system. So that is very interesting. I said, "You guys ought to be prepared to release some of the data about what that was all about"—because I thought this Committee might be interested as well as ours. He said, "You will get all the technical data from the review of environment factors that was done at the time."

I was amazed because I was with Sydney Water and I had never heard of that, but it went on public display and it is in the Sydney Water library. It may not be there at the moment because I have just asked for the loan of it, but there may be more than one copy. The Committee may be interested in having a look at the Review of Environmental Factors: Water Reuse Demonstration Plant (Water Factory), July 1997, volumes one and two. The reference number is 363.7284/SYD. They have confirmed that it is there in the library. I think that will give you all the data you would need if you wanted to say to the Government, "How about reconsidering a water factory as a demonstration plant to take the community through this whole process of looking at the whole issue of potable reuse of water"—or, at least, water supplies for those industrial and other community uses that really need a very high quality of water beyond what you would normally get from your normal sewage treatment plant, even tertiary plants. This is the next stage after the normal sewage treatment plant process.

CHAIR: Thank you, Mr Barratt and Mr Thorne, for your very considered written submissions. We appreciate the wealth of information in your accumulated experience. Please feel comfortable with the fact that the Committee will take very seriously your submissions and use them in our deliberations for the report.

(The witnesses withdrew)

STEPHEN CHARLES LELLYETT, Deputy Regional Director (NSW), Bureau of Meteorology, Level 16, 300 Elizabeth Street, Surry Hills, affirmed and examined:

CHAIR: Are you conversant with the terms of reference for this inquiry?

Mr LELLYETT: I am. I have been sent a copy.

CHAIR: Good. Before the Committee asks you any questions, I understand you have some details to present to the Committee.

Mr LELLYETT: Yes.

CHAIR: Please feel free to go ahead.

Mr LELLYETT: Just to outline what I will talk about here: basically there are two areas—increasing trends in terms of temperature, plus trends in rainfall and evaporation, and secondly some of the research work that is currently going on, some ideas of what might be needed and just some concluding remarks at the end. Firstly, having a look at temperatures, it is fairly well established that there has been a rise in global temperatures over a long period of time. This rise in temperatures on the global scale is also reflected at the national scale and the state scale of New South Wales. You can see that there is a high degree of consistency there in the time series. Not only is there a high degree of consistency timewise, but also spatially across New South Wales. These two diagrams show the picture here. That is the last 95 years up to 2005, showing a general warming trend consistently across all of New South Wales, and then an accelerated trend since 1950. The time series really shows the same thing. You can take a line from one side to the other, and it is increasing. But if you take a line within the last 50 years or so of that series, it is more steep. I do not want to talk too much about this. It is really quite well established.

I just want to establish the point that global warming, we believe in the bureau, is a real effect. It is here and it is going to be ongoing for some time. It is also reflected in the extremes of temperature, both an increase in the daytime maximum temperatures and overnight minimum temperatures and a decrease in the extreme cold days and cold nights. The case is that it has been observed in the past. We believe it is ongoing. That coincides with the peer reviewed research evidence and also coincides with the findings of the intergovernmental panel on climate change.

Next I will move to rainfall. The point to make here is that there is less certainty in the trends of rainfall as compared to temperatures. With the temperature trends, you will notice that they increase and they continue to increase for most of the series. You will notice now with rainfall we see quite a different situation. These are the aerial averages across all of Australia, the top diagram, and all of New South Wales in the bottom diagram. The first thing to note is that there is not the same degree of consistencies between the two scales as we saw with temperature. The second thing to note is that we see a discrete jump in rain falls around about the mid-1900s. So lower down in the early 1900s, then jumping up in the mid 1900s, and some variation, depending on where you take the series to start and end your series, you could interpret that as somewhat of a decline since that transition was made.

The kind of analysis that we saw before, these analyses can of course be done for rainfall too but they are not as instructive because you do not see the variation within the time series. However, here is a closer-up view of the time series and the changes with a lower level in the early 1900s and jumping up here in the mid 1900s, then coming down towards the end of the time series. If we take the first half and average the values, we come up with a figure of 477.7. If we take the second half of the series and average it, we come up with a figure of 573.9. Where you take that exact transition point is a bit arbitrary but I think the conclusion remains the same. There is a significant jump upward in rainfall.

If we analyse that on a district-by-district basis across New South Wales, these are results in percentage terms. Where the Sydney catchments are, let us say around Warragamba, would fall into this district here, which is roughly a 20.9 per cent increase on average across that district. So all those districts in the general area of the Sydney catchments have experienced around about a 20 to 22 per cent increase in rainfall, based on that type of linear analysis, which is not strictly correct for making

predictions into the future. But it is indicative of the changes that we have seen in the past and something that we do not really understand fully. There needs to be more research to understand why that jump occurred and then that puts any future predictions into better context, if you can understand that.

This is just to make the point once again that averaged across the whole of New South Wales for those two time periods, the early 1900s and the later 1900s, and then interestingly in this particular period 2001 to 2005, you see that the averages in the last few years have come down to very close to what they were in the early 1900s. For some particular stations within the Warragamba catchment, we see a similar trend. Note that this graph only goes from 1959 onwards, so it is only the latter half, but we see some oscillation there, a gradual downward trend that more steeply drops off toward the end, and then the same thing at this location but also within the Warragamba catchment, perhaps a bit more pronounced.

CHAIR: Just in relation that, you mentioned before that in the second half of the last century, there was an increase.

Mr LELLYETT: Yes.

CHAIR: Am I reading it correctly? It is an increase, but a decline in the recent decade or so. Is that it?

Mr LELLYETT: There was an increase around the mid-1900s and from there there was some oscillation but a gradual decrease, and, at the end of the period, a more rapid decrease, which I will talk about a bit more later.

CHAIR: Thank you.

Mr LELLYETT: This is a station with a longer time series where you can see the jump. So it is starting in 1921 and you go along to about 1946, 1947, 1948, and you see this rise. It is the same rise as in the statewide analysis. And then we see a gradual tapering off, with a good bit of noise in there, but a gradual tapering off and then a more severe tapering off towards the end. It is interesting to note that it has tapered off to about the same level as where it was in the early 1900s, much the same as what is shown in the New South Wales scale analysis.

Then we have a few stations around New South Wales which have very long periods of records going back to the 1800s. Sydney is one of them, but this cannot be taken necessarily as a proxy for the catchment area because it is in the Sydney Basin—a slightly different climatic regime—but the point to note is the characteristics of the trends, rather than the actual values. So you can see in the late 1800s there are generally some higher rainfall periods there dropping off towards 1900 or so, and then going along reasonably steadily, although Sydney is slightly going up, but then there is a sharp increase again around the mid-1900s and a similar kind of behaviour after that. So it is something that is being seen right across the State. You might ask yourself the question: If we had a rainfall regime in the early 1900s that was around about where we are at now, it is not a place where we have not been before, and if we reached that point before from the higher level, could it be some kind of a repetition?

Well, the problem we have is that we have only a fairly limited series of data to analyse and that is where the difficulty lies—in having enough data to be confident about what those trends are telling us. On top of it we have these other things going on with climate change and so forth. But if we look at the last eight years of droughts, this diagram shows actually 1996 to 2003, but you will find a similar kind of a pattern if you look at, say, the last eight years up until now. There is a generalised drying trend with rainfall, cumulative rainfall totals that are in, say, the lowest 10 per cent or 20 to 30 per cent on record for a sustained period of time. In fact, over in Western Australia, we have seen that type of a trend for about 20 or 30 years. There has been extensive research going on over there.

The Hon. RICK COLLESS: Does that indicate an evening out of the rainfall across Australia, particularly if you look at the Western Australian situation? You have got that wet south-west corner drying out and you have got the dry inland becoming more moist.

Mr LELLYETT: I am not sure that that is the correct analysis of what is happening. We believe that there has been a predominance of high pressure systems sitting themselves over south-eastern Australia in the last eight or 10 years but we are not sure yet exactly what the mechanism is. There are some theories that could be partially greenhouse, partially ozone and partially natural variability with a contraction of the circumpolar vortex, drawing systems in towards the poles. But that is a topic of research and it is ongoing at the moment. Research is ongoing to try to understand why these patterns are the way they are, but it certainly raises the question: Could these be the initial signals of climate change? That is the question that we have to try to answer.

There have been some other unusual phenomena in the last 10 years or so. There have been a few El Niños in close succession, which typically bring drought to eastern Australia, and we have also seen probably the eight or nine hottest years on record. We can analyse that trend. You see about a 20 per cent decline in early winter. Actually it turns out that it is spring so that is slightly incorrect. These are the conclusions, though, that I have drawn out. It is possible that we may be returning to a rainfall regime similar to the early 1900s, but combined with increasing temperatures, the effectiveness of the rainfall has been diminished.

I will talk a little bit about that in a moment. There is not exactly a direct connection. The strong decline in south-east Australian rainfall over the last, say eight to 10 years, might be part of a more significant long-term decline but further research is required to understand it. The other point is how do catchments respond to rainfall, and it is something that these analyses do not tell you. One aspect might be the recharging of dam storage levels; it could be more sensitive to the number and magnitude of heavy storms. So, for example, what I am trying to say is you could have a normal year of rainfall but within that year all the events might be relatively moderate, and if they are only moderate the soil will absorb a certain amount of moisture and then the remainder runs off. But if you have, even in a relatively dry year, a very severe event—lots of rainfall—the initial part of it would be absorbed into the soil where all the rest would run into the catchment, and so would make a difference to the level. I am not sure what research has been done in that area but I feel it is probably an area that needs to be looked at in the context of—

The Hon. RICK COLLESS: On those average figures that you showed us for the long-term average weather rainfall that appeared to be increasing from the fifties and so on, is there any data in there that indicates rainfall intensities and changes in rainfall intensities?

Mr LELLYETT: No, but I have something to show you on that. You have got two lines here. The green line is the 95th percentile, so it is the 95th per cent highest; there is only 5 per cent higher than that. The other one is the 99th percentile of rainfall. The first one is the number of days on which those types of rain that fall into those categories have occurred. You can see this has not been rigorously analysed statistically, but just eyeballing it you can see a linear line which indicates it appears to be declining in both cases. It is only a minor decline but nevertheless it is a decline and it is a little bit strange because in a sense it is slightly inconsistent with the global trends that we have tried to identify with climate change that go towards more periods of intense rainfall and more intense rainfall, and we are seeing a slightly different trend here.

So the top one is the number of occurrences, effectively—or frequency—and this is the actual mean intensity of those events. Again, you can see that they have been coming down. This is also something we need to do more to understand what is causing it. It is at the New South Wales scale. I do not know if somebody else has but we have not done any specific research on this aspect for, let us say, Warragamba or any of the Sydney catchments specifically. Some other area could be looked into.

I spoke briefly about the response of catchments. This graph here is from the Sydney Catchment Authority web site and it shows the storage levels in Warragamba for the time periods about July 1998 through to roughly the current time—I think it is in January, or so, 2006—and what we have superimposed here, we went through the records and looked at these periods where there have been declines to see if we could find any trend in rainfall. What we find is, this particular period was 60 to 80 per cent of average rainfall; the next one was between 40 and 80 per cent of average; this one here is between 20 and 40 per cent and this one here is between 65 and 80 per cent. You might think, "Why can't you just have one figure?" It is because those figures have been taken from a range

of individual stations rather than an aerially averaged value, which would really be the best way to do it but in the time I had available this is—

The Hon. RICK COLLESS: And in those periods where the storages were rising, how much above the average were those?

Mr LELLYETT: I have not had a chance to look at it yet in the time frame, unfortunately. If I had more time it would have been the obvious thing to have a look at. I was forwarded some information from Sydney Catchment Authority that I believe they distribute. They talk about various target values for alerts on the catchment and so forth, and one of the values they talk about is catchment average to fill Warragamba Dam. The figure is 250 millimetres in 24 hours or, alternatively, 135 millimetres per day for two days consecutively. If you take the 250 millimetres in 24 hours, that is much, much rarer than a 1 per cent event; it is much, much rarer than a one-in-100 year event. That is some serious rainfall.

The Hon. PATRICIA FORSYTHE: In the eighties we had two one-in-100 years rain events, as I recall, within about a year or so of each other. Do you know how much rain fell at that time?

Mr LELLYETT: I do not know, but I could find out for you.

The Hon. PATRICIA FORSYTHE: I think Easter 1988 was one of them.

Ms SYLVIA HALE: 1989 was very rainy too.

The Hon. PATRICIA FORSYTHE: And I think a little bit later.

Ms SYLVIA HALE: I take it from those figures, if you look at your first inverted dunce's cap, or whatever, October 1998 to September 1999 were actually getting 60 to 80 per cent of average and we are getting roughly the same in February 2004 and 2005, but one shows the storages as very high and the fourth one, the one on the right, shows the storages as very low. That would support your analysis of the type of rainfall event that you experienced, the impact of the type of rainfall event, whereas you were saying if you got consistent rain you got less run-off. So could one assume that that is the case in relation to February 2004 to July 2005 whereas between October 1998 and September 1999 we might have had a number of intermittent but very heavy falls? Can you draw that conclusion?

Mr LELLYETT: I cannot really draw that conclusion from the data as it stands. With more analysis you could probably draw that out. The kind of point you are making is what I was trying to draw your attention to, even though I do not have the actual final analysis of it. Just to say a couple of words about evaporation: analysis of evaporation is quite difficult; it is probably the most variable parameter that we have got as it is hard to measure. Nevertheless, we have made a preliminary go at analysing some historic evaporation data on this particular map here. It shows the trend in annual evaporation from 1970 to 2004. The green values are diminishing and the redder values are increasing evaporation. So you can see there is a general trend here towards a diminishing amount of evaporation. However, at the same time, the amounts are relatively small.

If you look at the scale, they are only in the first few colour codes of the scale, maybe down to, say, minus 10 or minus 15. To put that in context, over here you have got an evaporation change of 8 millimetres out of 2,500, so it is a really tiny amount.

The Hon. RICK COLLESS: You are talking in millimetres of evaporation per year?

Mr LELLYETT: Yes, correct.

The Hon. RICK COLLESS: Two thousand and a saving of 10, basically?

Mr LELLYETT: That is correct. So it is relatively small compared to the total. I made the comment before that if we had hotter droughts or hotter conditions as time goes by, which looks likely with the climate change, that that is also going to have an impact of exacerbating any rainfall deficiencies we might have, or lessening the effectiveness. You can see here that the effect through

evaporation is relatively small, but I believe there are probably other aspects such as plant physiology which would be affected where plants when they reach a certain threshold temperature cannot function properly anymore; so there is a greater demand there for more water. It will lessen the effectiveness of the rainfall even though it is not directly through evaporation.

I am not sure if you are familiar with these pieces of work on the next graph. If you are familiar with them I do not need to say too much except to say that the bureau is involved in those to the extent that it can be, but they are at national scale and I think they are probably good for serving their purpose for that scale, but the question is how applicable might we find them for doing the kind of work that you want to do in looking specifically at Sydney catchments?

Some other research, and this is by no means comprehensive—I am sure you have seen much more than this—the bureau in Melbourne is going to have a look at probable maximum precipitation changes under climate change. That does not directly affect the planning catchments, but it affects its design. So insofar as it affects design, it is applicable, it is generally similar. In New South Wales here we have locally been trying to have a look at this change in the mid-1900s and trying to understand that better, but I believe there might be some scope within this project at the bottom of the South-east Australian Climate Initiative to have a closer look at that. It is probably within the terms of reference, although I am not sure if it is funded for doing that specific work or not. That is one thing that would be very good, to either get into that project or have some other project.

Changes in Intensity of Rainfall under Climate Change over the Sydney catchment area: there is a study that is under way. I am not sure if you are aware of that. That has been commissioned by the various water authorities in the greater Sydney area and the greenhouse office is involved there to and have basically commissioned the CSIRO to do the work. They are looking at changes in the frequency and behaviour of extreme events under climate change. The work is very good, but the way it has been done probably is not going to shed light on the question of what happened in the fifties and it probably will not take account of those trends that we saw, unless, of course, they have a further look at that. Nevertheless, it is still of relevance.

I just wanted to make a comment here about the data. Data is always sort of the enemy to making good analyses and one of the problems we face is we have to try and homogenise the data and take out anything that is not caused by natural causes: changes in practices; changes in location, and so forth, of observing sites. We can make corrections for those types of things and that is what we have done to try and produce high-quality data sets, but it is a very long process; it takes resources to do it well, but with time it is on our agenda to try and develop those and to improve the information that we have got. In the longer run we would like to try and develop a gridded set of data down to five kilometres that is suitable for climate change type of analysis, but it remains to be seen how effectively that can be done, given the information that there is to go on. We are certainly trying to work towards that.

In this "Outline" slide are a few thoughts. I mentioned before the work in Western Australia looking at the decline of rainfall over there in the last 20 or 30 years. They put together the Indian Ocean Climate Initiative specifically to tackle that problem. I do not believe it was focused specifically on catchments and catchment management, but nevertheless it has some spin-offs for that, and relevance to it. These are some of the things that hopefully the research community should be focusing on in the coming period, to try to understand this change in the mid-1990s, better understand the variability overall in long-term cycles, understanding those changes that we have seen in the last 8 to 10 years of more rapid decline in rainfall, and looking at how dependent dam inflows are upon intense rainfall or otherwise. I do not think there is anything in the "Concluding Remarks" slide that I have not already said, so I will be happy to take any questions that you might have.

CHAIR: Is there any truth in, or do you have any information about, suggestions that rainfall over the catchment is declining and tending to be more over the city of Sydney? Is there any way that that can be proven, or have you seen any trends to support that suggestion, because it has been said a number of times in submissions and evidence to the Committee, in part, it is said, because of an expanding urban area, heat impacts and such like attracting more rainfall over the Sydney basin?

Mr LELLYETT: I could not say with certainty. I would need to look at research before I could make any comment.

The Hon. RICK COLLESS: Mr Lellyett, thank you very much for that presentation. I found it extremely interesting. Though you say that the strong decline over the last eight years may be part of a more significant, longer-term decline, at this point in time could it not also be due to variability in the records?

Mr LELLYETT: Are you saying it could be part of natural variability in the system?

The Hon. RICK COLLESS: Yes.

Mr LELLYETT: Well, there is a chance that it could be, although it is quite unusual. I think we really do need to go back and do the analysis to satisfy ourselves as to whether it is or not.

The Hon. RICK COLLESS: If the trend line for the last eight years that you showed continues, then it is very serious obviously, isn't it, because it is very steep?

Mr LELLYETT: Absolutely. I would be saying that we could be returning to a regime like that of the early 1900s, and we should be planning to deal with anything that is more than that. But it could be something less than that, given the trend in the last years, and given the fact that climate change is going on and we are still uncertain what the impacts will be on a regional scale, even though in the global scale there is certainty with temperature. But, with rainfall, and on a regional scale, at this point of time the uncertainties are really quite great.

The Hon. RICK COLLESS: In relation to variability, looking at the set of figures you showed us between 1900 and 1950, and how that had changed from 1950 to 2000, would you classify that as being climate change or variability? Did we have a climatic change to move into a wetter 50-year period? Our records probably do not go back long enough to determine what we are looking at, whether it is climate change or variability, do they?

Mr LELLYETT: As I say, we do not really understand it. I do not think we can say at this point in time. That is why it has got to be a topic for more research.

The Hon. RICK COLLESS: Have you looked at rainfall figures in other parts of the world and how they relate to temperature changes? I do not suppose there were very good records held anywhere in the world prior to 1900.

Mr LELLYETT: We even see differences in other parts of the country. I showed only a limited amount of information here, for the sake of time. But, if you look at the time series across the different States of Australia, you can see there is not a high degree of coherence between them as there would be in say temperature. It looks like it is a south-east Australian type of phenomenon, and certainly in New South Wales we have noticed it pretty much across the board.

CHAIR: And not in south-west Australia?

Mr LELLYETT: South-west Australia is a completely different kettle of fish. If you look at the south-west of Western Australia—if that is where you are talking about, around Perth—

CHAIR: Yes.

Mr LELLYETT: —there has been a relatively steady decline for 30 years there. I guess it took that long for them to get onto it. They have probably had a project going for close on five years now. But that is obviously different from ours and what we have seen in the last 7, 8 or 10 years. They have been going for much longer.

The Hon. RICK COLLESS: What have been the changes in sea-surface temperatures in that time?

Mr LELLYETT: I do have that.

CHAIR: You just happen to have it in your back pocket!

Mr LELLYETT: I have it in slides that were not part of the presentation. In this slide, "Sea-surface temperature trends", you can see we have got a similar thing. From 1900 to 2005 we see a trend of warming, and then we see a more rapid trend of warming in the last 55 years of that time series.

The Hon. RICK COLLESS: Can we draw from the high temperature trends and also the sea-surface temperature increases a conclusion that there is going to be more moisture held in the air? I mean, warmer air will hold more moisture, will it not, in terms of the total amount of water that it holds?

Mr LELLYETT: It is probably a difficult call, because there are many feedbacks.

The Hon. RICK COLLESS: And the nights have been warmer as well.

Mr LELLYETT: Yes, the nights have been warmer. In fact, I think the night temperatures have been increasing at a greater rate than have daytime temperatures.

The Hon. RICK COLLESS: What I am driving at here is: Is it likely that increased air temperature and increased sea temperatures will result in more moisture being in the atmosphere, in terms of total volume of moisture held in the atmosphere?

Mr LELLYETT: Yes. But whether that falls as rainfall, or whether it falls over the places that you would want to, is another question. You see that type of trend in the tropics. It is a warmer climate, you have got warmer oceans, and generally speaking it is more humid; you have got much more moisture.

CHAIR: But that may not translate to the southern part of New South Wales, for example?

Mr LELLYETT: Well, there are many other physical mechanisms in operation. I guess you are pointing towards saying that if there is more moisture in the air, then maybe you could get more rainfall.

The Hon. RICK COLLESS: Well, yes. The other thing that stimulated my thought processes in this is the lower, albeit very small, decreases in pan evaporation, as I guess you are talking about in those figures, which might indicate a higher level of cloud cover.

Mr LELLYETT: That could come into it.

Ms SYLVIA HALE: Or is there a connection between air movements—winds and whatever—and evaporation, because you talked about it solely in terms of heat?

Mr LELLYETT: There are quite a few variables that enter into the question—and temperature is only one, and a relatively small, component. Wind is another. Radiation is another. There are a whole lot of things that intertwine to generate rainfall or to create evaporation. It is a non-linear system with all sorts of aspects. That is why I am having trouble giving you a direct answer to your questions.

The Hon. RICK COLLESS: I appreciate how candid you have been, because this very much a discussion, rather than a lecture. I appreciate the opportunity to discuss it with you.

CHAIR: You speak about declining overall rainfall in New South Wales, but you are more or less taking averages right across the State as an artifice to create the question, "Well, what has New South Wales got?" If you look at systems say in the north of New South Wales, those are more connected climatically to south-east Queensland and sub-tropical circumstances. Could the figures you are quoting not be somewhat skewed by the fact that there is talk of greater storm activity in the sub-tropical areas, and therefore in terms of measuring on a State basis it is actually skewing the figures, and it may be worse than we think in terms of lack of rain in areas like the Sydney catchment and other areas that would be relatively drier? Is that a fair call?

Mr LELLYETT: I understand your point. It is true that if you average things out over the State, you lose some of the information. So some parts will be higher, and some parts will be lower, to generate an average. That is one of the reasons that this work was focused at a district level, so that you could see some of that variation across the State. If you want to look at the catchment, you need to go down again in scale, because there are going to be variations at that level as well. That is one of the problems with analysing data. I mean, you get to a point where perhaps you are trying to analyse an area that is so small you do not have enough data to be representative. But we do have a few stations in the catchment, and I think it would be useful to see what we can generate in terms of catchment average rainfalls.

The Hon. RICK COLLESS: Do you think there is a possibility that we could look at technology such as cloud seeding to increase rainfall in particular catchments, and will that be more feasible if there is more moisture being carried by the air?

Mr LELLYETT: Yes, definitely, if there is more moisture in the air. You cannot produce rainfall if there is no moisture. That is the first thing to say. Studies that were done in the Snowy, I think in the 70s, proved relatively inconclusive about the effectiveness of cloud seeding. It is very difficult to verify the results after the event. So, if you fire off some cloud-seeding particles, and you get rainfall, how do you know that rain would not have fallen anyway even if you had not done the cloud seeding? So, it is very difficult to verify whether cloud seeding is effective or not. That is one of the things contributing to the inconclusiveness of the data that we have seen so far on cloud seeding.

CHAIR: Have you been privy to the recent cloud-seeding experiments that the Government has undertaken?

Mr LELLYETT: Not directly.

Ms SYLVIA HALE: Is anyone in the bureau monitoring the effects of that experimentation?

Mr LELLYETT: I believe there is somebody within the bureau who is connected with that. They are certainly not managers of a project; they have more of a peripheral role, I guess. If you would like some information, I can find out what is available.

The Hon. RICK COLLESS: That would be good, if you could do that.

CHAIR: We are running out of time, so perhaps we have time for a quick question each. Can you say that climate change in the catchment will have an impact on Sydney's water supply?

Mr LELLYETT: I guess in the most general of terms you would have to say if there is going to be climate change there would probably be some impact. The problem is in quantifying it with certainty. That is where the difficulty lies. At the moment, the climate models are relatively instructive at the global level. But, when you come down to regional level and, if you like, to sub-regional level, down to the level of a catchment, the uncertainties involved in the outcomes are very high. In terms of rainfall, they might vary from above average to below average and anywhere in between depending on the scenario. There is a way to go yet before we can say with certainty what is happening at the local scale.

The Hon. RICK COLLESS: The question following on, of course, is what happens to the rainfall intensities. If the rainfall intensity were decreasing in the catchment areas, we would certainly get a lower coefficient runoff and therefore lower yields from the catchment. That might not apply to the same extent with urban runoff, because of the greater area of paved surfaces and the impact on rainfall intensities would not be as great. If that is going to be the reality, should the Government not be looking at harvesting urban stormwater as a realistic option for supplementing catchment flows?

Mr LELLYETT: That is beyond my expertise.

The Hon. RICK COLLESS: Can you comment on the impact of lower rainfall intensities in the catchments?

Mr LELLYETT: That is only a preliminary analysis that I have shown. We need to do more research to understand why it is happening and whether it is likely to be an ongoing trend or simply part of the natural variability of the system. It must make a difference, but it is not as simple even as the diagram I have shown, which shows individual events. To make a difference to the catchment, we may need rainfall sustained over several days to wet the ground before we get a more intense event that is really effective. Or perhaps there is a great event in one go that makes a big difference. It needs analysis, not only for individual events but also for consecutive events; that is, consecutive rainfall building up to a big one and so on. It is really difficult to say how much that would impact on the effectiveness because of those types of issues.

CHAIR: We are out of time. Thank you very much.

Mr LELLYETT: I hope it is helpful.

CHAIR: It is very helpful. We hear so many rumours about imagined impacts of climate change. Thank you very much for your time today. It is much appreciated.

Mr LELLYETT: Thank you for the opportunity.

(The witness withdrew)

(The Committee adjourned at 5.05 p.m.)